VIRGINIA DEPARTMENT OF EDUCATION

Division of Special Education Instructional Services

Virginia Alternate Assessment Program (VAAP)

Instructional Manual:

A Teaching Resource
The Aligned Standards of Learning

September 2005

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FOUNDATION FOR VIRGINIA ALTERNATE ASSESSMENT PROGRAM

Purpose and Philosophy

The purpose of the Virginia Alternate Assessment Program (VAAP) is to evaluate the performance of students who have traditionally been exempted from state assessment programs. Amendments to the Individuals with Disabilities Education Act (IDEA 1997) reflect the intent to extend educational accountability and reform to all students, including those with disabilities. Although these students represent a relatively small portion of the overall school population, the Virginia Alternate Assessment Program was developed with the belief that these students are a part of our accountability system and that the evaluation of their achievement represents an important component of our quest toward high standards.

The Virginia Alternate Assessment Program was developed using the following statements as guiding principles:

1. Students participating in the alternate assessment must be provided instruction and show progress in the general education curriculum based on Aligned Standards of Learning to improve quality of life and prepare students for employment and independent living.

2. Decisions about participation in the Virginia Alternate Assessment Program are made collaboratively by the IEP team for each individual student. Decisions about participation are not based on disability category or student placement.

3. Student performance in a variety of settings with social interactions and in a natural context will be based on general education and multiple sources of data.

4. Assessment must yield reliable and valid indicators reflecting improved instruction and student learning.

5. The Virginia Alternate Assessment Program will follow nondiscriminatory practices and will be sensitive to issues of cultural competence.

6. Although the alternate assessment measures student progress and performance based on Aligned Standards of Learning, this should not limit instruction in areas not assessed.

7. The Virginia Alternate Assessment Program will be parallel to the state and district-wide assessment to the greatest extent possible.

8. Individual schools, school divisions, and the state will be accountable and have high expectations for all students.

Learner Characteristics

Students who participate in the Virginia Alternate Assessment Program (VAAP) represent a very diverse group of learners. While these students share some common learning challenges, each has unique skills, preferences, and experiences that he/she brings to the learning environment. As a field, we recognize the importance of educational teams making deliberate and thoughtful decisions about whether a student meets the participation guidelines for the VAAP and, if so, how each student will receive instruction in a way that provides access to and progress in the general education curriculum. IEP teams are charged with developing a comprehensive program that addresses the full range of learning needs of this group of students that prepares them for generalization of skills to a variety of post-school environments.

These responsibilities require team members to plan and deliver instruction using proven, research-based techniques that result in positive student outcomes. Effective instruction is based on a clear understanding of learner needs and characteristics. The following list represents a number of documented characteristics of students who meet the participation guidelines for VAAP.

Students who participate in alternate assessment may exhibit some or all of the following characteristics:

- Communication difficulties that affect self-determination, behavior, social interactions, and participation in multiple learning environments.
- Uneven learning patterns in all domains including cognition, communication, socialization, and self-help.
- Other disabling conditions, including physical disabilities, sensory challenges, and medical needs, that impact health, stamina, and engagement in learning tasks.
- Motor impairments that make participation in routine tasks challenging.
- Difficulty learning new tasks, maintaining new skills, and generalizing skills to new environments.
- Individualized methods of accessing information (tactile, visual, auditory, multi-sensory).
- Requirements for extensive and long-term supports to access the general curriculum, participate in multiple learning environments, and live, work, and play in the community.

Educational Implications

Best practices have evolved in this field as strategies to address the learner characteristics outlined above (Orelove, Sobsey, & Silberman, 2004). Again, each child has very individualized needs, but general themes for instruction include:

- Development of a personalized curriculum (Knowlton, 1998) that provides instruction in the general curriculum and a sequence to instruction to insure positive post-school outcomes.
- Prioritization of skills with strong family and student input.
- Emphasis on active student involvement and engagement, with supports provided as necessary to facilitate participation.
- Collaborative teaming between and among family members, special educators, general educators, related service providers and other team members, as appropriate.
- Heavy focus on transition from grade to grade, school to school, and, most importantly, school to work.
- Delivery of systematic instruction that teaches meaningful, age-appropriate skills and relies on student performance data to monitor gains and progress towards goals.
- Emphasis on communication development with choice-making and self-determination deliberately taught.

Implementation and Theory of Learning

Snell and Browder (2000) encourage educational teams to tailor instruction to fit the student's current stage of learning for a particular skill. Understanding the student's skill level will help us set appropriate expectations and guide decision making about the use of prompting and reinforcement strategies. The following is a brief description of each stage with basic implications for instruction.

***Acquisition*:** Student is learning the skill and is achieving at 60% or less on the steps of the task. When learning a new skill, all of us require more support and assistance. During this stage, the teacher is careful to provide enough prompting to reduce errors and encourage successive approximations. The teaching strategies should be outlined and consistent across instructors with plenty of practice provided so that the student can become more comfortable with the task. Feedback during this stage of learning needs to be frequent and specific.

Maintenance: Student is provided regular opportunities to use the skill, thus reducing the likelihood that the skill might be forgotten. The teacher is beginning to reduce the level of prompting and feedback. The student is encouraged to look for and rely on natural cues in the environment.

***Fluency*:** Student accuracy has exceeded 60%, and the focus of instruction is increasing speed and/or quality of performance. While the student's accuracy on the steps of the task may not be at criterion, the student is no longer a "beginner" with this skill. Again, instruction focuses on increasing the student's level of independence, reliance on natural cues and reinforcers, and self-monitoring.

Generalization: Student is expected to use the skill at the appropriate time and place and to engage in problem solving related to the task. At this stage of learning, performance should not be impeded by changes in instructors, settings, or materials. Students will need to be systematically exposed to a variety of changes in the task so that they can practice appropriate responses.

Case study demonstrating stages of learning:

Using Aligned Math Standard: **M-NS2 a,b**

The student given a set of ten or fewer objects will: a) tell how many are in the set by counting orally; b) select the corresponding numeral from a given set.

Natascha is a teenager who has Down syndrome and dual sensory impairments. Natascha attends her local high school where she is learning the use of critical math skills to make purchases in her community. Natascha has difficulty with expressive communication and relies on a combination of verbalizations, signs, and a communication booklet with pictures to express wants and needs. After evaluating Natascha's current math skills, the team decided that counting with 1:1 correspondence is a high priority academic skill. Shopping activities provides a functional context and are highly motivating. The team also decided that Natascha would practice 1:1 counting within the context of using a "next dollar up" strategy to pay for items at the store. For example, if the item to be purchased is $3.50, Natascha rote counts to the next dollar ($4.00) and then uses 1:1 correspondence to count the bills that are needed to be given to the cashier. During the acquisition, or beginning stage of learning, Natascha required frequent practice of the skill, close proximity to the teacher, consistent prompts and specific feedback. As Natascha began to develop more fluency (and maintaining the skill because of regular opportunities to practice), the instructor began to move away Natascha during the activity and encouraged Natascha to look to the cashier for directions and assistance with the task. Various cashiers were provided information about ways to encourage Natascha to use her booklet when they did not understand her clearly. Generalization occurred as Natascha was provided opportunities to practice these skills in multiple stores where the requirements were slightly different. Staff gradually introduced rote counting and 1:1 counting to 10, adjusting prompts and feedback as required. It was clear that Natascha had learned the problem-solving component when she reached into her pocket to pull out a debit card because she did not have enough cash to the do the "next dollar up" strategy.

References and Resources:

Browder, D. M. (2001). *Curriculum and assessment for students with moderate and severe disabilities*. New York: Guildford Publications.

Kleinert, H.L, & Kearns, J. (2001). *Alternate assessment*: *Measuring outcomes and support for students with disabilities.* Baltimore: Paul H. Brookes Publishing

Knowlton, E. (1998). Considerations in the design of a personalized curriculum for students with developmental disabilities. *Education and Training in Mental Retardation and Developmental Disabilities*, 33, 95-107.

Orelove, F.P. Sobsey, D., & Silberman, R.K. (2004). *Educating children with multiple disabilities: A collaborative approach* (4th ed..). Baltimore: Paul H. Brookes Publishing Co.

Snell, M.E., & Brown, F. (2000). Development and implementation of education programs. In M.E. Snell, & Brown (Eds.), *Instruction of students with severe disabilities* (5th ed., pp. 115-172). Upper Saddle River, NJ: Merrill Prentice-Hall.

Guidelines for Participation
Virginia Alternate Assessment Program (VAAP)

Student Name _____ **Date of Birth** _____

School/Division _____ **Date** _____

A completed alternate assessment shall be submitted for students participating in the Virginia Alternate Assessment Program (VAAP) at the elementary, middle, and high school levels. Alternate assessments shall be completed as follows:

Grades 3, 5, 8 and 11	**Reading, Math, Science, History/Social Science**
Grades 4, 6, 7	**Reading and Math**
NOTE: If your school division has a content specific History/Social Science exam during a certain year (Check with your Division Director of Testing) you must have a corresponding VAAP collection that year for Social Science/History	

Directions:

The IEP team determines participation in the alternate assessment. Team members must consider current and historical documentation (to be noted on page 2 of this form). Documentation may include, but is not limited to, evaluation data, school records, parent/teacher observations, anecdotal notes, previous IEPs, etc. The following reasons **alone are not sufficient** for decision-making:

- Poor attendance;
- English as a Second Language;
- Social, cultural, and economic differences;
- Disruptive behavior;
- Student's reading level;
- Expectations of poor performance;
- Amount of time receiving special education services;
- Low achievement in general education;
- Categorical disabilities labels;
- Place where the student receives services.

The IEP Team has the responsibility to determine and document that the student meets **ALL** of the following criteria by circling "yes" for each of the statements. If team members determine that the student **DOES NOT MEET** a specific criterion, "no" should be circled. This indicates the student is not a candidate for alternate assessment and participation in a different option in the State Standards of Learning Assessment System.

Guidelines for Participation
Virginia Alternate Assessment Program (VAAP)

(Complete for all students considered for the VAAP)
IEP Team Must Answer ALL the Following Questions

(Circle One)

Y	**N**	1. The student has a current IEP or one is being developed.

(Circle One)

Y	**N**	2. The student demonstrates **significant cognitive disabilities**. *Sources of information: (Learner Characteristics, psychological evaluation, achievement tests, social adaptive behavior test results, observations from parents and teachers, social maturity data, curricular content, etc.)*

(Circle One)

Y	**N**	3. The student's present level of performance indicates the need for extensive, direct instruction and/or intervention in a curriculum framework based on **Aligned Standards of Learning**. The present level of performance or student evaluation may also include personal management, recreation and leisure, school and community, vocational, communication, social competence and/or motor skills. *Sources of information: (Informal and formal assessment results, checklists, data log, work samples, structured or spontaneous observations from teachers and parents, measurable IEP goals, scheduling matrix, curricular content, list of necessary supports.)*

(Circle One)

Y	**N**	4. The student requires intensive, frequent, and individualized instruction in a variety of settings to show active interaction and achievement. *Sources of information: (Measurable IEP goals, scheduling matrix, instructional strategies effectiveness data, list of various inclusive settings, learning style inventory, etc.)*

(Circle One)

Y	**N**	The student is working toward educational goals other than those prescribed for a Modified Standard, Standard or Advanced Studies Diploma. *Sources of information: (list of diploma options and requirements, curricular content, measurable IEP goals, transition plan, parent and student discussion, etc.)*

(Complete for students who meet the criteria listed above)

The IEP team members agree that _____ meets the participation criteria stated above for the VAAP for the _____ school year and will not participate in any other statewide assessment. This participation decision will be stated on the IEP and is supported by the current and historical data found on the following documents:

Supporting Documentation:

Position/Representing	Signature	Date

Virginia Alternate Assessment Program Acknowledgments

We wish to express our gratitude to the following individuals for their contributions in the redesign process as well as assisting in the development of the VAAP instructional manual.

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VIRGINIA ALTERNATE ASSESSMENT PROGRAM
STUDENT PROFILE

STUDENT:			
GRADE:		**TEACHER:**	

STUDENT STRENGTHS

COMMUNICATION

1) How does the student currently communicate information: such as requests, protests, understanding of directions, preference, etc.?
2) What are the top priorities for instruction related to communication?

ACADEMICS

1) In what ways has the student been exposed to basic literacy and numeracy activities: such as listening to a book, identifying symbols, early counting skills, time-telling, and money skills, etc.?
2) In what ways has previous instruction targeted early academic skills?
3) What are the student's current skills in reading and math?

4) What are the student's preferences for materials, places, and people?

STUDENT NEEDS

SENSORY/MEDICAL

1) Does the student have any vision, hearing, motor or other health impairments?
Vision:
Hearing:
Motor:
Health/medical factors that may impact instruction:

2) Based on information from above, what are adaptations/modifications that might be needed for that student to access information for instruction?

SUPPORTS

1) What types of environmental supports (lighting, seating, etc.) work well for this student?"
2) What type of instructional supports/modifications work well for this student?
3) Does the student utilize or need any assistive technology (both low tech and high tech)?

VAAP Instructional Priorities Planning Sheet

Student: _____ **Grade:** _____

Name of Person:_____ **Position/Role:** _____

Directions: Review the following Aligned Standards of Learning academic subject areas. For EACH subject area select the top instructional priorities for the target student throughout the school year. Use the present level of performance as well as other documents to determine what is appropriate for each individual student.

English: Reading

(Review Aligned Standards of Learning Reading Scope and Sequence, Aligned Standards of Learning Reading Curriculum Framework)

From the following list, pick one or more of the topic areas that will serve as instructional priorities:

Organizing Topics:

- ❑ Letters and Sounds
- ❑ Concept of Print
- ❑ Decoding and Spelling
- ❑ Word Analysis
- ❑ Fluency
- ❑ Vocabulary and Comprehension

Potential Standards to be taught:_____

_____

Mathematics

(Review Aligned Standards of Learning Math Scope and Sequence, Aligned Standards of Learning Math Curriculum Framework)

From the following list, pick one or more of the topic areas that will serve as instructional priorities:

Organizing Topics:

- ❑ Whole Numbers
- ❑ Decimals
- ❑ Fractions
- ❑ Fraction Operations & Estimation
- ❑ Measurement: Money, Length Weight/Mass, Volume, Temperature Time, Perimeter, Area, Volume Circumference
- ❑ Geometry
- ❑ Statistics
- ❑ Probability
- ❑ Patterns and Functions
- ❑ Algebra

Potential Standards to be taught:_____

_____

Science

(Review Aligned Standards of Learning Science Curriculum Framework)

From the following list, pick one or more of the strands that will serve as instructional priorities:

Strands:

- ❑ Scientific Reasoning Investigation and Logic
- ❑ Force, Motion, and Energy
- ❑ Matter
- ❑ Life Processes
- ❑ Living Systems
- ❑ Interrelationships in Earth/Space Systems
- ❑ Earth Patterns, Cycles, and Change
- ❑ Resources
- ❑ Life Science
- ❑ Earth Science

Potential Standards to be taught:_____

_____

History/Social Science

(Review Aligned Standards of Learning History/Social Science Curriculum Framework)

From the following list, pick one or more of the strands that will serve as instructional priorities:

Strands:

- ❑ History
- ❑ Civics
- ❑ Economics
- ❑ Geography

Potential Standards to be taught:_____

_____

Functional Skills

Directions: Please list the functional skills under each of the following areas that reflect the top instructional priorities for the target student throughout the school year. Fill in any skill areas that are appropriate for the student.

Communication Skills

1. _____
2. _____
3. _____

Social Skills

4. _____
5. _____
6. _____

Behavior Skills/Positive Behavior Supports

7. _____
8. _____
9. _____
10. _____

Self-Determination Skills

11. _____
12. _____
13. _____

Vocational Skills

14. _____
15. _____
16. _____

Communication

"Communication is the key to learning, for much of what we learn depends on interactions with others. Communication is an essential skill that for many individuals with severe disabilities can be very difficult. Even expressing very basic needs can require significant effort for an individual who must overcome physical, sensory, and intellectual disabilities to do so. Educators must help all individuals communicate by providing appropriate motivation, keeping expectations high, and letting those with disabilities realize that what they have to say is valued." (Downing, 1999)

WHY IS COMMUNICATION IMPORTANT?

- So that individuals can communicate and get their wants and needs met
- So that individuals understand what is happening to and around them, can question if they don't understand, and have choice and control throughout their days
- So that all individuals have a rich and enjoyable social life
- So that individuals can demonstrate understanding of instructional concepts

BASIC BELIEF STATEMENTS:

- To be human is to communicate
- It is impossible to NOT communicate
- The only prerequisite to communication instruction is BREATHING
- Behavior = Communication
- Good communication instruction is strength-based and builds on current skills
- Identifying the student's deficits is the EASY and often least helpful part of the puzzle
- The most important part of teaching communication is learning to be an astute observer

BASIC COMMUNICATION

RECEPTIVE COMMUNICATION

- Is the process of receiving and understanding a message
- Includes any behaviors that indicate a understanding of what was directed to a communication partner

EXPRESSIVE COMMUNICATION

- Is how one conveys a message or signals to a communication partner
- Is typically accomplished through behaviors that include writing, speaking, signing, body language, facial expression and gesturing. These behaviors are often demonstrated in combination to communicate effectively.

"A majority of students with significant cognitive disabilities have limited ways of expressing themselves or understanding the world around them. They do not use or understand symbols and the rules of language. Instead, they rely on their own bodies and current contexts to communicate." (Snell, 2000)

NONSYMBOLIC COMMUNICATION

- Is how we communicate with our bodies in relationship to current context
- May include: facial expressions, body movement, eye gaze, and gesturing
- May be referred to as pre-linguistic, pre-language, and nonverbal

It is critical that educators learn to be astute observers to determine the forms and functions of their student's communication.

SYMBOLIC COMMUNICATION

- Establishes a 1-to-1 relationship between the symbol and the object/person/activity
- Is when each symbol stands for or refers to the real thing. An example is the written letters of the word dog refer to a real dog
- May include: written words, manual signs, systems with Braille, pictures, line drawings and speech words

FORM VS. FUNCTION

- **FORM** – The behavior a student uses to communicate
- **FUNCTION** – The purpose or intent of the communicative behavior

FORMS OF COMMUNICATION

(Sample forms of communication that a student might use)

Facial expressions

- Opens mouth to indicate "more" when asked "What do you want?"
- Smiles or grimaces
- Raises eyebrow to indicate disagreement with a peer's answer to a math problem

Vocalizations

- Cries to indicate displeasure that a peer is not in class that day
- Makes soft "u" sound when listening to favorite part of a story
- Makes loud "a" sound to signal peer to turn off a CD

Body movements

- After checking the calendar box, shakes limbs to indicate transitioning to favorite class
- Turns head away from math worksheet to indicate they are finished

Switch activation for physical control

- Touches yellow plate switch labeled with a picture and word symbol, to move a power point book to the next page
- Pulls strings on switch to turn on lights at the math center

Switch activation for social control

- Touches a switch with voice output recorded message "Come here, please" to get a peers' attention
- Activates a buzzing device to indicate correct answers on a social studies small group quiz

Touch Person

- Touches peer's shoulder during a science lab to indicate they need to start the next step of an experiment
- Touches peer's face to ask, "Will you be my partner?"

Manipulate person

- While showing the student three possible answers to a math problem using manipulatives, the student pulls the adult's hand toward the manipulatives representing the correct answer
- Pushes adult's hand toward picture on a graphic organizer to show the main character of a story

Touch object

- When presented with three objects, touches Indian headdress when asked, "What did Indians use to wear?"
- Touches the color of crayon to use next on an art project

Extend objects

- Extends paper to indicate he is finished with his test
- Extends picture of selected classmate to show preferred partner on activity

Simple gestures

- Waves "Hi"/ "Bye"
- Gestures "mine" by patting chest

Pointing

- Points to desired book when given a choice of two books for a reading lesson
- Points to Unifex cubes to indicate the need for manipulatives on a math problem

Two/Three choice communication systems

- Uses eye gaze to look at one of four objects attached to a plexiglass frame to use during a science experiment
- Touches one of three switches to pick desired peer to work with on a language arts project
- Activates one of two switches with attached objects representing gym class/art class to indicate which class is coming next in the schedule

Complex gestures

- Gestures, "Want" to choose a cooperative group with whom to work
- Shrugs shoulders to indicate, "I don't know"
- Shakes head, "No" or "Yes" to answer discussion questions in class

Object cues – representational objects

- Chooses and extends one of five small objects from his wheelchair tray that represent aspects of a novel to indicate an answer to a question about the book
- From a chart, the student pulls off the object that represents the next step in an activity to prompt his cooperative group members

Pictures, photographs and line drawings

- Out of two or more pictures, selects picture of pig to indicate the main character of fictional story
- When presented with line drawings of three different shapes, student points to line drawing of requested rectangle
- Student presents adult a picture of the math teacher from a chart of pictures, when asked what subject/class is next

Picture symbols/pictures systems

- Student uses picture symbols to fill in a graphic organizer to outline the sequence of events from a story
- Student uses picture symbols to follow a sequence of steps when working on a science experiment
- Student selects the appropriate Rhebus picture out of three choices that represents the correct answer on a comprehension test

Verbal – speech words

- Student reads sight word list
- Identifies peers to line up next by speaking their names

Sign Language

- Uses sign names to identify desired peers to work with on an English literature project
- Uses "help" sign to ask teacher for assistance on a math problem

Written words/numbers

- Writes name on the top of papers
- Writes the numbers 1-5 underneath the corresponding piles of manipulatives
- Writes own phone number on a job application

Systems with Braille

- Student labels all materials with own Brailled name to help find own books and notebooks
- Student is taught to find correct classrooms in the school by finding Braille label

References:

Downing, J.E. (1999). *Teaching Communication Skills to Students with Severe Disabilities*. Baltimore: Paul H. Brookes Publishing Co.

Beukelman, D.R.., Mirenda, P. (1998). *Augmentative and alternative communication: Management of severe communication disorders in children and adults* (2nd ed.). Baltimore: Paul H. Brookes Publishing Co.

Orelove, F.P., & Sobsey, D. (2004*). Education children with multiple disabilities: A collaborative approach* (4th ed.). Baltimore: Paul H. Brookes Publishing Co.

Snell, M. E., Brown, F. (2000). *Instruction of students with severe disabilities* (5th ed.). New York: Charles E. Merill

Communication Skills

Note: The following statements represent a list of communication skills and **DO NOT** represent a continuum or hierarchy.

Directions: Please select one of the skills listed below for each of the academic standards chosen across all content areas. You must teach the selected communication skill as it relates to the selected academic standard. You may use communication skills multiple times across academic standards.

Statements:

C1: The student will use gestures to respond to, support, accentuate and dramatize verbal messages.

C2: The student will use facial expressions to respond to, support, accentuate and dramatize verbal messages.

C3: The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C4: The student will contribute to group interactions across content areas, settings, situations and audiences.

C5: The student will follow basic rules for conversations including turn taking and listening to a speaker.

C6: The student will express wants and needs to others.

C7: The student will initiate communication.

C8: The student will engage in communicative exchanges (conversations) with peers and adults.

C9: The student will follow one-step or multi-step directions.

C10: The student will use voice level appropriate for a variety of settings and situations.

C11: The student will listen to and actively participate in a variety of language activities including choral speaking, rhymes, songs and stories with repeated patterns.

C12: The student will consistently respond to "Yes/No" questions across a variety of settings, situations and content areas.

C13: The student will share stories or information with an audience.

C14: The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.

ENGLISH:
READING ALIGNED
STANDARDS OF LEARNING

ENGLISH: READING ALIGNED STANDARDS OF LEARNING

Reading

E-R1 The student will understand how print is organized and read.
- a) Hold print materials in the correct position.
- b) Identify the front cover, back cover, and title page of a book.
- c) Follow words from left to right and from top to bottom on a printed page.
- d) Match voice with print: syllables, words, and phrases.

E-R2 The student will demonstrate an understanding that print makes sense.
- a) Explain that printed materials provide information.
- b) Identify common signs and logos.
- c) Read ten high-frequency words.
- d) Read and explain own writing and drawings.

E-R3 The student will develop an understanding of basic phonetic principles.
- a) Identify and name the uppercase and lowercase letters of the alphabet.
- b) Match consonant and short vowel sounds to appropriate letters.
- c) Identify beginning consonant sounds in single-syllable words.

E-R4 The student will demonstrate comprehension of fiction and nonfiction.
- a) Use pictures to make predictions about content.
- b) Retell familiar stories, using beginning, middle, and end.
- c) Discuss characters, setting, and events.
- d) Use story language in discussions and retellings.
- e) Identify what an author does and what an illustrator does.
- f) Identify the topics of nonfiction selections.

E-R5 The student will apply knowledge of how print is organized and read.
- a) Read from left to right and from top to bottom.
- b) Match spoken words with print.
- c) Identify letters, words, and sentences.

E-R6 The student will apply phonetic principles to read and spell.
- a) Use beginning and ending consonants to decode and spell single-syllable words.
- b) Use two-letter consonant blends to decode and spell single-syllable words.
- c) Use beginning consonant digraphs to decode and spell single-syllable words.
- d) Use short vowel sounds to decode and spell single-syllable words.
- e) Blend beginning, middle, and ending sounds to recognize and read words.
- f) Use word patterns to decode unfamiliar words.
- g) Use compound words.
- h) Read and spell common, high-frequency sight words, including *the*, *said*, and *come*.

E-R7 The student will use meaning clues and language structure to expand vocabulary when reading.

a) Use titles and pictures.
b) Use knowledge of the story and topic to read words.
c) Use knowledge of sentence structure.
d) Reread and self-correct.

E-R8 The student will read familiar stories, poems, and passages with fluency and expression.

E-R9 The student will read and demonstrate comprehension of a variety of fiction and nonfiction.

a) Preview the selection.
b) Set a purpose for reading.
c) Relate previous experiences to what is read.
d) Make predictions about content.
e) Ask and answer who, what, when, where, why, and how questions about what is read.
f) Identify characters, setting, and important events.
g) Retell stories and events, using beginning, middle, and end.
h) Identify the topic or main idea.

E-R10 The student will use simple reference materials.

a) Use knowledge of alphabetical order by first letter.
b) Use a picture dictionary to find meanings of unfamiliar words.

E-R11 The student will use phonetic strategies when reading and spelling.

a) Use knowledge of consonants, consonant blends, and consonant digraphs to decode and spell words.
b) Use knowledge of short, long, and r-controlled vowel patterns to decode and spell words.
c) Decode regular multisyllabic words.

E-R12 The student will use meaning clues and language structure when reading.

a) Use information in the story to read words.
b) Use knowledge of sentence structure.
c) Use knowledge of story structure and sequence.

E-R13 The student will use language structure to expand vocabulary when reading.

a) Use knowledge of prefixes and suffixes.
b) Use knowledge of contractions and singular possessives.
c) Use knowledge of simple abbreviations.
d) Use knowledge of antonyms and synonyms.

E-R14 The student will read fiction and nonfiction, using a variety of strategies independently.

a) Preview the selection by using pictures, diagrams, titles, and headings.
b) Set purpose for reading.
c) Read stories, poems, and passages with fluency and expression.
d) Reread and self-correct when necessary.

E-R15 The student will read and demonstrate comprehension of fiction and nonfiction.

a) Make predictions about content.
b) Read to confirm predictions.
c) Relate previous experiences to the topic.
d) Ask and answer questions about what is read.
e) Locate information to answer questions.
f) Describe characters, setting, and important events in fiction and poetry.
g) Identify the problem, solution, and main idea.

E-R16 The student will demonstrate comprehension of information in reference materials.

a) Use a table of contents.
b) Use pictures and charts.
c) Use dictionaries and indices.

E-R17 The student will apply word-analysis skills when reading.

a) Use knowledge of all vowel patterns.
b) Use knowledge of homophones.
c) Decode regular multisyllabic words.

E-R18 The student will use strategies to read a variety of fiction and nonfiction materials.

a) Preview and use text formats.
b) Set a purpose for reading.
c) Apply meaning clues, language structure, and phonetic strategies.
d) Use context to clarify meaning of unfamiliar words.
e) Read fiction and nonfiction fluently and accurately.
f) Reread and self-correct when necessary.

E-R19 The student will read and demonstrate comprehension of fiction.

a) Set a purpose for reading.
b) Make connections between previous experiences and reading selections.
c) Make, confirm, or revise predictions.
d) Compare and contrast settings, characters, and events.
e) Identify the author's purpose.
f) Ask and answer questions.
g) Draw conclusions about character and plot.
h) Organize information and events logically.
i) Summarize major points found in fiction materials.
j) Understand basic plots of fairy tales, myths, folktales, legends, and fables.

E-R20 The student will continue to read and demonstrate comprehension of nonfiction.

a) Identify the author's purpose.
b) Make connections between previous experiences and reading selections.
c) Ask and answer questions about what is read.
d) Draw conclusions.
e) Organize information and events logically.
f) Summarize major points found in nonfiction materials.
g) Identify the characteristics of biographies and autobiographies.
h) Compare and contrast the lives of two persons as described in biographies and/or autobiographies.

E-R21 The student will demonstrate comprehension of information from a variety of print resources.

a) Use dictionary, glossary, thesaurus, encyclopedia, and other reference books, including online reference materials.
b) Use available technology.

E-R22 The student will read fiction and nonfiction with fluency and accuracy.

a) Use context to clarify meanings of unfamiliar words.
b) Explain words with multiple meanings.
c) Use knowledge of word origins; synonyms, antonyms, and homonyms; and multiple meanings of words.
d) Use word-reference materials, including the glossary, dictionary, and thesaurus.

E-R23 The student will read and demonstrate comprehension of fiction.

a) Explain the author's purpose.
b) Describe how the choice of language, setting, and information contributes to the author's purpose.
c) Compare the use of fact and fantasy in historical fiction with other forms of literature.
d) Identify major events and supporting details.
e) Describe the relationship between text and previously read materials.
f) Identify sensory words.

E-R24 The student will read and demonstrate comprehension of nonfiction.

a) Use text organizers, such as type, headings, and graphics, to predict and categorize information.
b) Formulate questions that might be answered in the selection.
c) Explain the author's purpose.
d) Make simple inferences, using information from texts.
e) Draw conclusions, using information from texts.
f) Summarize content of selection, identifying important ideas and providing details for each important idea.

g) Describe relationship between content and previously learned concepts or skills.
h) Distinguish between cause and effect and between fact and opinion.
i) Identify new information gained from reading.

E-R25 The student will demonstrate comprehension of information resources to research a topic.
a) Construct questions about a topic.
b) Collect information, using the resources of the media center, including online, print, and media resources.
c) Evaluate and synthesize information.

E-R26 The student will read fiction and nonfiction with fluency and accuracy.
a) Use context to clarify meaning of unfamiliar words.
b) Use knowledge of root words, prefixes, and suffixes.
c) Use dictionary, glossary, thesaurus, and other word-reference materials.

E-R27 The student will read and demonstrate comprehension of fiction.
a) Describe the relationship between text and previously read materials.
b) Describe character development in fiction and poetry selections.
c) Describe the development of plot and explain how conflicts are resolved.
d) Describe the characteristics of free verse, rhymed, and patterned poetry.
e) Describe how an author's choice of vocabulary and style contributes to the quality and enjoyment of selections.

E-R28 The student will read and demonstrate comprehension of nonfiction.
a) Use text organizers, such as type, headings, and graphics, to predict and categorize information.
b) Identify structural patterns found in nonfiction.
c) Locate information to support opinions, predictions, and conclusions.
d) Identify cause-and-effect relationships.
e) Identify compare-and-contrast relationships.
f) Skim materials to develop a general overview of content and to locate specific information.
g) Identify new information gained from reading.

E-R29 The student will demonstrate comprehension of information from a variety of print resources.
a) Develop notes that include important concepts, summaries, and identification of information sources.
b) Organize information on charts, maps, and graphs.

ENGLISH ALIGNED STANDARDS OF LEARNING FOR STUDENTS WITH SIGNIFICANT COGNITIVE DISABILITIES

ENHANCED SCOPE AND SEQUENCE

READING *STRAND*

(Skill Group 1-6)

Commonwealth of Virginia
Department of Education
Richmond, Virginia
2005

Introduction

The *English Aligned Standards of Learning Enhanced Scope and Sequence* is a resource intended to help teachers align their classroom instruction with the content found in *English Aligned Standards of Learning*. The *English Aligned Standards of Learning Enhanced Scope and Sequence* is organized by the Reading strand established in the *English Aligned Standards of Learning*, and it includes the content of the Standards of Learning and the essential understandings, knowledge, and skills found in the *English Aligned Standards of Learning Curriculum Framework*. In addition, the *English Aligned Standards of Learning Enhanced Scope and Sequence* provides teachers with sample lesson plans aligned with the standards and their related essential understandings, knowledge, and skills.

School divisions and teachers can use the *English Aligned Standards of Learning Enhanced Scope and Sequence* as a resource for developing sound curricular and instructional programs. Teachers who use this resource should correlate available instructional resources with the essential understandings, knowledge, and skills and determine an appropriate pace of instruction. This resource is not a complete curriculum but can be a valuable instructional tool.

Introduction to Early Literacy for Students with Significant Cognitive Disabilities

According to Virginia's Foundation Blocks for Early Learning (VDOE, 2004) http://www.pen.k12.va.us/VDOE/Instruction/Elem_M/FoundationBlocks.pdf, the research development of early literacy skills is based on the child's opportunities to engage in many structured and incidental experiences that build:

I. **Oral Expression**
II. **Vocabulary**
III. **Phonological Awareness**
IV. **Letter Knowledge and Early Word Recognition**
V. **Print and Book Awareness**
VI. **Written Expression**

Some children who participate in the Virginia Alternate Assessment Program, may have had limited opportunities to benefit from these experiences because of communication difficulties, sensory impairments (vision, hearing concerns), motoric disabilities, and lack of incidental learning. In many instances, children have not been exposed to literacy activities because of a lack of understanding and awareness of literacy development. This paired with low expectations have in many instances prevented children from participation in a literacy-rich environment.

Therefore, teachers must be prepared to provide daily and systematic opportunities for children to participate in activities that build these skills, while individualizing the activities and materials to match the learning styles and communication mode of each child**.**

The following information provides a brief overview of each of the skill areas referenced in Virginia's Building Blocks with specific implications for students with significant cognitive disabilities. It is important to note that Foundation Blocks was developed to provide a clear link between preschool literacy development and kindergarten Standards of Learning. It is essential that educators carefully consider the ages of their students to develop age-appropriate activities that target critical literacy skills. While this information is not intended to be a complete review of the literature, it will provide team members the opportunity to design instruction that promotes these critical skills.

I. Oral Expression

Children of all ages require frequent and daily opportunities to talk and listen to a variety of adults and peers. "Talking" and "listening" will need to be taught in various forms (speaking, signing, pointing to pictures, touching objects, etc.) to accommodate the needs of specific children. To promote the development of oral expression and its link to literacy, educators must:

- Talk to students about daily routines, activities, what is happening in the environment and encourage all responses to this information.

- Provide **many** opportunities for students to "explore" book materials that include teacher and student-generated books. These early books should be relevant to the student and might include pictures of family members matched to names, pictures of recent events matched to text, pictures and object symbols and/or textures that have meaning to the student.

- Expect student to use a variety of communication forms (behaviors, gestures, vocalizing, push/pulling on adults, looking at/pointing to, etc.) to express wants, needs, make comments, express likes and dislikes, and engage in social opportunities and joint attention. Encourage and respond to ALL attempts made by the student to pay attention to pictures, books, words, labels, logos, etc.

- Provide exposure to a variety of age-appropriate stories that are engaging to the child, which might include nursery rhymes, jingles/raps, music. Literacy is based on a great deal of exposure to the "cadence" of language.

- Stories and print material must be "inviting" and motivating to the child. While there is a wealth of high quality children's literature, the starting place for an individual child may need to be with print that is relevant to him/her, such as language experience activities, conversation books, etc. Book "selections" must reflect the child's age (no nursery rhymes for older students), and strongest modality for learning (tactile, vision, hearing, kinesthetic, combination).

- Provide many, many regularly scheduled opportunities for student to hear stories 1:1 with an adult or peer, in small group, in various environments---classrooms, media center, community library, storytellers, peer readers, general education classrooms, reading partners. Children need to have repeated exposure to the same books so that they begin to anticipate the next picture or the next words, based on past experiences. This repetition and anticipation is the basis of "memory reading" and pretend reading.

- Expect children to respond to and answer questions about book experiences. Student might smile and/or vocalize to indicate favorite part of the story, picture, event, character, or action. Events of the book might be depicted in print/text matched to pictures, objects, textures. Pair print with additional information that helps the student gain "meaning" from the print.

- Collect a variety of favorite books and print materials that are available as leisure options for the student. Repeated exposure to the same motivating books solidifies vocabulary, promotes anticipation, independence, ownership, and confidence. This collection of books should be readily accessible in the classroom and offered as a choice multiple times across every school day.

- Provide opportunities for children to "retell" in whatever modality appropriate (pointing, looking at, vocalizing, signing, using voice output device, etc.) favorite stories.

II. Vocabulary

Opportunities to hear, repeat, and understand appropriate vocabulary (including words that are signed, paired with pictures, objects, or other symbols that have meaning for the child) is essential to early literacy development. To promote vocabulary development:

- Use vocabulary appropriate to the child to label objects, routine activities, people and events. Make sure the learning environment is "print-rich" classroom areas should be labeled with words, pictures, objects, textures, etc. Allow daily and repeated opportunities for the child to discover, explore, and question/make comments about these "labels."

- Reinforce/encourage any student attempt to respond to spoken, signed, and written words used by others. For some children, "respond" might mean a change in body movements, turning his/her head toward the speaker or showing any type of anticipatory response.

- Provide a variety of "concept" books that label and identify objects and vocabulary words. A concept book for math might include illustrations and tactile items to explain/demonstrate "more," "less," and "equal to."

- Provide many opportunities for participation in nonverbal and verbal turn-taking activities, such as playing catch with a ball. The adult will need to provide the appropriate direction ("your turn, my turn"); across time, encourage the child to communicate same information. Turn-taking is an important skill in shared literacy experiences.

- Provide opportunities for engagement in a wide variety of vocabulary-building activities, such as field trips, cooking, trips to the library, etc. Use objects or "remnants" from trips/activities to create a point of reference for remembering the event. For instance, a french fry box from McDonalds paired with the words, might represent a recent trip to the fast food restaurant.

- Incorporate music, songs, poems into daily routines to build vocabulary and interest in language. Literacy is very dependent on exposure to a great variety of spoken language.

III. Phonological Awareness

Phonological awareness is a critical literacy skill and is based on an *understanding* of sounds and spoken words. Children's ability to manipulate sounds is based on repeated exposure to expressive language including rhyming, word play activities, auditory discrimination tasks, and an awareness of environmental sounds. Phonological awareness is a prerequisite to phonemic awareness and, ultimately, the ability to read according to "phonetic" principals. Children who are going to learn to read by making sense of sounds will need a strong background in phonological awareness.

- Provide many experiences in identifying and locating environmental sounds. Reinforce any and all responses to environmental sounds.

- Provide repeated exposure to rhymes, fingerplays, songs, poems. Incorporate rhythmic activities into daily routines (sing songs during clean up and transition times, etc.).

- Provide frequent fun activities that encourage manipulation of sounds, including "the name game," in which different names are generated by changing the first letter of a child's name.

- Provide opportunities to sort pictures and objects by whether they rhyme, have same beginning sounds, different beginning sounds, etc.

- Provide manipulatives to help child hear and manipulate various sounds in words (for instance, three blocks are used to represent three sounds in m-a-t).

IV. Letter Knowledge and Early Word Recognition

An understanding that symbols have *meaning* is fundamental to traditional reading skills. During early literacy activities, children must learn that there is a direct match between the spoken word and the symbol representing the word (picture, written word, texture, etc.). Activities to promote this concept might include:

- Label items and areas of the classroom. Draw attention to these labels (text matched to pictures, Braille signs, logos, pieces of objects, etc.) to explain choices and activities.

- Encourage child to match pictures to words and to objects. Provide practice in "reading" words from the environment (names of peers, objects, schedules).

- Provide repeated practice with alphabet manipulatives, such as magnetic letters, foam letters, tiles with sizes and textures to match student's needs and preferences.

- Provide opportunities to "make" letters and words with paint, yarn, pipe cleaners, water on the chalkboard, play dough, sand, pudding, etc. Provide assistive technology strategies specific to the child (keyboard adaptations, font sizes, etc.).

- Encourage children to assign meaning to print, even if it is just an approximation. Pair pictures to print to enhance meaning and understanding.

- Provide exposure to alphabet books and individualize then based on what is meaningful for a specific child. For instance, a picture of the child's mother to represent "M" will have much more meaning than a picture of something they have no experience with, such as a "monkey."

- Build sight word vocabulary based on experiences and interests. For instance, if the child has an interest in simple machines, add words to the sight word bank based on this interest.

- Use "patterned" books that repeat the same words from page to page with just one or two changes. This provides predictability and gives the child the ability to be more independent in the reading experience. Match a picture, symbol, tactile cue to the new word to help the child interpret the meaning.

V. Print and Book Awareness

Children need an understanding that reading and writing are ways to gather information and communicate information. Children demonstrate an understanding of voice to print match by learning to follow print as it is read aloud. "Reading" for many children will need to be broadly interpreted to match the communication skills of an individual child.

- Provide many opportunities for child to explore/manipulate books, magazines, pictures, object books, remnant books.

- Model and talk about book skills. This includes how to position book, turn pages, point to pictures, point to individual words, and how to follow print left to right, top to bottom, etc.

- Provide many opportunities for child to practice these skills in different formats. This includes picture sentences (pictures that run left to right), sentence strips that are familiar to the child, children's literature, etc.

- Work collaboratively with general education teachers to identify the child's skill in developing concept of word and potential next instructional steps.

- Pair text with extra visual information (pictures, photographs), visual cues (textures, pieces of objects, and/or auditory cues (such as "touch and say" books).

VI. Written Expression

Early writing skills develop in a predictable sequence. Educators need to be aware of these stages in order to monitor the progression of these skills and provide instruction and feedback that will facilitate movement from one stage to another. It is VERY important that instruction and feedback be provided in a way that is reinforcing without undue pressure on the child to "jump" to the next stage. Some children will need to spend a great deal of time experimenting with writing instruments, scribbling, and drawing, before moving to more symbolic writing skills. The following represents a brief description of various writing stages as they emerge in children who are typically developing:

Stages of Children's Writing

There are at least six different stages of writing:

Drawing: Students will need the opportunity to draw and attach meaning to their drawings. All these efforts must be encouraged. Questions such as "tell me about your picture" will facilitate the child's understanding that writings/drawings can be used to communicate information. At these early stages, directive questions or comments will not be helpful (avoid questions/comments such as "what is it," "that doesn't look like a tree").

Scribbling: Children need to understand that scribbling is a form of writing and that they can attach meaning to the scribbles. Skills are advancing when adults notice that scribbles are beginning to run from left to right and top to bottom. These more advanced scribbles are mimicking writing with letters and words.

Invented letters: After many, many opportunities to experiment with scribbling and drawing, children will begin to use a mixture of scribbles and "invented" letters. These strokes resemble real letters and are often drawn randomly on the page or mixed in with other strokes. These efforts represent significant progress and should be highly encouraged.

Random letters: At this stage, children will begin to use some letters, often the letters in their first name. These random letters will not have spaces between them, but will appear as a "string." Invented letters may still appear in combination with random letters.

Invented spelling: At this very exciting stage, children are beginning to understand the connection between letters and sounds and may start to put spaces between their "words" to indicate that they have an understanding of concept of word. This skill is critical to the development of more advanced writing skills. At the beginning of this stage, a letter matching a beginning sound (or the most salient sound in a word) might be used to represent a whole word. Later in this stage, children will use two letters, beginning and ending sounds, to indicate a whole word.

Common spelling: In this stage Children develop more advanced understanding of letter- sound relationships. This more advanced understanding is directly linked to the child's stage of reading development. Writing and reading skills are integrally linked at this stage.

Strategies:

- Reinforce all approximations, including touch/holding various instruments, scribbling, making a mark, etc.

- Consult with occupational therapist for strategies to allow the child the best opportunity to participate (keyboard, adapted pencils, etc.).

- Model writing for a variety of reasons, including drawing, labeling, making lists, letters to friends, giving directions, labeling items and events.

- Encourage child to interpret writings and pictures. Write the information provided by the child on the paper to reinforce the idea that spoken language can be written.

- Encourage child to dictate information to be written. Encourage repeated readings of dictations. Post writings around the room and provide time to "read" the room.

The READING Strand for Skill Groups 1–6

The Reading strand for Skill Group 1-6 encompasses the following Aligned Standards of Learning:

- Skill Group 1 – E-R1, E-R2, E-R3, E-R4
- Skill Group 2 – E-R5, E-R6, E-R7, E-R8, E-R9, E-R10
- Skill Group 3 – E-R11, E-R12, E-R13, E-R14, E-R15, E-R16
- Skill Group 4 – E-R17, E-R18, E-R19, E-R20, E-R21
- Skill Group 5 – E-R22, E-R23, E-R24, E-R25
- Skill Group 6 – E-R26, E-R27, E-R28, E-R29

The Reading strand can be divided into Organizing Topics, as shown in the following table.

READING STRAND						
Organizing Topic	**Skill Group 1**	**Skill Group 2**	**Skill Group 3**	**Skill Group 4**	**Skill Group 5**	**Skill Group 6**
Letters and Sounds	E-R3 →					
Concept of Print	E-R1 →	E-R5 →				
Decoding and Spelling		ER-6 →				
Decoding, Word Analysis, and Spelling			E-R11 →	E-R17 →		
Word Analysis and Spelling					E-R22 →	E-R26 →
Fluency		E-R8 →	ER-14 →	E-R18 →		
Vocabulary and Comprehension	E-R2, E-R4 →	E-R7, E-R9, E-R10 →	E-R12, E-R13, E-R15, E-R16 →			
Vocabulary and Comprehension of Fiction				E-R19 →	E-R23 →	E-R27 →
Vocabulary and Comprehension of Nonfiction				E-R20 E-R21 →	E-R24 E-R25 →	E-R28 E-R29 →

SKILL GROUP INFORMATION

by

Organizing Topics

SKILL GROUP 1

SKILL GROUP 1

Organizing Topic → Concepts of Print

In Skill Group 1, students who do not already have book handling skills learn these skills as well as the directionality of print. All students learn the correspondence of the spoken word to the written word. Since students come to school with varying degrees of knowledge and mastery of these skills, it is imperative that they are assessed and that the needed instruction be woven into other content lessons. Daily opportunities, both formal and informal, for learning, reviewing, and mastering these skills should be a part of every English program.

Related Aligned Standards of Learning

E-R1 The student will understand how print is organized and read.

a)Hold print materials in the correct position.
b)Identify the front cover, back cover, and title page of a book.
c)Follow words from left to right and top to bottom on a printed page.
d)Match voice with print: syllables, words, and phrases.

Essential understandings, knowledge, and skills

To be successful with this standard, students are expected to

- Hold printed material the correct way
- Identify the front and back covers of a book
- Distinguish the title page from all the other pages in a book
- Turn pages appropriately
- Distinguish print from pictures
- Follow text with a finger, pointing to each word as it is read from left to right and top to bottom
- Locate words, letters, spaces, and lines of text
- Match voice with print in syllables, words, and phrases
- Locate periods, question marks, and exclamation points.

Suggested activities for teachers

- Model how print is organized, tracking print and identifying parts of a book when reading aloud.
- Record dictated sentences, and have students read them aloud.
- Read posters, charts, student writing, etc., using pointers.
- Have students create class books or individual books.

Suggested activities for students

- Identify letters, words, spaces, and lines of text in big books and on charts.
- Track words in familiar songs, rhymes, and poems.
- Participate in interactive writing.
- Participate in shared reading of a variety of genre.

Suggested resources

- *Phonological Awareness Literacy Screening (PALS)* Web site, http://pals.virginia.edu
- *Virginia's Early Intervention READING Initiative (EIRI)* Web site, http://www.pen.k12.va.us/VDOE/Instruction/Reading/readinginitiative.html
- *Teaching Early Phonological Awareness Skills* Web site, http://www.pen.k12.va.us/VDOE/Instruction/Reading/doe-pa.pdf

Suggested classroom assessment methods

- Classroom observations
- Student interviews
- Student demonstrations

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R1a
Given a social studies textbook on a bookstand, the student will answer the question, "Is the book right side up?" The student will keep the bookstand and book on her desk, and give focused eye contact to the book as the general education social studies class takes turns reading it aloud.	
Possible Communication Skills:	
C2. The student will use facial expressions to respond to, support, accentuate and dramatize verbal messages. C11.The student will listen to and actively participate in a variety of language activities including choral speaking, rhymes, songs and stories with repeated patterns. C12 .The student will consistently respond to "Yes/No" questions across a variety of settings, situations and content areas.	

SAMPLE ACTIVITY 2:	E-R1b

Given a book he has been reading with a cooperative group in language arts /English class, the student will identify the front cover, back cover and title page by pointing at each as represented on a choice board with at least four options.

Possible Communication Skills:

C1. The student will use gestures to respond to, support, accentuate and dramatize verbal messages.
C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

SAMPLE ACTIVITY 3:	E-R1c

During small group reading instruction, student will take turns reading aloud while tracking an age-appropriate book from left to right and top to bottom. In order to take her turn at appropriate time, student will find personalized visual cue (her photo) in text and activate a voice output communication device to read sentences.

Possible Communication Skills:

C9.The student will follow one-step or multi-step directions.
C11.The student will listen to and actively participate in a variety of language activities including choral speaking, rhymes, songs and stories with repeated patterns.
C13. The student will share stories or information with an audience.

SKILL GROUP 1

Organizing Topic → Letters and Sounds

In Skill Group 1, students who do not already know the letters of the alphabet, need to learn to recognize both the uppercase and lowercase letters of the alphabet. All students learn how letters and sounds work in written language. Phonetic skills are the foundation for decoding and encoding words – basic skills that are needed for students to develop fluency and automaticity in reading and writing. These skills are assessed and taught in a systematic approach through direct instruction, individual and small group activities, and time spent exploring and reading books and other print materials. Students' knowledge of both uppercase and lowercase letters is a strong predictor of their reading success.

Related Aligned Standards of Learning

E-R3 The student will develop an understanding of basic phonetic principles.

a)Identify and name uppercase and lowercase letters of the alphabet.

b)Match consonant and short vowel sounds to appropriate letters.

c)Identify beginning consonant sounds in single-syllable words.

Essential understandings, knowledge, and skills

To be successful with this standard, students are expected to

- Recognize and name rapidly and with ease uppercase and lowercase letters in sequence and in random order
- Match uppercase and lowercase letter pairs
- Recognize and say the usual sounds of all letters
- Write the grapheme (letter) that represents the spoken sound
- Isolate initial consonants in single-syllable words (For example, */t/* is the first sound in *top*.)
- Identify the onset (*/c/*) and rime (*-at*) and begin to separate the sounds fully (*/c/-/a/-/t/*) by saying each sound aloud
- Blend onsets (*/c/*) and rimes (*-at*) to form words (*cat*)
- Substitute other onsets (*/b/* for */c/*) to form different words (*bat*).

Suggested activities for teachers

- Assist students as they generate lists of words for individual sounds and spelling patterns.
- Use interactive writing to apply knowledge of letter-sound relationships.

Suggested activities for students

- Sort picture cards by their common beginning, middle, and ending sounds.
- Highlight word patterns, beginning consonants, or ending consonants in words.
- Sort words by a common phonetic element pattern.

Suggested resources

- *Phonological Awareness Literacy Screening (PALS)* Web site, http://pals.virginia.edu
- *Virginia's Early Intervention READING Initiative (EIRI)* Web site, http://www.pen.k12.va.us/VDOE/Instruction/Reading/readinginitiative.html
- *Teaching Early Phonological Awareness Skills* Web site, http://www.pen.k12.va.us/VDOE/Instruction/Reading/doe-pa.pdf

Suggested classroom assessment methods

- Classroom observations
- Student interviews
- Student demonstrations
- Letter and sound identification of the alphabet

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R3a
The primary grade student will identify (by pointing to the letters on her augmentative communication device) the name of the first and last letter (upper- and lowercase letters) in the names of classmates when the written name is presented with the photo of the classmate.	
Possible Communication Skills:	
C1. The student will use gestures to respond to, support, accentuate and dramatize verbal messages. C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.	

SAMPLE ACTIVITY 2:	E-R3a

The elementary student will play sound bingo with her class and will vocalize to indicate that she has that sound on her bingo board. A peer or other assistant will then point to one row at a time and ask, “Is it in this row?” The student will vocalize when the answer is “Yes.” Next the peer or assistant will point to one letter at a time in that particular row and ask, “Is it this letter?” The student will vocalize when the answer is “Yes.” The peer will then put a dab of washable paint over that letter.

Possible Communication Skills:

C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.
C10.The student will use voice level appropriate for a variety of settings and situations.
C12 .The student will consistently respond to “Yes/No” questions across a variety of settings, situations and content areas.

SAMPLE ACTIVITY 3:	E-R3c

The high school world history teacher will create student “returned work” folders labeled with printed names and photos. The student will return work to his classmate’s folders by identifying the initial letter sound of the students’ name and matching it with the name and photo.

Possible Communication Skills:

C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.
C9.The student will follow one-step or multi-step directions.

SKILL GROUP 1
Organizing Topic → Vocabulary and Comprehension

In Skill Group 1, students learn that comprehension is an active process that requires them to use their own experiences and learn new vocabulary in order to get meaning from text they hear read aloud. By the end of the year some students will read "emergently." They will reread by re-creating the words of the text and showing through verbal statements or occasional pointing that they understand that the print on the page carries the message. Students increase their vocabulary, on a daily basis, in all content areas. They not only learn new words but also new meanings and uses for familiar words. Students use their oral vocabulary to make sense of the words they see in print.

Related Aligned Standards of Learning

E-R2 The student will demonstrate an understanding that print makes sense.

a)Explain that printed materials provide information.
b)Identify common signs and logos.
c)Read ten high-frequency words.
d)Read and explain own writing and drawings.

E-R4 The student will demonstrate comprehension of fiction and nonfiction.

a)Use pictures to make predictions about content.
b)Retell familiar stories, using beginning, middle, and end.
c)Discuss characters, setting, and events.
d)Use story language in discussions and retellings.
e)Identify what an author does and what an illustrator does.
f)Identify the topics of nonfiction selections.

Essential understandings, knowledge, and skills

To be successful with these standards, students are expected to

- Apply knowledge that print conveys a message
- Recognize and identify common signs, logos, and labels
- Recognize and identify their own first and last names and the first names of classmates
- Read and explain their own drawings and writings
- Explain that printed text provides information
- Retell information gathered from looking at a picture or from listening to a text read to them
- Locate high-frequency words and phrases in familiar text
- Recognize ten high-frequency words (Each student may know a different set of words.)
- Make predictions based on illustrations or portions of the text
- Link knowledge from their own experiences to make sense of and talk about the text
- Give evidence that they understand the meaning of what is being read aloud, including the who, what, when, where, why, and how
- Retell a story in their own words or re-enact it, arranging the events in the correct sequence (beginning, middle, and end)
- Use vocabulary from a story in discussions and retellings

- Use descriptive language to talk about characters, settings, and events of a story
- Respond to simple questions about the content of a book
- Produce artwork or a written response that demonstrates comprehension of a story that they have heard read aloud
- Identify the roles of an author and an illustrator
- Name the topic of a nonfiction selection.

Suggested activities for teachers

- Write the daily schedule on the board and read it with students.
- Display popular food containers in the home living center.
- Place name tags with first and last name at students' seats.
- Label helper chart, center chart, behavior charts, cubbies, mailboxes, etc. with students' names.
- Make and share class books and individual books.
- Display student pictures and writings.
- Conduct class discussions of books being read.
- Collect and display environmental print signs, logos, and labels.
- Model the strategies of previewing/predicting, retelling, and finding information in books to answer questions.
- Model using punctuation to read with proper phrasing and expression.
- Read stories daily and discuss content, characters, and setting.
- Identify the author and illustrator of each book read.
- Include the student's name as author and illustrator when making individual books.
- Discuss book illustrations and text and predict what may happen next.
- List or illustrate story events in sequence.
- Conduct a picture walk as a prereading strategy.

Suggested activities for students

- Participate in journal writing and share writing.
- Share favorite book during show and tell.
- Retell stories, using book illustrations, character cutouts, or puppets.
- Illustrate beginning, middle, and end of stories read aloud.

Suggested resources

- *Phonological Awareness Literacy Screening (PALS)* Web site, http://pals.virginia.edu
- *Virginia's Early Intervention READING Initiative (EIRI)* Web site, http://www.pen.k12.va.us/VDOE/Instruction/Reading/readinginitiative.html
- *Teaching Early Phonological Awareness Skills* Web site, http://www.pen.k12.va.us/VDOE/Instruction/Reading/doe-pa.pdf

Suggested classroom assessment methods

- Classroom observations
- Student interviews
- Student demonstrations
- Running records

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R2a
The elementary student will locate his seat, cubby, and work folder by identifying his nametag and when asked how he knows it is his he will point to his name as explanation.	
Possible Communication Skills:	
C1. The student will use gestures to respond to, support, accentuate and dramatize verbal messages. C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C8. The student will engage in communicative exchanges (conversations) with peers and adults.	

SAMPLE ACTIVITY 2:	E-R2b
The high school student will use a visual overlay and point to a logo to select a fast food restaurant to go to for lunch with his peers.	
Possible Communication Skills:	
C1. The student will use gestures to respond to, support, accentuate and dramatize verbal messages. C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.	

SAMPLE ACTIVITY 3:	E-R2d

The student will verbally read and explain a scrapbook with items, pictures, and words depicting a recent family trip. The student will respond to questions from her typically developing peers regarding her scrapbook.

Possible Communication Skills:

C7. The student will initiate communication.
C8. The student will engage in communicative exchanges (conversations) with peers and adults.
C12 .The student will consistently respond to "Yes/No" questions across a variety of settings, situations and content areas.
C13. The student will share stories or information with an audience.
C14. The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.

SAMPLE ACTIVITY 1:	E-R4a

While taking a picture walk through a book, the elementary student will respond to yes/no prediction questions about the book.

Possible Communication Skills:

C1. The student will use gestures to respond to, support, accentuate and dramatize verbal messages.
C2. The student will use facial expressions to respond to, support, accentuate and dramatize verbal messages.
C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.
C4. The student will contribute to group interactions across content areas, settings, situations and audiences.
C8. The student will engage in communicative exchanges (conversations) with peers and adults.
C9.The student will follow one-step or multi-step directions.
C11.The student will listen to and actively participate in a variety of language activities including choral speaking, rhymes, songs and stories with repeated patterns.
C12 .The student will consistently respond to "Yes/No" questions across a variety of settings, situations and content areas.

SAMPLE ACTIVITY 2:	E-R4b

In a collaborative reading group, the student will order pictures from a familiar story and retell the story to another group of students.

Possible Communication Skills:

C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.
C4. The student will contribute to group interactions across content areas, settings, situations and audiences.
C5. The student will follow basic rules for conversations including turn taking and listening to a speaker.
C7. The student will initiate communication.
C10.The student will use voice level appropriate for a variety of settings and situations.
C11.The student will listen to and actively participate in a variety of language activities including choral speaking, rhymes, songs and stories with repeated patterns.
C13. The student will share stories or information with an audience.

SAMPLE ACTIVITY 3:	E-R4f

Using a voice output communication device with at least 4 cells that are labeled with potential nonfiction topics, the student will activate a cell when asked, “What have we been reading about in this science lesson?”

Possible Communication Skills:

C1. The student will use gestures to respond to, support, accentuate and dramatize verbal messages.
C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.
C4. The student will contribute to group interactions across content areas, settings, situations and audiences.
C5. The student will follow basic rules for conversations including turn taking and listening to a speaker.
C8. The student will engage in communicative exchanges (conversations) with peers and adults.

SKILL GROUP 2

SKILL GROUP 2

Organizing Topic → Concept of Print

In Skill Group 2, concept of print skills are reviewed and extended. As they begin to read, students apply their knowledge of directionality of text and their ability to match the spoken word to the print. Daily opportunities both formal and informal for learning, reviewing, and mastering these skills should be a part of every English program.

Related Aligned Standards of Learning

E-R5 The student will apply knowledge of how print is organized and read.

a) Read from left to right and from top to bottom.

b) Match spoken words with print.

c) Identify letters, words, and sentences.

Essential understandings, knowledge, and skills

To be successful with this standard, students are expected to

- Demonstrate concepts of print and spoken word by
  - tracking print from left to right and top to bottom
  - following print from one line to the next line (return sweep)
  - matching spoken words to print
- Identify letters, words, and sentences
- Differentiate between letters and words by
  - recognizing spaces between words in sentences
  - locating capital letters in sentences
  - locating periods, question marks, exclamation points, speech bubbles, and quotation marks
  - recognizing that a sentence starts with a capital letter and ends with a period, question mark, or exclamation point.

Suggested activities for teachers

- Model how print is organized, how to track print, and how to identify parts of a book.
- Use interactive writing.
- Locate and discuss the use of periods, question marks, exclamation points, speech bubbles, and quotation marks in big books and in other texts.
- Have students track print when reading.
- Cut up written sentences for students to reassemble.

Suggested activities for students

- Identify letters, words, and sentences in big books and on charts.

Suggested resources

- *Phonological Awareness Literacy Screening (PALS)* Web site, http://pals.virginia.edu
- *Virginia's Early Intervention READING Initiative (EIRI)* Web site, http://www.pen.k12.va.us/VDOE/Instruction/Reading/readinginitiative.html
- *Teaching Early Phonological Awareness Skills* Web site, http://www.pen.k12.va.us/VDOE/Instruction/Reading/doe-pa.pdf

Suggested classroom assessment methods

- Classroom observations
- Student interviews
- Student demonstrations

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R5c
Given pictures of individual letters and items labeled with their name, the elementary student will sort the pictures into a T-chart of letters and words (e.g. a T chart with the letters M and N at the top).	
Possible Communication Skills:	
C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C9.The student will follow one-step or multi-step directions.	

SAMPLE ACTIVITY 2:	E-R5a
Given a personal schedule using pictures and words that is aligned left to right and top to bottom, the middle school student will identify the next event in the day by pointing to it.	
Possible Communication Skills:	
C1. The student will use gestures to respond to, support, accentuate and dramatize verbal messages. C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.	

SAMPLE ACTIVITY 3:	E-R5b
Using a sequential voice output device labeled with a cue word from the text, the student will read a section of the biology text to his class.	
Possible Communication Skills:	
C11.The student will listen to and actively participate in a variety of language activities including choral speaking, rhymes, songs and stories with repeated patterns. C13. The student will share stories or information with an audience.	

SKILL GROUP 2

Organizing Topic → Decoding and Spelling

Having developed the concept of word and letter-sound correspondence in Skill Group 1, students in Skill Group 2 concentrate on learning and integrating basic phonetic principles to decode and encode words. Decoding and encoding skills help students develop fluency and automaticity in reading and writing. Students should use picture and context clues to verify their decoding of unknown words. The best way to get students to refine and extend their knowledge of letter-sound correspondence is through repeated opportunities to read text at their independent level. By the end of Skill Group 2, students should have a reading vocabulary of 300 to 500 sight words and be able to decode single-syllable words. The goal of phonics instruction is not that students be able to state rules governing letter-sound relationships. Rather, the purpose is to lead students to an understanding of the alphabetic principle – the systematic and predictable relationships between written letters and spoken sounds.

Related Aligned Standards of Learning

E-R6 The student will apply phonetic principles to read and spell.

a) Use beginning and ending consonants to decode and spell single-syllable words.
b)Use two-letter consonant blends to decode and spell single-syllable words.
c)Use beginning consonant diagraphs to decode and spell single-syllable words.
d)Use short vowel sounds to decode and spell single-syllable words.
e)Blend beginning, middle, and ending sounds to recognize and read words.
f)Use word patterns to decode unfamiliar words.
g)Use compound words.
h)Read and spell common, high-frequency sight words, including the, said, and come.

Essential understandings, knowledge, and skills

To be successful with this standard, students are expected to

- Apply knowledge of beginning and ending consonants and short vowels in single-syllable words by
  - recognizing beginning and ending consonant sounds
  - separating the sounds in a word
  - blending separately spoken phonemes to make a word
  - spelling words
- Accurately decode unknown, orthographically regular, single-syllable words and nonsense words (e.g., *sit, zot*), using letter-sound mappings to sound them out
- Apply knowledge of word patterns to decode unfamiliar words by
  - recognizing word patterns, such as CVC
  - using onsets and rimes to create, read, and spell new words that include blends, such as the *l* and *r* blends, and digraphs, including *ch, sh, th,* and *wh*
- Use the vowel patterns CVC, VC, and CVCC to decode and spell single-syllable words
- Use the vowel patterns CVVC to decode and spell single-syllable words
- Recognize and use simple compound words
- Read common high-frequency sight words.

Suggested activities for teachers

- Use interactive writing to apply knowledge of letter-sound relationships.
- Provide or create independent level reading material.

Suggested activities for students

- Develop letter-sound correspondence to automaticity.
- Generate lists of words for individual sounds and spelling patterns.
- Sort Picture Cards by their common beginning, middle, and ending sounds, including words with consonant blends and diagraphs.
- Read decodable texts.
- Highlight word patterns, beginning or ending consonants, and blends in words.
- Sort words by a common phonetic element or vowel pattern.

Suggested resources

- *Phonological Awareness Literacy Screening (PALS)* Web site, http://pals.virginia.edu
- *Virginia's Early Intervention READING Initiative (EIRI)* Web site, http://www.pen.k12.va.us/VDOE/Instruction/Reading/readinginitiative.html
- *Teaching Early Phonological Awareness Skills* Web site, http://www.pen.k12.va.us/VDOE/Instruction/Reading/doe-pa.pdf

Suggested classroom assessment methods

- Classroom observations
- Student demonstrations
- Quizzes

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R6a
Given a word family ending and using a spinner labeled with consonants, the elementary student will read and spell the single-syllable words produced, e.g. "_at" and the letters b, c, f, and h.	
Possible Communication Skills:	
C3: The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C9: The student will follow one-step or multi-step directions	

SAMPLE ACTIVITY 2:	E-R6f

Given a list of rhyming and non-rhyming words and a fill-in-the-blank poem, the middle school student will use the word pattern and point to choose words to complete the poem.

Possible Communication Skills:

C1. The student will use gestures to respond to, support, accentuate and dramatize verbal messages.
C2. The student will use facial expressions to respond to, support, accentuate and dramatize verbal messages.
C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.

SAMPLE ACTIVITY 3:	E-R6h

The high school student will dictate a short story in which they will spell high-frequency sight words (including the, said, and come) aloud for a peer or adult assistant to write.

Possible Communication Skills:

C8. The student will engage in communicative exchanges (conversations) with peers and adults.
C10.The student will use voice level appropriate for a variety of settings and situations.
C13 The student will share stories or information with an audience.
C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.

SKILL GROUP 2

Organizing Topic → Fluency

In Skill Group 2, students work on developing oral reading fluency. Fluent readers can read text quickly, accurately, and with expression. Fluency develops from reading practice. Classrooms should be designed to provide students with opportunities to read and reread materials at their instructional and independent levels. These materials include decodable text. The purpose of oral reading is to help students develop fluent reading habits that allow them to read text quickly, smoothly, accurately, and with proper expression.

Related Aligned Standards of Learning

E-R8 The student will read familiar stories, poems, and passages with fluency and expression.

Essential understandings, knowledge, and skills

To be successful with this standard, students are expected to

- Engage in read-alouds voluntarily
- Read a wide variety of self-selected and teacher-selected stories, poems, and informational texts aloud
- Use expression and intonation to convey meaning when reading aloud
- Practice reading in texts on their independent reading level to develop accuracy, fluency, and expression.

Suggested activities for teachers

- Use a variety of rereading strategies, such as choral reading, echo reading, partner reading, and Readers' Theater.
- Model fluent reading through daily read-alouds.
- Demonstrate that conventions of print, such as bold type, exclamation points, commas, periods, question marks, and quotation marks are clues to meaning and good reading expression.

Suggested activities for students

- Practice reading with fluency and expression, and tape-record it.
- Listen to books on tape.

Suggested resources

- *Phonological Awareness Literacy Screening (PALS)* Web site, http://pals.virginia.edu
- *Virginia's Early Intervention READING Initiative (EIRI)* Web site, http://www.pen.k12.va.us/VDOE/Instruction/Reading/readinginitiative.html
- *Teaching Early Phonological Awareness Skills* Web site, http://www.pen.k12.va.us/VDOE/Instruction/Reading/doe-pa.pdf

Suggested classroom assessment methods

- Classroom observations
- Student demonstrations
- Running records

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R8
Practice reading a book appropriate for a younger grade with expression. When fluent, the student reads the story aloud to the younger class.	
Possible Communication Skills:	
C10.The student will use voice level appropriate for a variety of settings and situations. C13. The student will share stories or information with an audience.	

SAMPLE ACTIVITY 2:	E-R8
Prepare a novel by attaching small picture and word prompts at 3 different sections of text which have been recorded on a voice output communication device. When the student gets to that section of the text she matches the picture/word prompt in the book to the same picture/word prompt on the device and activates it to have a turn reading aloud to the whole class.	
Possible Communication Skills:	
C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C4. The student will contribute to group interactions across content areas, settings, situations and audiences.	

SAMPLE ACTIVITY 3:	E-R8
Help the student prepare a poem to read aloud during a poetry reading at a coffee shop with other high school English literature students.	
Possible Communication Skills:	
C2. The student will use facial expressions to respond to, support, accentuate and dramatize verbal messages. C10. The student will use voice level appropriate for a variety of settings and situations. C13 The student will share stories or information with an audience.	

SKILL GROUP 2
Organizing Topic → Vocabulary and Comprehension

In Skill Group 2, students should learn that comprehension is an active process that requires them to learn new vocabulary and use their own experiences in order to get meaning from stories they hear. By the end of this Skill Group, students are expected to demonstrate their comprehension of books read independently or with a partner, as well as books that adults read to them. They are also expected to read and understand simple written instructions. Comprehension skills should be systematically and directly taught to students.

Related Aligned Standards of Learning

E-R7 The student will use meaning clues and language structure to expand vocabulary when reading.
- a)Use titles and pictures.
- b)Use knowledge of the story and topic to read words.
- c)Use knowledge of sentence structure.
- d)Reread and self-correct.

E-R9 The student will read and demonstrate comprehension of a variety of fiction and nonfiction.
- a)Preview the selection.
- b)Set a purpose for reading.
- c)Relate previous experiences to what is read.
- d)Make predictions about content.
- e)Ask and answer who, what, when, where, why, and how questions about what is read.
- f)Identify characters, setting, and important events.
- g)Retell stories and events, using beginning, middle, and end.
- h)Identify the topic or main idea.

E-R10 The student will use simple reference materials.
- a) Use knowledge of alphabetical order by first letter.
- b) Use a picture dictionary to find meanings of unfamiliar words.

Essential understandings,knowledge, and skills

To be successful with these standards, students are expected to

- Use prior knowledge to interpret pictures
- Use titles and pictures to make predictions about text
- Use pictures to confirm vocabulary choice
- Use knowledge of the story or topic to make predictions about vocabulary and text
- Notice when words or sentences do not make sense in context
- Recognize complete sentences when reading
- Use intonation, pauses, and emphasis that signal the structure of the sentence when reading
- Use clues of punctuation, including periods, question marks, exclamation points, commas, and quotation marks, to guide their reading
- Reread to confirm vocabulary choice
- Reread and self-correct when text does not make sense

- Preview reading material by looking at the book's cover and illustrations and by reading titles and headings
- Choose a purpose for reading by looking at the illustrations, determining prior knowledge, and predicting the outcome of the selection
- Draw on prior knowledge to make predictions before and during reading
- Make and confirm predictions based on illustrations or portions of the text
- Use knowledge from their own experiences to make sense of and talk about a text
- Read various nonfiction forms, including letters, lists, recipes, newspapers, and magazines
- Identify the topic or main idea of a short fiction or nonfiction selection
- Identify characters, setting, and important events
- Answer simple who, what, when, where, why, and how questions about a selection
- Create artwork or a written response that shows comprehension of a selection
- Extend the story orally or with drawings
- Retell stories and events, using beginning, middle, and end
- Use simple reference materials
- Alphabetize a list of five to eight words according to first letter
- Use a picture dictionary to locate unfamiliar words.

Suggested activities for teachers

- Model using knowledge of alphabetical order to locate words in a picture dictionary.
- Have students line up in alphabetical order by first or last name.
- Model previewing, predicting, and setting a purpose during teacher read-alouds.
- Use before-reading strategies, such as concept webs, KWL charts, and sharing personal experiences.
- Reread familiar texts.
- Provide time for independent reading.
- Read from a variety of genres and identify whether the text is fiction or nonfiction.
- Model think-aloud comprehension strategies during teacher read-alouds.
- Have students use during-reading strategies, such as
  - summarizing (Students frequently stop reading to summarize or retell story events after each page, paragraph, or section.)
  - graphic organizers (Students record information such as story events, story elements, or the summary of a section as they read.).
- Have students use after-reading strategies, such as
  - summarizing/retelling
  - sequencing events
  - class/group discussions.
- Make a class chart with the headings Fiction and Nonfiction. Record stories read aloud under the correct heading.
- Have students create flip books that show the beginning, middle, and end of a story.
- Have students share story information after independent reading.

Suggested classroom assessment methods

- Classroom observations
- Student interviews
- Student demonstrations
- Running records
- Retellings
- Quizzes

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R7a
Given a voice output device with at least 4 cells, the student will activate the cell with a picture and word(s) that matches the cover art or picture on a given page to read the corresponding text aloud when asked a question in language arts class.	
Possible Communication Skills:	
C1 The student will use gestures to respond to, support, accentuate and dramatize verbal messages. C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C8 The student will engage in communicative exchanges (conversations) with peers and adults	

SAMPLE ACTIVITY 2:	E-R7b
In a high school literature class, using a picture that corresponds to particular text the student will read new vocabulary by pairing the written word with each picture. Each day have the student pair words with correct pictures that prime her for the day's chapter.	
Possible Communication Skills:	
C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C9 The student will follow one-step or multi-step directions	

SAMPLE ACTIVITY 3:	E-R7c
In a middle school science class, using a voice output communication device with a dynamic (computerized) display the student will activate a series of cells to construct sentences when answering questions about their reading.	
Possible Communication Skills:	
C4 The student will contribute to group interactions across content areas, settings, situations, and audiences C8 The student will engage in communicative exchanges (conversations) with peers and adults. C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.	

SAMPLE ACTIVITY 1:	E-R9a
In small groups, have elementary students preview a book about Williamsburg by examining the cover art and any pictures and discussing any visits they have taken to the city. Encourage typically developing peers to ask the student yes/no questions.	
Possible Communication Skills:	
C4 The student will contribute to group interactions across content areas, settings, situations and audiences. C8 The student will engage in communicative exchanges (conversations) with peers and adults. C12 The student will consistently respond to "Yes/No" questions across a variety of settings, situations and content areas.	

SAMPLE ACTIVITY 2:	E-R9a/c/d
In pairs, have middle school students visit a virtual History Museum online. After exploring online materials, have a typically developing peer present a book about a historical event they learned about online and ask the students to make predictions regarding the content.	
Possible Communication Skills:	
C13 The student will share stories or information with an audience.	

SAMPLE ACTIVITY 3:	E-R9h

Prepare the high school student by using pictures throughout the time your class is reading a novel. Using the pictures with short captions, from a choice of three, have the student select the main idea or topic from a chapter.

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.
C13 The student will share stories or information with an audience.

SAMPLE ACTIVITY 1:	E-R10a/b

Teach the student to create a personal picture dictionary by providing a booklet with A-Z pages and room to write words and draw or glue pictures. Encourage the student to put words for favorite objects, activities, events, etc in the dictionary under the correct letter.

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.
C9 The student will follow one-step or multi-step directions

SAMPLE ACTIVITY 2:	E-R10a/b

Incorporate regular journal entries into language arts lessons. Students can draw, dictate, or independently write journal entries. Leave a blank for the student to fill in any words that are in a picture dictionary (or spell it incorrectly and have the student look it up in their dictionary).

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.
C9 The student will follow one-step or multi-step directions
C13 The student will share stories or information with an audience.

SAMPLE ACTIVITY 3:	E-R10a/b
Provide the student with a simple electronic dictionary/ speller. Teach them to look up correct spellings by typing in their approximate spelling.	
Possible Communication Skills:	
C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C9 The student will follow one-step or multi-step directions.	

SKILL GROUP 3

SKILL GROUP 3
Organizing Topic → Decoding, Word Analysis, and Spelling

In Skill Group 3, students continue to refine and extend their phonics skills. They use what they have learned about phonemes, rhyming words, onsets, ryhmes, decoding, and encoding to figure out new words, increase fluency, and improve spelling. Students continue to use pictures and context clues to verify their decoding of unknown words and for determining word meaning. Students also focus on word analysis skills. Mastery and application of these skills allow students to improve their fluency, vocabulary, spelling, and comprehension. These skills are assessed and taught systematically through direct instruction and individual and small group activities. The goal of phonics instruction is not that students be able to state rules governing letter-sound relationships. Rather, the purpose is to lead students to an understanding of the alphabetic principle — the systematic and predictable relationships between written letters and spoken sounds.

Related Aligned Standards of Learning

E-R11 The student will use phonetic strategies when reading and spelling.

a)Use knowledge of consonants, consonant blends, and consonant digraphs to decode and spell words.

b)Use knowledge of short, long, and r-controlled vowel patterns to decode and spell words.

c)Decode regular multisyllabic words.

Essential understandings, knowledge, and skills

To be successful with these standards, students are expected to

- Apply knowledge of consonants and consonant blends to decode and spell words
- Apply knowledge of consonant digraphs (sh,wh,ch,th) to decode and spell words
- Apply knowledge of vowel patterns, such as CV, VC, CVC, CVCE, CVVC, CVCC, to decode and spell words
- Apply knowledge of r-controlled vowel patterns to decode and spell words
- Read regularly spelled one- and two-syllable words automatically
- Decode regular multisyllabic words
- Use phonetic strategies to self-correct reading when meaning breaks down.

Suggested activities for teachers

- Have students generate word lists illustrating a particular sound or spelling pattern.
- Teach spelling patterns.
- Provide abundant independent level reading materials and time to read them.

Suggested activities for students

- Read decodable texts.
- Highlight word patterns, blends, digraphs, diphthongs, and *r*-controlled vowel spellings in words.
- Sort words by a common phonetic element or vowel pattern.

Suggested resources

- *Phonological Awareness Literacy Screening (PALS)* Web site, http://pals.virginia.edu
- *Virginia's Early Intervention READING Initiative (EIRI)* Web site, http://www.pen.k12.va.us/VDOE/Instruction/Reading/readinginitiative.html

Suggested classroom assessment methods

- Student demonstrations
- Running records
- Writing samples
- Quizzes
- Tests

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R11a
Adapt the classroom computer so that it is accessible to a single-switch user. Teach the student how to navigate software that uses reinforcing and fun activities to teach phonics. The student must respond correctly to the computer to move through the activities by matching consonants, consonant blends, and consonant digraphs.	
Possible Communication Skills:	
C9 The student will follow one-step or multi-step directions	

SAMPLE ACTIVITY 2:	E-R11a/c
Teach the student to use an electronic dictionary with speech. The student types in an unfamiliar multi-syllabic word and has the device read it back to her so that she can continue reading.	
Possible Communication Skills:	
C9 The student will follow one-step or multi-step directions C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.	

SAMPLE ACTIVITY 3:	R11a/b
Provide a chart with a sample of a word pattern in each of three columns. The student will sort words into word family groups based on short vowel, long vowel and r-controlled vowel patterns. The student will then spell words, using a voice output communication device with letters on cells, which a typically developing peer dictates from the list.	
Possible Communication Skills:	
C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C9 The student will follow one-step or multi-step directions	

SKILL GROUP 3

Organizing Topic → Fluency

In Skill Group 3, students continue to work on developing oral reading fluency. Fluent readers can read text quickly, accurately, and with expression. Fluency develops from reading practice, therefore classrooms should be designed to provide students with opportunities to read and reread materials at their instructional and independent levels. By the end of Skill Group 3, students should be able to read, with 90-percent accuracy or better, books on their independent reading level. Listening to students read graded passages provides information for estimating reading levels, diagnosing strengths and weaknesses, and evaluating progress.

Related Aligned Standards of Learning

E-R14 The student will read fiction and nonfiction, using a variety of strategies independently.

a)Preview the selection by using pictures, diagrams, titles, and headings.

b)Set purpose for reading.

c)Read stories, poems, and passages with fluency and expression.

d)Reread and self-correct when necessary.

Essential understandings, knowledge, and skills

To be successful with this standard, students are expected to

- Use prior knowledge to predict information
- Interpret illustrations, such as diagrams, charts, graphs, and maps to make predictions about the text
- Use titles and headings to generate ideas about the text
- Skim text for section headings, bold type, and picture captions to help set a purpose for reading
- Set a purpose for reading
- Use print clues, such as bold type, italics, and underlining, to assist in reading
- Apply phonics, meaning clues, and language structure to decode words and increase fluency
- Use phonics, meaning clues, and language structure strategies to reread and self-correct
- Pause at commas and periods during oral reading
- Practice reading in text that is on their independent reading level to develop accuracy, fluency, and expression.

Suggested activities for teachers

- Record on chart paper “What I Think Will Happen” before reading and “What Did Happen” after reading.
- Model previewing, predicting, and setting a purpose for reading during teacher read-alouds.
- Consistently have students preview, predict, and set a purpose for reading.
- Provide time for independent reading.

Suggested activities for students

- Reread familiar texts.

Suggested resources

- *Phonological Awareness Literacy Screening (PALS)* Web site, http://pals.virginia.edu
- *Virginia's Early Intervention READING Initiative (EIRI)* Web site, http://www.pen.k12.va.us/VDOE/Instruction/Reading/readinginitiative.html

Suggested classroom assessment methods

- Student demonstrations
- Running records

Suggestions for Sample Activities:

Sample Activity 1:	E-R14a
The student will use a highlighter tool or switch to mark the appropriate heading found in enlarged and/or adapted electronic science text when asked by a typically developing peer in a cooperative learning group, "Which one says 'Weather'?"	
Possible Communication Skills:	
C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C8 The student will engage in communicative exchanges with peers and adults.	

Sample Activity 2:	E-R14c
The student will read fluently by selecting the appropriate text phrase paired with pictures and/or symbols from a four celled voice output communication device to complete missing phrases in repeated pattern literature during guided reading with typically developing peers. (Primary examples include supplying "_____,_____, What do you see?" or "I see a _____ looking at me" in the book Brown Bear, Brown Bear" or "He was still hungry," in The Very Hungry Caterpillar, or "No more monkeys jumping on the bed!" in "Five Little Monkeys Jumping on the Bed. Intermediate/high school students might include supplying a missing phrase from a read-aloud of "The Pledge of Allegiance.").	
Possible Communication Skills:	
C11 The student will listen to and actively participate in a variety of language activities including choral speaking, rhymes, songs and stories with repeated patterns.	

Sample Activity 3:	E-R 14 c
The student selects symbols to be paired with text to write a personal experience story about an assembly or field trip with typically developing peers. Once completed, the story is re-read aloud by the student or student's self-operated voice-output communication system on multiple occasions to increase independence and fluency.	
Possible Communication Skills:	
C10 The student will use voice level appropriate to a variety of settings and situations. C13 The student will share stories and information with an audience.	

SKILL GROUP 3
Organizing Topic → Vocabulary and Comprehension

In Skill Group 3, most students should be readers. When they read independently, they can understand and enjoy books that are considerably longer and more complex in plot, vocabulary, syntax, and structure than the books they read in Skill Group 2. Silent and independent reading will increase, with some parts of books read aloud for emphasis, classification, or pleasure. Reading programs focus on vocabulary development for both narrative and informational/functional text as well as the comprehension strategies of identifying main ideas, making and confirming prediction, and formulating questions about what they are learning across the curricula. Vocabulary and comprehension skills should be systematically and directly taught to students.

Related Aligned Standards of Learning

E-R12 The student will use meaning clues and language structure when reading.
- a)Use information in the story to read words.
- b)Use knowledge of sentence structure.
- c)Use knowledge of story structure and sequence.

E-R13 The student will use language structure to expand vocabulary when reading.
- a)Use knowledge of prefixes and suffixes.
- b)Use knowledge of contractions and singular possessives.
- c)Use knowledge of simple abbreviations.
- d)Use knowledge of antonyms and synonyms.

E-R15 The student will read and demonstrate comprehension of fiction and nonfiction.
- a)Make predictions about content.
- b) Read to confirm predictions.
- c) Relate previous experiences to the topic.
- d) Ask and answer questions about what is read.
- e) Locate information to answer questions.
- f) Describe characters, setting, and important events in fiction and poetry.
- g)Identify the problem, solution, and main idea.

E-R16 The student will demonstrate comprehension of information in reference materials.
- a)Use a table of contents.
- b)Use pictures and charts.
- c)Use dictionaries and indices.

Essential understandings, knowledge, and skills

To be successful with these standards, students are expected to

- Use prior knowledge to interpret pictures and diagrams in order to predict text
- Use meaning clues to support decoding
- Use surrounding words in a sentence to determine the meaning of a word
- Use the context of the sentence to distinguish which of the multiple meanings of a word makes sense
- Use knowledge of word order, including subject, verb, and adjectives, to check for meaning
- Use story structure, titles, pictures, and diagrams to check for meaning

- Reread to clarify meaning
- Use common prefixes and suffixes to decode words
- Demonstrate an understanding of common prefixes, such as *un-, re-, dis-, pre-,* and *mis-*
- Demonstrate an understanding of common suffixes, such as *-er, -y, -ful, -less, -est,* and *-ly*
- Demonstrate an understanding of the meaning of contractions
- Demonstrate an understanding of what the apostrophe signifies in singular possessive words (e.g., *Mary's*)
- Identify simple abbreviations, including those for titles (e.g., *Mr., Mrs., Ms.,* and *Dr.*), calendar words (e.g., *Jan., Feb., Mon.,* and *Tue*.), and address words (e.g., *St.* and *Rd*.)
- Supply synonyms and antonyms for a given word
- Read fiction and nonfiction print materials and trade books that reflect the Virginia Standards of Learning in English, history and social science, science, and mathematics
- Use information from the text to make predictions
- Use information from a selection to confirm predictions
- Find evidence to support predictions
- Begin to skim for information
- Apply knowledge of story structure to predict what will happen next
- Use knowledge of sequence to make predictions while reading functional text such as recipes and other sets of directions
- Use knowledge from their own experiences to make sense of and talk about a topic
- Describe the setting and important events of a story
- Describe a character's traits, feelings, and actions as presented in a story
- Identify the problem and solution presented in a story
- Identify the main idea
- Identify the sequence of steps in functional text such as recipes or other sets of directions
- Follow the steps in a set of written directions
- Locate information in textbooks and other trade books to answer questions
- Begin to use knowledge of transition words (signal words), such as *first, next,* and *soon,* to understand how information is organized
- Use the framework of beginning, middle, and end to retell story events
- Ask and answer simple who, what, when, where, why, and how questions
- Write responses to what they read
- Locate titles and page numbers, using a table of contents
- Use a table of contents to locate information in content-area books
- Interpret pictures, diagrams, and tables
- Interpret information presented in bar graphs, charts, and pictographs
- Alphabetize words to the second and third letter

- Locate words, using first, second, and third letter
- Locate guide words, entry words, and definitions in dictionaries and indices.

Suggested activities for teachers

- Model rereading and self-correcting.
- Read nonfiction books aloud, and model using text clues, such as bold type, italics, underlining titles, and headings, to gain meaning.
- Model and have students consistently preview/predict before reading fiction and nonfiction selections.
- Have students make class, group, and individual charts, graphs, and maps.
- Create a class book which illustrates the multiple meanings of words.
- Model comprehension strategies by using think-alouds during teacher read-alouds.
- Read aloud from a variety of genres.
- Have students use before-reading strategies, such as
  - anticipation guides
  - previewing/predicting
  - KWL charts
  - brainstorming
  - creating concept webs that help students build background knowledge.
- Have students use during-reading strategies, such as
  - summarizing (Students frequently stop reading to summarize or retell story events after each page, paragraph, or section.)
  - sticky-note or bookmark reading (Students place sticky notes or bookmarks in the text to mark information that relates to a particular question.)
  - graphic organizers (Students record information such as story events, story elements, or the summary of a section as they read.).
- Have students use after-reading strategies, such as
  - summarizing/retelling
  - sequencing events
  - class/group discussions
  - confirming predictions.
- Teach the format for a functional text.
- Preview books with students noting such features as the title page, table of contents, and glossary.
- Demonstrate the use of glossaries, title page, indices, and table of contents in other curriculum texts.
- Create class books with a table of contents and glossary.

Suggested activities for students

- Reread familiar text.
- Dramatize the story.

Suggested resources

- *Phonological Awareness Literacy Screening (PALS)* Web site, http://pals.virginia.edu
- *Virginia's Early Intervention READING Initiative (EIRI)* Web site, http://www.pen.k12.va.us/VDOE/Instruction/Reading/readinginitiative.html

Suggested classroom assessment methods

- Classroom observations
- Student demonstrations
- Running records
- Retellings
- Quizzes
- Tests
- Student projects

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R12c
As a member of an elementary group, the student will collaborate to create a story based on a recent common experience, (e.g. field trip, assembly). The student will provide at least one sentence to the collaborative story.	
Possible Communication Skills:	
C4. The student will contribute to group interactions across content areas, settings, situations and audiences C9 The student will follow one-step or multi-step directions C13 The student will share stories or information with an audience	

SAMPLE ACTIVITY 2:	E-R12a/c
When teaching a middle school novel unit (e.g. *Bully for you, Teddy Roosevelt*), help the students create a reader response journal for each day's reading. The student will label pictures illustrations from the story or related pictures cut from magazines (if reading a book that is not illustrated) to guide their responses.	
Possible Communication Skills:	
C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C9 The student will follow one-step or multi-step directions	

SAMPLE ACTIVITY 3:	E-R12b

Student dictates sentences about the day's reading which the high school
English teacher writes on individual sentence strips. Cut the sentences into individual words. The student will recreate sentences.

Possible Communication Skills:

C4 The student will contribute to group interactions across content areas, settings, situations and audiences
C9 The student will follow one-step or multi-step directions
C13 The student will share stories or information with an audience.

SAMPLE ACTIVITY 1:	E-R13a

The student will choose the appropriate prefix needed to complete a root word to name a demonstrated action during a language arts instructional activity within the general education classroom. (e.g. After the demonstration and display of untying a shoe, the student will select the prefix UN from a choice board of UN, RE and MIS to attach to a picture/symbol of "tie" with associated text to make the word "untie").

Possible Communication Skills:

C1 The student will use gestures to respond to, support, accentuate and dramatize verbal messages.
C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

SAMPLE ACTIVITY 2:	E-R 13b

The student will select the appropriate singular possessive phrase to describe an age-appropriate personal belonging of a member within the general education language arts class from two or more choices. (When shown a backpack, the student chooses between *Mary* or *Mary's* to answer the question "Whose backpack is that?" ; When shown a CD player, the student chooses between *his* and *hers* to answer the questions, "Whose CD player is it?").

Possible Communication Skills:

C8 The student will engage in communicative exchanges (conversations) with peers and adults.
C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.

SAMPLE ACTIVITY 3:	E-R13c

The student will select the appropriate abbreviation to name a familiar staff person when moving from setting to setting within the school, (cafeteria, library, gym…) with typically developing peers. When asked, "Who is this?" the student will select either "*Mr*." or "*Mrs*." from a choice board before pointing to the staff person's picture and last name.

Possible Communication Skills:

C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.
C8. The student will engage in communicative exchanges (conversations) with peers and adults.

SAMPLE ACTIVITY 1:	E-R15a

The student will widen his eyes to indicate the appropriate naming of his prediction about content of a book selected during a trip to the library with typically developing peers. A peer or teacher might say, "This book is about monkeys. This book is about dogs or This book is about fish." The student widens his eyes when fish are named to indicate his prediction that the book is about fish. Or, when shown a selected book from the library shelf, the student will point or activate a voice output system to answer yes/no questions, such as, "Is this book about dogs? Is this book about fish? Is this book about monkeys?" to indicate his content prediction.

Possible Communication Skills:

C2 The student will use facial expressions to respond to, support, accentuate, and dramatize verbal messages.
C12 The student will consistently respond to "Yes/No" questions across a variety of settings, situations, and content areas.

SAMPLE ACTIVITY 2:	E-R15b

The student will respond to "yes/no," questions such as "Was the book about fish?" and/or "Were you right?" after listening to a typically developing peer read aloud a selected book from which content predictions were made by the student.

Possible Communication Skills:

C8 The student will engage in communicative exchanges with peers and adults.
C12 The student will consistently respond to "Yes/No" questions across a variety of settings, situations, and content areas.

SAMPLE ACTIVITY 3:	E-R15d

The student will use a picture communication system and/or a picture choice board to respond to "Wh" comprehension questions about the text shared during a guided reading or partial participation reading activity with typically developing peers. (When asked, "Who did we just read about?" the student selects from pictures/symbols of boy, fish or dog. When asked, "What was the fish doing?" the student selects from pictures/symbols of dancing, swimming, reading, or eating.

Possible Communication Skills:

C1 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.
C8 The student will engage in communicative exchanges with peers and adults

SAMPLE ACTIVITY 1:	E-R16a

During a content lesson with typically developing peers, the student will match print on a card listing a chapter title to the listed title in the table of contents. The student will answer "yes/no" questions related to the page number the chapter begins upon when asked, "Does it begin on page____?"

Possible Communication Skills:

C4 The student will contribute to group interactions across content areas, settings, situations and audiences.
C12 The student will answer yes/no questions across a variety of settings, situations, and content areas.

SAMPLE ACTIVITY 2:	E-R16b

The student will count the number of scoops displayed on a picture graph when reading an experience story written by the class called "Our Favorite Ice Cream." The student will select the appropriate response from a 4 cell choice board to answer the question, "How many students liked chocolate?"

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate, and dramatize verbal messages.
C13 The student will share stories or information with an audience.

SAMPLE ACTIVITY 3:	E-R16c

The student will use a personal word bank with a guide letter of the alphabet listed at the top of each page, to locate a requested word by a peer in a cooperative learning group within a general education content class. (During science, the student looks at the word volcano, scans the word bank for the letter "v", then selects the word volcano on that page and shares the definition of the word with the group).

Possible Communication Skills:

C3 The student will use objects and or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.
C4 The student will contribute to group interactions across content areas, settings, situations and audiences.

SKILL GROUP 4

SKILL GROUP 4
Organizing Topic → Decoding, Word Analysis, and Spelling

In Skill Group 4, students' decoding of the print-sound code should become automatic across text. Students should continue to learn about words – roots, inflections, suffixes, prefixes, homophones, and word families. Mastery and application of word-analysis skills allow students to improve their fluency, vocabulary, spelling, and comprehension.

Related Aligned Standards of Learning

E-R17 The student will apply word-analysis skills when reading.

a)Use knowledge of all vowel patterns.

b)Use knowledge of homophones.

c)Decode regular multisyllabic words.

Essential understandings, knowledge, and skills

To be successful with this standard, students are expected to

- Apply knowledge of all vowel patterns
- Apply knowledge of diphthongs, such as *aw* and *oy*
- Apply knowledge of roots
- Apply knowledge of affixes, such as *dis-, ex-, non-, pre-, -ly,* and *-ness*
- Use knowledge of homonyms/homophones, such as *be/bee, hear/here,* and *sea/see*
- Use context clues to verify meaning and determine appropriate homophone usage
- Apply knowledge of the change in tense (*-ed*), number (*-s*), and degree (*-er* and *-est)* signified by inflected endings
- Decode regular multisyllabic words in order to read fluently.

Suggested activities for teachers

- Teach spelling patterns.

Suggested activities for students

- Generate word lists illustrating a particular sound or spelling pattern.
- Read decodable texts.
- Sort spelling words by their common phonetic element or vowel pattern.
- Create books with illustrations and sentences to show correct homophone use.

Suggested resources

- *Phonological Awareness Literacy Screening (PALS)* Web site, http://pals.virginia.edu
- *Virginia's Early Intervention READING Initiative (EIRI)* Web site, http://www.pen.k12.va.us/VDOE/Instruction/Reading/readinginitiative.html

Suggested classroom assessment methods

- Classroom observations
- Student demonstrations
- Running records
- Writing samples
- Quizzes
- Tests

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R17a
The student will complete a word family sort, matching word pairs by the vowel pattern displayed, (tree/bee, bat/cat, dog/log, and book/cook) during a cooperative learning language arts instructional activity.	
Possible Communication Skills:	
C4 The student will contribute to group interactions across content areas, settings, situations and audiences. C11 The student will listen to and actively participate in a variety of language activities including choral speaking, rhymes, songs and stories with repeated patterns.	

SAMPLE ACTIVITY 2:	E-R17b
The student will complete a matching activity in which two homophone words and two pictures are displayed during an inclusive language arts activity. (Student matches the words bare and bear, to corresponding pictures of skin and a grizzly).	
Possible Communication Skills:	
C4 The student will contribute to group interactions across content areas, settings, situations and audiences. C13 The student will share stories and information with an audience.	

SAMPLE ACTIVITY 3:	E-R17c

The student will match a new multisyllabic vocabulary word to a real item, picture or symbolic representation of the word during a shared reading activity with typically developing peers. (Student matches the multisyllabic word, “computer” to the real object in the classroom).

Possible Communication Skills:

C3 The student will use object and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.
C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.

SKILL GROUP 4

Organizing Topic → Fluency

In Skill Group 4, students continue to work on developing oral reading fluency. Fluent readers can read text quickly, accurately, and with expression. Fluency develops from reading practice, therefore classrooms should be designed to provide students with opportunities to read and reread materials at their instructional and independent levels.

Related Aligned Standards of Learning

E-R18 The student will use strategies to read a variety of fiction and nonfiction materials.

a) Preview and use text formats.
b) Set a purpose for reading.
c) Apply meaning clues, language structure, and phonetic strategies.
d) Use context to clarify meaning of unfamiliar words.
e) Read fiction and nonfiction fluently and accurately.
f) Reread and self-correct when necessary.

Essential understandings, knowledge, and skills

To be successful with this standard, students are expected to

- Use text formats such as the following to preview and set a purpose for reading:
  - poetry features, such as lines and stanza
  - content text features, such as headings and chapter layout by topic
  - functional formats, such as advertisements, flyers, and directions
  - specialized type, such as bold face and italics
  - visually and graphically represented information, such as charts, graphs, graphic organizers, pictures, and photographs
- Apply understanding of text structure to guide reading by
  - making predictions based on knowledge of text form types, such as narrative, informational, graphic, and functional
  - making predictions based on knowledge of literary forms, such as folk tale, biography, and autobiography
  - identifying sequence and cause-effect relationships of information in functional texts, such as recipes and other sets of directions
- Use surface features of text to make meaning from text by
  - applying phonetic strategies
  - using punctuation indicators, such as commas, periods, exclamation points, question marks, and apostrophes showing contraction and possession
  - applying knowledge of simple and compound sentence structures
  - knowing when meaning breaks down and then rereading to self-correct
- Apply understanding of language structure to make meaning from text by
  - using signal words of time-sequence, such as *first, second, next, later, after,* and *finally*
  - using signal words of compare-contrast, such as *like, unlike, different,* and *same*
  - using signal words of cause-effect, such as *because, if…then,* and *when…then*

- using conventions of dialogue, such as: quotation marks to indicate someone is saying something, indentation to show that the speaker has changed, and signal words like *he said* and *she exclaimed*
- using knowledge of how ideas are connected between sentences when one word is used in place of another, such as the use of a pronoun for a noun, the use of a general location word (such as: *here* or *there*) for a specific location, and the use of a synonym for an earlier word (such as *animal* for *dog*)
- using context clues, such as a restatement, a renaming or synonym, an example, or a direct description or definition included in the sentence or paragraph, to clarify the meaning of unfamiliar words

- Read familiar fiction and nonfiction with fluency and accuracy.

Suggested activities for teachers

- Teach the organizational format of a functional text.
- Use the newspaper, mini-page, or content area text to find and highlight text features, such as captions, headings, maps, charts, and graphs.
- Model the use of text features while previewing/predicting, setting a purpose for reading, and during reading by using think-alouds.

Suggested activities for students

- Reread familiar text to improve reading fluency.

Suggested resources

- *Phonological Awareness Literacy Screening (PALS)* Web site, http://pals.virginia.edu
- *Virginia's Early Intervention READING Initiative (EIRI)* Web site, http://www.pen.k12.va.us/VDOE/Instruction/Reading/readinginitiative.html

Suggested classroom assessment methods

- Classroom observations
- Student demonstrations
- Running records

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R18a
The student will identify the bold face and italicized words during a content lesson with typically developing peers and use these words to make a graphic organizer of key information in the text. (The student selects the highlighted words, soil, light, water, and photosynthesis and places them within a graphic organizer developed to illustrate these key components of the plant life cycle.	
Possible Communication Skills:	
C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.	

SAMPLE ACTIVITY 2:	E-R 18b

The student will match various sources of text information to their purpose, such as a recipe to a food item, a map to a bus, and a telephone directory to a phone.

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.
C13 The student will share stories or information with an audience.

SAMPLE ACTIVITY 3:	E-R18c

The student will sequence pictorial or symbolic representations of the events in a story as happening *first, second, next, and finally* after partially participating in a read aloud story activity with typically developing peers.

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.
C13 The student will share stories and information with an audience.

SKILL GROUP 4
Organizing Topic → Vocabulary and Comprehension of Fiction

In Skill Group 4, when students read independently, they can understand and enjoy books that are considerably longer and more complex in plot, vocabulary, syntax, and structure. While oral guided reading is the focus of instruction, silent and independent reading will increase, with some parts of books read aloud for emphasis, clarification, or pleasure. Reading programs focus on vocabulary development for narrative text and the comprehension strategies of identifying main ideas, making and confirming predictions, and formulating questions about what they are reading. Vocabulary and comprehension skills should be systematically and directly taught to students.

Related Aligned Standards of Learning

E-R19 The student will read and demonstrate comprehension of fiction.

a)Set a purpose for reading.
b)Make connections between previous experiences and reading selections.
c)Make, confirm, or revise predictions.
d)Compare and contrast settings, characters, and events.
e)Identify the author's purpose.
f)Ask and answer questions.
g)Draw conclusions about character and plot.
h)Organize information or events logically.
i)Summarize major points found in fiction materials.
j)Understand basic plots of fairy tales, myths, folktales, legends, and fables.

Essential understandings, knowledge, and skills

To be successful with this standard, students are expected to

- Read for a specific purpose by
  - locating specific information in a reading selection
  - identifying details that support a stated main idea
  - expressing a stated main idea in their own words
- Make a variety of connections with the text, such as
  - connections between their own personal experiences and what is happening in the text
  - connections between the text they are reading and other texts they have read, such as identifying a similar plot or character
  - connections between what they already know about the topic and what they find that is new to them in the reading
- Use specific details to make, justify, and modify predictions by
  - identifying details from their own experience and knowledge that supports their predictions
  - identifying information from the text that supports or contradicts a prediction
  - revising predictions based on new understandings
- Gain meaning before, during, and after reading by
  - asking and answering questions to clarify meaning
  - asking and answering questions to predict what will happen next

  - understanding that sometimes two or more pieces of information need to be put together to answer a question
  - understanding that some questions are answered directly in the text
  - understanding that the answers to some questions must be inferred from the reader's background experiences and knowledge
  - understanding the basic plots of fairy tales, myths, folktales, legends, and fables
- Apply knowledge of characterization by
  - identifying a character's attributes (traits)
  - using evidence from the text to support generalizations about the character
  - identifying how the attributes of one character are similar to or different from those of another character
- Apply knowledge of setting by
  - identifying the time and place of a story,
  - Using supporting details from the text
  - identifying the details that make two settings similar or different
- Write responses that go beyond literal restatements
- Make generalizations about a character based on that character's response to a problem, the character's goal, and what the character says to other characters
- Support with specific details generalizations about characters from a selection
- Compare two characters within a selection or between/among two or more selections
- Identify the author's purpose
- Draw conclusion about a character and/or the plot from the selection
- Compare and contrast settings, characters, and events
- Organize information or events
- Summarize major points in a selection.

Suggested activities for teachers

- Model the following Think-Alouds for students:
  - Make and revise predictions.
  - Set a purpose for reading.
  - Connect previous experiences to the literature.
  - Formulate questions about the text and recognize the answer.
  - Summarize what has been read.
  - Reread to confirm understanding of text.

- Model and have students use before-reading strategies, such as
  - previewing/predicting
  - creating concept webs that help students build background knowledge
  - formulating questions about the text.
- Model and have students use during-reading strategies, such as
  - discussion
  - summarizing (Students frequently stop reading to summarize or retell story events after a section of the story has been read.)

  - graphic organizers (Students record information such as story events, story elements, or the summary of a section as they read.).
- Model and have students use after-reading strategies, such as
  - summarizing/retelling
  - sequencing events
  - graphic organizers
  - confirming predictions and discussing whether the answer to the purpose for reading was found.
- Engage students in group projects that extend reading and help to develop/practice skills for analyzing and applying new knowledge.

Suggested activities for students

- Use a Venn diagram or other graphic organizer to compare and contrast two characters' attributes or two settings.

Suggested resources

- *Phonological Awareness Literacy Screening (PALS)* Web site, http://pals.virginia.edu

Suggested classroom assessment methods

- Classroom observations
- Student interviews
- Student demonstrations
- Running records
- Quizzes
- Tests
- Student projects

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R19h
The student will select "First" and "Next" events in the story by vocalizing, pointing, gesturing to the pictures provided that represent different parts of the story. Before reading a book to a small group of students with and without disabilities, set the purpose. "You are going to read and listen to this book so that you can *put the picture/events from the story in order*." Provide an example for the students about what it means to "put things in order". Use their daily schedule as an example. Using picture symbols to represent activities show the student the order of events "You arrive at school (bus) Take books out of backpack and put on desk (books) Put your backpack away (locker/cubby) Sit down at desk (desk) Take out CD player and listen to poems (Headphones) etc…" Explain to the students that just like your schedule goes in order, so does the story have a first, next order. After reading, using pictures copied from the book, (ask student to select the events as they occurred in the story). Ask requests like: "Show me what comes first. Show me what comes next."	
Possible Communication Skills:	
C9.The student will follow one-step or multi-step directions.	

SAMPLE ACTIVITY 2:	E-R19f

The student will give answers to questions asked about a story read by pointing to objects that represent the story, picture symbols or pictures from book. The student may use a switch with a recording feature (AbleNet's One Step or Step by Step switches) to ask questions to his peers about the story.

Select a text that is common among peers and has pictures. Create a PowerPoint book (electronic book) using a scanner to copy pages of the story and inserting them into slides in PowerPoint software. Record a peer reading each page of the story and insert the sound clips into the appropriate slide of the story. Using a switch interface attached to the computer, the student can listen to the book and turn the pages by clicking the switch after each page is read. After the student listens to the story, the teacher may ask who and what questions using visuals to support. For example, show the student a picture of the main character in the story and a picture of an object in the story. Ask the student to choose/indicate (by eye-gaze, pointing, gesturing) who the story is about. Then using visuals again, show the student a picture of a significant event that occurred in the story and a picture from a different story. Ask the student what happened in the story. The student will indicate his choice/answer by eye-gaze, pointing or gesturing to the appropriate picture. Using a switch with a recording device, ask a peer buddy from another class/group to record the question "What do you think was the funniest part of the story?" The student may use the switch to ask peers in his group the question. The switch needs to be placed in an area that can be independently activated by the student.

Possible Communication Skills:

C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

SAMPLE ACTIVITY 3:	E-R19a

In science class, the student will state a purpose for reading about what plants need in order to grow (sun, water, food) so that the class can grow a garden. Using text that is understandable, (the text could be adapted using picture symbols paired with words and amount of text on each page could be limited, maintaining the important facts), the student will use this information to plan for a school garden. As the student reads and listens to information about plants, he/she will help classmates identify three necessary components for successful plant growth.

The student, with a peer buddy, will use a watering can, Miracle Grow Plant food box, and a picture of the sun to develop a chart listing the days of the week down the left hand column and objects in three rows across the top. The students can use this chart each day to document the conditions of the garden. The student can use a voice output device to ask "Did you water the garden today?" "Did you feed the plants today?" "Was it sunny today?" Peers could write yes or no in the chart to answer each question or the student could assist peers by using an ink stamp to record answers in the chart.

Possible Communication Skills:

C4. The student will contribute to group interactions across content areas, settings, situations and audiences.

SKILL GROUP 4

Organizing Topic → Vocabulary and Comprehension of Nonfiction

In Skill Group 4, most students are learning to make connections between previous experiences and reading selections. Reading programs focus on vocabulary development for informational/functional texts and the comprehension strategies of drawing conclusions, summarizing major points, organizing information/events, and formulating questions across the curricula. Students are learning the shared and distinguishing characteristics of an autobiography and a biography. They will also use a variety of print resources to research topics. Vocabulary and comprehension skills should be systematically and directly taught to students.

Related Aligned Standards of Learning

E-R20 The student will continue to read and demonstrate comprehension of nonfiction.

a)Identify the author's purpose.

b)Make connections between previous experiences and reading selections.

c)Ask and answer questions about what is read.

d)Draw conclusions.

e)Organize information and events logically.

f)Summarize major points found in nonfiction materials.

g)Identify the characteristics of biographies and autobiographies.

h)Compare and contrast the lives of two persons as described in biographies and/or autobiographies.

E-R21 The student will demonstrate comprehension of information from a variety of print resources.

a)Use dictionary, glossary, thesaurus, encyclopedia and other reference books, including online reference materials.

b)Use available technology.

Essential understandings, knowledge, and skills

To be successful with these standards, students are expected to

- Know the shared and distinguishing characteristics of autobiography and biography
- State in their own words the main idea of a nonfiction selection
- Identify details that support the main idea of a nonfiction selection
- Organize, using graphic organizers such as a Venn diagram or time line, information by chronological sequence, by cause-effect relationship, and through comparing and contrasting
- Make a variety of connections with the text, such as
  - connections between their own personal experiences and the text
  - connections between the text they are reading and other texts they have read
  - connections between what they already know about the topic and what they find in the reading that is new to them
- Gain meaning before, during, and after reading by
  - asking and answering questions to clarify meaning
  - understanding that sometimes two or more pieces of information need to be put together to answer a question
  - understanding that some questions are answered directly in the text
- Identify the author's purpose

- Summarize what they have read
- Draw conclusions about what is read
- Compare and contrast the lives of two people described in biographies and/or autobiographies
- Make decisions about which resource is best for locating a given type of information
- Locate selected information in glossaries, dictionaries, thesauruses, encyclopedias, atlases, and other print and online reference materials
- Retrieve information from electronic sources
- Use the Internet to find information on a given topic
- Use a printer to create hard copies of information retrieved from electronic sources.

Suggested activities for teachers

- Have students answer the question, "What does the author do to help us understand?" when previewing and setting a purpose for reading nonfiction. Generate a list, such as
  - The author organizes information by chapters.
  - The author uses headings in bold type to show important ideas.
  - The author uses maps, charts, graphs, and captions to give additional information.
  - The author uses italics and bold type to emphasize important vocabulary.
- Teach the organizational format of a functional text.
- Teach the SQ3R strategy for reading nonfiction:
  - Survey (preview the text)
  - Question (think or write a question about the text you want to answer)
  - Read
  - Recite
  - Review.
- Use the newspaper or mini-page to find and highlight text features, such as captions, headings, maps, charts, and graphs.
- Model the application of text features while previewing/predicting, when setting a purpose for reading, and during reading by using Think-Alouds.
- Develop project ideas that help students practice and extend student learning.
- Use a Venn diagram to compare and contrast various literary forms.

Suggested resources

- *Phonological Awareness Literacy Screening (PALS)* Web site, http://pals.virginia.edu

Suggested classroom assessment methods

- Classroom observations
- Student interviews
- Student demonstrations
- Running records

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R20b
The student will use his/her voice, visual aids (provided by teacher) or an AAC device to express stories and information with his/her classmates. Help the student select a book that relates to a recent family trip/ school trip/ hobby or special interest of his/hers. Gather information from parents/friends, including photos or souvenirs that relate to the topic. Create a communication system if necessary, using appropriate vocabulary related to the topic, to encourage the student's involvement in the reading process. As you read with the student, help him/her to make connections between his/her experiences and what is happening in the book. Encourage communication with the student.	
Possible Communication Skills:	
C13 The student will share stories or information with an audience.	

SAMPLE ACTIVITY 2:	E-R20c
After reading non-fiction material with the student or after the student has read an electronic book, ask who and what questions. Use visuals to support the student. The student might share his answers by pointing to objects that represent the story, picture symbols or pictures from the book.	
Possible Communication Skills:	
C13 The student will share stories or information with an audience.	

SAMPLE ACTIVITY 3:	E-R20h
Ask student and family members about famous people in history that might be of interest to the student (ex. Babe Ruth, Betsy Ross, Martin Luther King Jr.) Help the student to select two people (use pictures of each) and ask student to choose by pointing, gesture, eye gaze. The student may work with a peer buddy to search on the internet for in biographical/autobiographical information that includes words and pictures. The peer might ask "Which person do you want to search the web for?" The peer would show the student two photos of different people. The student and peer can take the information gained and make a chart that compares and contrasts their characteristics.'" The student will select his/her answer by using eye gaze, pointing, vocalizing toward the pictures representing two different people. The student might also indicate his/her preference between the two by using different facial expressions (frown or smile) when show each photo and asked "Which one of these people do you like the best?"	
Possible Communication Skills:	
C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.	

SAMPLE ACTIVITY 1:	E-R21a
Given a picture menu of items available in the school store, and when asked, "What do you want to buy?" the student will point or gestures at each item on the list. The student may select his/her choice with assistance by using a bingo marker to mark the picture of each desired item. When the student goes to the school store, he/she may express what he would like to purchase by handing the clerk a list of items that was created in the classroom with a peer buddy.	
Possible Communication Skills:	
C6 The student will express wants and needs to others.	

SAMPLE ACTIVITY 2:	E-R21a
When asked by the teacher to find the word of the day using the picture dictionary—the student will use his four cell device that has different words/symbols on it including the "word of day" and activate it to tell classmates the word and definition.	
Possible Communication Skills:	
C9 The student will follow one-step or multi-step directions.	

SAMPLE ACTIVITY 3:	E-R21a
As the students move through the day, remind them to "Check your schedule" and without prompting, assess to see whether or not the student can understand what to do next according to his/her schedule. The student will find his/her schedule and read it/use it and proceed to next activity. Develop a daily visual schedule (using words; picture symbols; objects; photographs) with each student.	
Possible Communication Skills:	
C9 The student will follow one-step or multi-step directions.	

SKILL GROUP 5

SKILL GROUP 5
Organizing Topic → Word Analysis and Spelling

In Skill Group 5, students' decoding of the print-sound code is automatic across the whole span of language. Students continue to learn about words — roots, inflections, suffixes, prefixes, homophones, and word families — as part of vocabulary growth. Books present new words to be decoded using knowledge of phonetic skills and word structures. Mastery and application of these skills allow students to improve their fluency, vocabulary, spelling, and comprehension.

Related Aligned Standards of Learning

E-R22 The student will read fiction and nonfiction with fluency and accuracy.

a)Use context to clarify meanings of unfamiliar words.

b)Explain words with multiple meaning.

c)Use knowledge of word origins; synonyms, antonyms, and homonyms; and multiple meanings of words.

d)Use word-reference materials, including the glossary, dictionary, and thesaurus.

Essential understandings, knowledge, and skills

To be successful with this standard, students are expected to

- Use context to clarify the meaning of unfamiliar words
- Use their knowledge of synonyms (words with like meanings) and antonyms (words with opposite meanings) to understand the meanings of unfamiliar words
- Discover word meaning by using their knowledge of homonyms/homophones (words that are pronounced the same but are spelled differently and have different meanings), such as read/red, no/know, hear/here
- Use clues in the context of a sentence, paragraph, or reading selection to predict and explain the meanings of words that have more than one meaning (multiple meanings of words)
- Use context to select the most appropriate definition of a multiple-meaning word from a glossary or dictionary
- Use knowledge of word origins
- Identify the word reference material(s) most likely to contain needed information
- Read familiar text with fluency, accuracy, and expression.

Suggested activities for teachers

- Provide a variety of interesting materials and time to read.
- Model using context clues to determine the meaning of an unfamiliar word.

Suggested activities for students

- Generate lists of synonyms, antonyms, and homophones.
- Make a class book of sentences and illustrations for words with multiple meanings.
- Use a graphic organizer to compare and contrast the features and uses of the glossary, dictionary, and thesaurus.

Suggested classroom assessment methods

- Classroom observations
- Student demonstrations
- Writing samples
- Quizzes
- Tests

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R22a

Using the lyrics from the student's favorite song (children's songs; pop; rock-n-roll; country; etc.) put on chart paper in a visual format understood by the student---remove key words. Using visual aids ask student to select the word that is missing and place it in the blank. Review the lyrics and ask the student "Does this make sense?" For example for the song "I believe I can fly." You might leave out the word "fly" and ask the group what word is missing. The student indicates his answers ideas by selecting the word/picture symbol by speaking, pointing or eye gaze when participating in reading activities. The student can also hit a voice output device that has the repeating verse of a song with the last word missing (i.e. "I believe I can …") Classmates can say their answers aloud following the verse recorded on the switch.

Possible Communication Skills:

C11.The student will listen to and actively participate in a variety of language activities including choral speaking, rhymes, songs and stories with repeated patterns.

SAMPLE ACTIVITY 2:	E-R22c

Discuss with the class places in the school and community that have signs/symbols that tell you where you are going or what to do (Exit/Entrance, Men/Women, Out/In, Push/Pull, Up/Down etc.). Label these as "antonyms". Take the students around the school building to point out the signs and use pictures from the community that have these signs. Encourage the students to follow the directions on the sign, so that you can assess their understanding of the sign. Point out to the students the origin of the words. For example "You follow the *Exit* sign to go out of the building, and the *Entrance* sign to come in the building. You did the *opposite* action when you followed the directions of each sign." When asked by the teacher while standing outside Target "Do you go in this door?" (while pointing to the word marked on the door "EXIT Only") The student shakes his head/frowns/gestures to indicate "NO".

Possible Communication Skills:

C12. The student will consistently respond to "Yes/No" questions across a variety of settings, situations and content areas.

SAMPLE ACTIVITY 3:	E-R22a

After attending a school play or going out for community-based instruction, write a story with your students. Use sentence strips, picture symbols and/or photographs. Write at least 5 sentences. Read the story several times. For the next day's lesson prepare your story strips (cut them into chunks) and as you read the story again, take out key words. Read the story aloud to the class and ask the students to use word cards/picture symbols/and /or photographs to fill in the missing words. The student will work in the small group and share answers by taking turns with classmates. As the story is read aloud by the teacher, the student will use a touch light to indicate to the teacher that he/she would like to answer the question. The student will indicate his answer using word cards/picture symbols/and /or photographs.

Possible Communication Skills:

C5. The student will follow basic rules for conversations including turn taking and listening to a speaker.

SKILL GROUP 5

Organizing Topic → Vocabulary and Comprehension of Fiction

In Skill Group 5, students have learned how to read and now continue to build and expand vocabulary and comprehension skills. Students read widely from the fiction genres of poetry, classic literature, and contemporary literature. Students use reading strategies before, during, and after reading to develop and demonstrate comprehension. The use of graphic organizers facilitates students' understanding of text organization and helps them identify major events and supporting details.

Related Aligned Standards of Learning

E-R23The student will read and demonstrate comprehension of fiction.

a)Explain the author's purpose.

b)Describe how the choice of language, setting, and information contributes to the author's purpose.

c)Compare the use of fact and fantasy in historical fiction with other forms of literature.

d)Identify major events and supporting details.

e)Describe the relationship between text and previously read materials.

f)Identify sensory words.

Essential understandings, knowledge, and skills

To be successful with this standard, students are expected to

- Explain why the author wrote the piece (identify purpose), e.g., to entertain, inform, or persuade
- Find words or sentences that help identify the author's purpose
- Find setting details and other information that help identify the author's purpose
- Know that fictional stories, such as fantasy, describe imaginary characters and events
- Understand that historical fiction is a story based on facts
- Identify the facts contained in a piece of historical fiction
- Compare the use of fact and fantasy in historical fiction with the use of fact and fantasy in other forms of literature
- Identify major events and supporting details
- Discuss the similarities and differences between text and previously read materials
- Identify sensory words that describe sights, sounds, smells, and tastes, and describe how they make the reader feel
- Know that narrative poetry tells a story through verse.

Suggested activities for teachers

- Read aloud from a variety of genres, and have students identify the author's purpose.

Suggested activities for students

- List examples of fact and fantasy from a work of historical fiction.
- Identify major events and supporting details in fiction, using graphic organizers.

Suggested classroom assessment methods

- Classroom observations
- Student demonstrations
- Student interviews
- Quizzes
- Tests

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	R23f

Select a poem that includes a lot of sensory words that are tangible. Select some objects that might represent these words (windy (fan); soft (pillow); hard (rock); wet (water). Explain to the students that poets choose their words carefully to create an impact on their readers and that these words help the reader to better imagine places, characters and events. Read the poem aloud to the class. Ask the students to try and imagine what the pictures the poet was trying to create. Read the story again with the students and use some of the objects that represent the sensory words of the poem to help the students "experience" the poem. The students will indicate their feelings using their form of communication. Ask them what they liked and didn't like about the poem experience.

Possible Communication Skills:

C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.

SAMPLE ACTIVITY 2:	E-R23b

Adapt a story for the class using picture symbols and words. Read the story aloud, following along with your finger to point out each word/symbol. Identify key components of the accompanying pictures. Develop a template of a graphic organizer to display key elements of the story (Who? What? Where? Conclusion?). Provide students with words/picture symbols/photograph of things that represent the story and ask the student "Who was the story about?" "What happened in the story?" "Where did the story take place?" "What happened at the end of the story?" The student may use the graphic organizer to display his/her answers. The student may also verbalize/gesture/eye-gaze/point to indicate answer.

Possible Communication Skills:

C8 The student will engage in communicative exchanges (conversations) with peers and adults.

SAMPLE ACTIVITY 3:	E-R23d

Read or tell a story using a book with props representing main parts of the story. After you have read the story several times to the class using the props, have the students go through the box of props and identify the specific part of the story where this prop was used. The student may page through the book, and point to the page/sections where the prop was used in the story. The student will verbally communicate or use a prerecorded device to say, "I know where it belongs." The student will point/gesture eye gaze toward the section of the story where the prop belongs.

Possible Communication Skills:

C7 The student will initiate communication.

SKILL GROUP 5
Organizing Topic → Vocabulary and Comprehension of Nonfiction

In Skill Group 5, students continue to build and expand vocabulary and to demonstrate comprehension of nonfiction text: before reading — by predicting and categorizing information, during reading — by formulating questions and making inferences, and after reading — by summarizing content. They will also collect information from a variety of resources in order to acquire additional knowledge about a topic. Students will construct questions about a topic, gather information, and then synthesize the information for use in oral presentations and/or writing.

Related Aligned Standards of Learning

E-R24 The student will read and demonstrate comprehension of nonfiction.

a)Use text organizers, such as type, headings, and graphics, to predict and categorize information.

b)Formulate questions that might be answered in the selection.

c)Explain the author's purpose.

d)Make simple inferences, using information from texts.

e)Draw conclusions, using information from texts.

f)Summarize content of selection, identifying important ideas and providing details for each important idea.

g)Describe relationship between content and previously learned concepts or skills.

h)Distinguish between cause and effect and between fact and opinion.

i)Identify new information gained from reading.

E-R25 The student will demonstrate comprehension of information resources to research a topic.

a)Construct questions about a topic.

b)Collect information, using the resources of the media center, including online, print, and media resources.

c)Evaluate and synthesize information.

Essential understandings, knowledge, and skills

To be successful with these standards, students are expected to

- Apply prior knowledge to make predictions and to describe the relationship between content and previously learned concepts
- Generate questions to guide reading of text through reading strategies, such as KWL (Ogle) or DRTA (Stauffer)
- Use text set in special type styles (e.g., boldfaced, italics) and color; captions under pictures and graphics; and headings of sections and chapters to predict and categorize information
- Summarize text by identifying important information and providing supporting detail for each important idea in a selection, using tools such as graphic organizers, outlines, and notes
- Write responses that go beyond literal restatements in order to make connections to their own lives and to other selections
- Understand that nonfiction materials, such as biographies and informational text, tell about real people, places, objects, and/or events
- Understand how written text and accompanying illustrations connect to convey meaning
- Explain why the author wrote the piece

- Combine information from various places in the text to draw a conclusion
- Distinguish between fact and opinion
- Identify cause-and-effect relationships
- Identify new information learned from reading
- Make simple inferences, using information from the text
- Formulate research questions based on a topic
- Select and use appropriate references, such as dictionaries, atlases, almanacs, encyclopedias, and thesauruses, including online, print, and media resources
- Select the information that is related to their topic
- Evaluate and combine (synthesize) related information from two or more sources
- Identify key terms to use in searching for information
- Skim to find information related to a topic.

Suggested activities for teachers

- Model and use Think-Aloud comprehension strategies.
- Model how to use before-reading strategies, such as
  - previewing titles, headings, captions, maps, charts, and graphs to make predictions.
  - setting a urpose for reading
  - KWL charts
  - brainstorming
  - creating concept webs that help students build background knowledge
  - formulating questions about the text.
- Model how to use during-reading strategies, such as
  - summarizing (Students frequently stop reading to summarize or retell events.)
  - sticky-note or bookmark reading (Students place sticky notes or bookmarks in the text to mark information that relates to a particular question.)
  - graphic organizers.
- Model how to use after-reading strategies, such as
  - summarizing/retelling
  - class/group discussions
  - graphic organizers
  - completing the L part of KWL.

Suggested activities for students

- Use the SQ3R strategy:
  - Survey (preview the text)
  - Question (think or write a question about the text)
  - Read
  - Recite
  - Review.

Suggested classroom assessment methods

- Classroom observations
- Student demonstrations
- Student interviews
- Quizzes
- Tests
- Student projects

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R24b

Select a topic of interest to the student/students based on your knowledge, student input and their families. The student will indicate by "Yes or No" what he wants to learn about the topic, when asked "Do you want to learn____?" Introduce the topic to the class. Using chart paper, write the topic at the top in the center. Below and at the left margin write *What We Know.* Create communication tools for your students related to the topic as well as tools that are unrelated to the topic. Ask the students to communicate what they KNOW about the topic and place it on the chart under what we KNOW. Prior to the next lesson create a three column table. The first column is labeled *"What we KNOW"*; the second column heading *"What we WANT to learn"*; the third column heading *"What we LEARNed"*. Introduce the chart as a KWL chart, pointing out each feature. Help the students to generate some questions about what they WANT to learn and complete the chart using words/picture symbols/photos.

Possible Communication Skills:

C12 The student will consistently respond to "Yes/No" questions across a variety of settings, situations and content areas.

SAMPLE ACTIVITY 2:	E-R24e

Continue activity from E-R24b.
Using the information in the second column "WANT to learn", ask the students to communicate the answer to these questions given a choice of two to three communication symbols. Record answers in the third column of the KWL chart "Information LEARNED". After reading the story, encourage the students draw conclusions to fill in the final column of the KWL chart "Information LEARNED", generate a class discussion. Create communication tools for your students related to the topic as well as tools that are unrelated to the topic.

Possible Communication Skills:

C6 The student will express wants and needs to others.

SAMPLE ACTIVITY 3:	E-R24i

Continue activity from E-R24e.
Review the chart with the students. Identify new information learned about the topic in the last column. Work with the students to graph "What I KNOW" using visual supports (pictures/photos) attached to poster board with Velcro. Create a second graph that includes "What I KNOW" and the pictures/photos of "What I LEARNED" attached to poster board with Velcro. Ask the students to compare the graphs and identify/comment that they learned more about the topic after reading---the second graph SHOULD be larger.

Possible Communication Skills:

C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.

SAMPLE ACTIVITY 1:	E-R25a

The student will identify what they Know about a topic and What they want to know about a topic as a part of preparing questions to complete a research project for a general education middle school science class. (After choosing a research topic the student will utilize a choice board with picture symbols to select symbols to complete a KWL chart).

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.
C4 The student will contribute to group interactions across content areas, settings, situations and audiences.
C9 The student will follow one-step or multi-step directions.
C13 The student will share stories or information with an audience.

SAMPLE ACTIVITY 2:	E-R25b

The student will use a switch to access the internet in an elementary general education computer lab in order to select information related to a particular topic

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.
C9 The student will follow one-step or multi-step directions.

SAMPLE ACTIVITY 3:	E-R25c
The student will use graphic organizer software to organize information/pictures from at least 3 sources on a research topic for a general education high school history class.	
Possible Communication Skills:	
C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C9 The student will follow one-step or multi-step directions.	

SKILL GROUP 6

SKILL GROUP 6

Organizing Topic → Word Analysis and Spelling

In Skill Group 6, students continue to build and use their spelling and vocabulary knowledge. They use word structure and context clues to determine meanings of unfamiliar words. They also use work-reference materials to learn new words. Emphasis is on word origins, specifically Greek and Latin affixes.

Related Aligned Standards of Learning

E-R26The student will read fiction and nonfiction with fluency and accuracy.

a)Use context to clarify meaning of unfamiliar words.

b)Use knowledge of root words, prefixes, and suffixes.

c)Use dictionary, glossary, thesaurus, and other word-reference materials.

Essential understandings, knowledge, and skills

To be successful with this standard, students are expected to

- Use context to infer the correct meanings of unfamiliar words
- Apply knowledge of root words, prefixes, and suffixes
- Continue to learn about Greek and Latin affixes
- Use word references and context clues to determine which meaning is appropriate in a given situation
- Identify the word-reference materials, such as a dictionary, glossary, or thesaurus, that is most likely to contain the information needed
- Understand that often a word can be divided into root word, prefix and suffix in order to determine its pronunciation
- Understand how a prefix changes the meaning of a root word
- Read familiar text with fluency, accuracy, and expression.

Suggested activities for teachers

- Model using context clues to determine the meaning of an unknown word.

Suggested activities for students

- Define and use words in meaningful sentences.
- Generate lists of words with prefixes and suffixes.
- Locate words with Greek and Latin affixes within text.

Suggested classroom assessment methods

- Classroom observations
- Student demonstrations
- Writing samples
- Quizzes
- Tests

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R26 a
While reading a paragraph from a short story about a baseball pitcher and his pet *Airedale*, the new word *Airedale* is highlighted. The student is given a choice of three pictures, only one of which could be a pet, and selects the one that indicates the meaning of the word.	
Possible Communication Skills:	
C1. The student will use gestures to respond to, support, accentuate and dramatize verbal messages. C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.	

SAMPLE ACTIVITY 2:	E-R26b
Reading a biography about Eleanor Roosevelt, student will sort photographs of her when she was unmarried and after she was married. Photographs will represent her as a single woman and with F.D.R. as a couple.	
Possible Communication Skills:	
C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C 12. The student will consistently respond to "Yes/No" questions across a variety of settings, situations, and content areas. C13. The student will share stories or information with an audience.	

SAMPLE ACTIVITY 3:	E- R26c
When reading *Little House on the Prairie* and encountering an unfamiliar word, the student will choose the appropriate word reference source to find the meaning of the unfamiliar word (e.g., dictionary or thesaurus).	
Possible Communication Skills:	
C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.	

SKILL GROUP 6
Organizing Topic → Vocabulary and Comprehension of Fiction

In Skill Group 6, students are independent readers of a variety of literary forms. Emphasis is on developing critical reading skills in order to examine implied relationships and understandings, recognize how character and plot are developed, and formulate and justify opinions about text. Students also continue to organize information they extract from text and represent their understanding graphically and in writing. Vocabulary and comprehension skills should be systematically and directly taught to students.

Related Aligned Standards of Learning

E-R27 The student will read and demonstrate comprehension of fiction.

a)Describe the relationship between text and previously read materials.

b)Describe character development in fiction and poetry selections.

c)Describe the development of plot and explain how conflicts are resolved.

d)Describe the characteristics of free verse, rhymed, and patterned poetry.

e)Describe how an author's choice of vocabulary and style contributes to the quality and enjoyment of selections.

Essential understandings, knowledge, and skills

To be successful with this standard, students are expected to

- Understand that characters are developed by
  - what is directly stated in the text
  - their speech and actions
  - what other characters in the story say or think about them
- Understand that some characters change during the story or poem and some characters stay the same
- Understand that the main character has a problem that usually gets resolved
- Identify the problem of the plot
- Understand that plot is developed through a series of events
- Identify the events in sequence that lead to resolution of the conflict
- Discuss why an author might have used particular words and phrases
- Discuss the similarities and differences between a text and previously read materials
- Identify the characteristics of free verse (poetry with neither regular meter nor rhyme scheme), rhymed poetry, and patterned poetry.

Suggested activities for teachers

- Read aloud from a variety of genres and authors.
- Discuss the plot development, conflict resolution, and character development in selections read aloud.
- Select different types of poems to read aloud, and categorize them as examples of free verse, rhymed poetry, or patterned poetry.
- Think aloud about an author's word choice and style.

Suggested activities for students

- Create cartoon strips to show the sequence of events in a story.
- Use a Venn Diagram to compare and contrast characters in a story.
- Use story maps and flow charts to identify the sequence of events.

Suggested classroom assessment methods

- Classroom observations
- Student demonstrations
- Writing samples
- Student interviews
- Quizzes
- Tests

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R27a
After reading two books in a series (e.g., *Charlie and the Chocolate Factory* and *Charlie and the Great Glass Elevator*) the student will join a novel group discussion during which they verbally describe the similarities and differences between the two books (e.g. fantasy, characters, setting, etc.).	
Possible Communication Skills:	
C4 The student will contribute to group interactions across content areas, settings, situations, and audiences. C13 The student will share stories or information with an audience. C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.	

SAMPLE ACTIVITY 2:	E-R27b
As part of a group project the student will create a timeline to describe how a character changes through the course of a book by using a switch to access timeline software on a computer.	
Possible Communication Skills:	
C4 The student will contribute to group interactions across content areas, settings, situations, and audiences. C12 The student will consistently respond to "Yes/No" questions across a variety of setting, situations, and content areas. C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.	

SAMPLE ACTIVITY 3:	E-R27c
After listening to a peer read a self-authored tall tale, the middle school student will use an emotions overlay on his augmentative communication device and choose the emotion that the story makes him feel (e.g., a locker filled with a thousand dead frogs makes him feel disgusted).	
Possible Communication Skills:	
C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C5. The student will follow basic rules for conversations including turn taking and listening to a speaker. C14. The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.	

SKILL GROUP 6
Organizing Topic → Vocabulary and Comprehension of Nonfiction

In Skill Group 6, students are becoming increasingly independent readers and continue to build and expand their vocabulary. The interactions between the readers and the nonfiction texts are becoming more sophisticated and deliberate as students make inferences, formulate opinions, and identify cause-and-effect relationships. Students organize the information they extract from a variety of print resources and represent their understandings on charts, maps, and graphs.

Related Aligned Standards of Learning

E-R28 The student will read and demonstrate comprehension of nonfiction.

a)Use text organizers such as type, headings, and graphics, to predict and categorize information.
b)Identify structural patterns found in nonfiction.
c)Locate information to support opinions, predictions, and conclusions.
d)Identify cause-and-effect relationships.
e)Identify compare-and-contrast relationships.
f)Skim materials to develop a general overview of content and to locate specific information.
g)Identify new information gained from reading.

E-R29 The student will demonstrate comprehension of information from a variety of print resources.

a) Develop notes that include important concepts, summaries, and identification of information sources.
b) Organize information on charts, maps, and graphs.

Essential understandings, knowledge, and skills

To be successful with these standards, students are expected to

- Apply prior knowledge to make predictions
- Use text set in special type styles (e.g., boldfaced, italics) and color; captions under pictures and graphics; and headings of sections and chapters to predict and categorize information
- Identify specific information in text that supports predictions
- Understand how text features (e.g. formats, graphics, diagrams, illustrations, charts, maps) make information accessible and usable
- Skim material to develop a general overview or to locate specific information
- Distinguish between fact and opinion
- Form opinions and draw conclusions from the selection
- Locate details to support opinions, predictions, and conclusions
- Identify structural and organizational patterns, such as cause-and-effect, comparison/contrast, and chronological order
- Identify new information learned from reading
- Take notes from a variety of print resources
- Identify source of information
- Summarize important concepts
- Organize information, using a visual representation, such as charts, maps, and graphs.

Suggested activities for teachers

- Model and use Think-Aloud comprehension strategies.
- Teach student to use text features, such as titles, headings, captions, graphs, maps, and charts for help in determining which section of a text to skim for information.

Suggested activities for students

- Use before-reading strategies, such as
  - preview and predict
  - setting a purpose for reading
  - anticipation guides
  - KWL charts
  - brainstorming
  - creating concept webs that help students build background knowledge
  - formulating questions about the text.
- Use during-reading strategies, such as
  - summarizing (Students frequently stop reading to summarize or retell events.)
  - sticky-note or bookmark reading (Students place sticky notes or bookmarks in the text to mark information that relates to a particular question.)
  - graphic organizers.
- Use after-reading strategies, such as
  - summarizing/retelling
  - class/group discussions
  - completing the L part of KWL.

Suggested classroom assessment methods

- Classroom observations
- Student demonstrations
- Writing samples
- Student interviews
- Quizzes
- Tests

Suggestions for Sample Activities:

SAMPLE ACTIVITY 1:	E-R28a
In science class, working with a peer, the student will use a visual graphic organizer software program to choose and place "Living" and "Non-living" sample photographs from the software library into two categories. After making the two-category list, peer and student will check in Science textbook to determine if they've predicted correctly about the photographs.	
Possible Communication Skills:	
C9. The student will follow one-step or multi-step directions. C12. The student will consistently respond to "Yes/No" questions across a variety of settings, situations and content areas. C14. The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.	

SAMPLE ACTIVITY 2:	E-R28b
During a social studies small group lesson, the student will place four objects representing major events in Virginia history in chronological order and displayed on a visual timeline.	
Possible Communication Skills:	
C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize messages. C4. The student will contribute to group interactions across content areas, settings, situations, and audiences. C13. The student will share stories or information with an audience.	

SAMPLE ACTIVITY 3:	R28g
As she reads a short autobiography about a favorite movie star with a typically developing peer, the student will use a highlighter or post-it notes to identify facts she did not know about the star. The student will then work with the peer to develop a visual graphic organizer about the life of the star to do a book report in class.	
Possible Communication Skills:	
C4. The student will contribute to group interactions across content areas, settings, situations and audiences. C5. The student will follow basic rules for conversations including turn taking and listening to a speaker. C10. The student will use voice level appropriate for a variety of settings and situations.	

SAMPLE ACTIVITY 1:	E-R29b

In preparation for a class party the student will create a chart of four soft drink choices using labels (environmental print). She will read the choices and survey her classmates' soft drink preferences and make a tally next to the choice. She will then provide a count to the teacher of how many drinks to purchase.
Possible Communication Skills:
C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C5. The student will follow basic rules for conversations including turn taking and listening to a speaker. C13. The student will share stories or information with an audience.

SAMPLE ACTIVITY 2:	E-R29a

Using a switch to access graphic organizer software on a computer the student will create a concept map of information from a new topic in Health class.
Possible Communication Skills:
C.3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C9. The student will follow one-step or multi-step directions.

SAMPLE ACTIVITY 3:	E-R29b

During Work and Family Studies class, the group in charge of making appetizers will read a recipe from an illustrated cookbook and create a list of ingredients. Using that list the student will check available supplies and create a chart of "Ingredients we have" and "Ingredients we need."
Possible Communication Skills:
C3. The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C4. The student will contribute to group interactions across content areas, settings, situations and audiences. C8. The student will engage in communicative exchanges with peers and adults.

Aligned Standards of Learning Resources
Reading Strategies

GENERAL READING STRATEGIES:

- Use slant boards, wedges, or easels for easier viewing of materials
- Secure books and other reading materials to student's desk with clamps, bungee cords, tape, or Velcro
- Use visual aides (e.g., objects, pictures) to help stimulate ideas for discussion or for projects
- Provide adaptive surfaces for reading materials (slant boards, easels, non-slip padding)
- Use adapted writing tools for any writing assignments (e.g., pencil grips, pencils on splints, wrist supporters, arm stabilizers)
- Use banks of communication symbols or words to assist with sentence development, answering questions, asking questions, or discussion with peers
- Enlarge the text of any written materials
- Modify worksheets (e.g., simplify format and/or language, reduce amount of text)
- Provide a mini flashlight to support visual tracking while reading
- Discuss what is depicted in illustrations and how it relates to the text; highlight the location of specific vocabulary within the illustrations
- Preview reading highlighting vocabulary, story line, background information, etc
- Elicit student's prior knowledge of the content
- Highlight target vocabulary words from a larger field of text with removable highlighter tape, highlighters, etc
- Use Post-its to cover (delete) sounds/words
- Reduce amount to be read
- Adjust allotted time for assignments

- Provide peer tutor or adult to support or read to student
- Enhance meaning of reading with gestures, exaggerated facial expressions and intonation during group reading
- Read chorally or sing words/text(music, rhythm and rhyme are memory enhancers)
- Present several versions of the same story (e.g., *The Three Little Pigs* and *The Three Little Wolves and the Big Bad Pig*)
- Use reading material focused on the student's interests (e.g., sports, cooking)
- Locate high interest/low reading level materials to facilitate fluency in reading
- Teach students the lyrics to original or other songs. Using an overhead projector (or computer and projector) and song lyrics on the overlays, have the students read the lyrics
- Explore various titles in *Poetry for Young People* (e.g., William Shakespeare, Robert Frost), which has text with graphics to support shared reading experiences
- Create word walls to reinforce frequently used words and topic/story vocabulary. Post word cards on the blackboard, whiteboard, or walls. Color code and group words together by category
- Use American Sign Language or kinesthetic sign for reinforcement of letter names/sounds
- Provide a magnifying glass or word windows to accentuate text
- Provide colored acetate filters (e.g. overhead film, transparency pockets, etc.) to lay over text to assist with tracking. Increase or decrease contrast or make reading more comfortable
- Use word magnets to develop sentences, phrases, or titles
- Segment components of stories/words so they can be physically manipulated (stickies, index cards, sentence strips, etc.). For examples, sequencing parts of stories, manipulating word families, etc
- Create graphic organizers to preview/review narratives, vocabulary, characterization, etc. (e.g., concept maps, Venn Diagrams, story boards, sequence grids, & webs)
- Use webs to effectively brainstorm ideas individually or in groups

ENHANCED/ADAPT/MODIFY BOOKS:

- Add page fluffers, made with small pieces of foam, glue dots, or page-turners and page extenders made with Emory boards or tongue depressors attached to the sides of the pages, to assist with turning pages while reading
- Use plastic page protectors or laminate pages for easier turning of pages in books, notebooks, etc
- Use a 3 ring binder for page turning
- Use objects and actions to enhance meaning of text and specific vocabulary. Use toys and objects to role-play and provide cues to meanings of words
- Cut apart and remake books that have graphics but no text. This helps students to "tell" the story from the pictures
- Cut graphics out of one copy of a book, put Velcro on the back of graphics/pictures. Velcro the pages of a second copy of the book making the book more interactive. (e.g., students can match characters/objects to the picture in the book, choose the correct picture when asked by teacher, do interactive worksheets, etc
- Cut & paste Picture Communication Symbols over text so student "reads" via the symbols or place under text to facilitate reading of text
- Find or create pictures for non-illustrated text that relate to the content
- Rewrite text for older students who read at lower levels – begin simply with a sentence or two to summarize paragraphs. Increase difficulty by summarizing pages into one or two paragraphs, etc
- Student can give a presentation by putting his/her pictures/notes on adapted slide projector. Student can display slides by using a switch
- Have materials available on filmstrips, computers, videos/DVDs, for students who have difficulty reading
- Tape record text or get books on tape for students to preview, read, and review story content (available from libraries, audiotape purchase/rental stores, Recordings for the Blind and Dyslexic)

USING AUGMENTATIVE COMMUNICATION DEVICES:

- Reproduce reading materials and reduce the size to fit on augmentative communication device or alternate keyboard as visual cues
- Create overlays that included the phrases and words needed for story frames, frame sentences, and other types of modeled writing
- Use small post-it notes to mark paragraphs for reading, then use corresponding stickers on squares for overlay or augmentative communication device (pre-recorded reading of the paragraph)

USING A COMPUTER:

- Provide a computer with software (*Writing with Symbols,* or *Co:Writer)* for writing and to facilitate students reading their own writing
- Use multimedia software (*Hyperstudio, IntelliPics,* or *Imagination Express)* to author own ballads, poems, or stories.These can be read on screen with and without voice output
- Use storybook software
- Download stories, ballads, or poems from the internet, then upload them into a talking word processor
- Use a screen reader on a computer to help with reading
- On the computer screen place the mouse curser on page turning arrow screen and secure the mouse where the student can click to turn the pages

RESOURCES ON THE INTERNET:

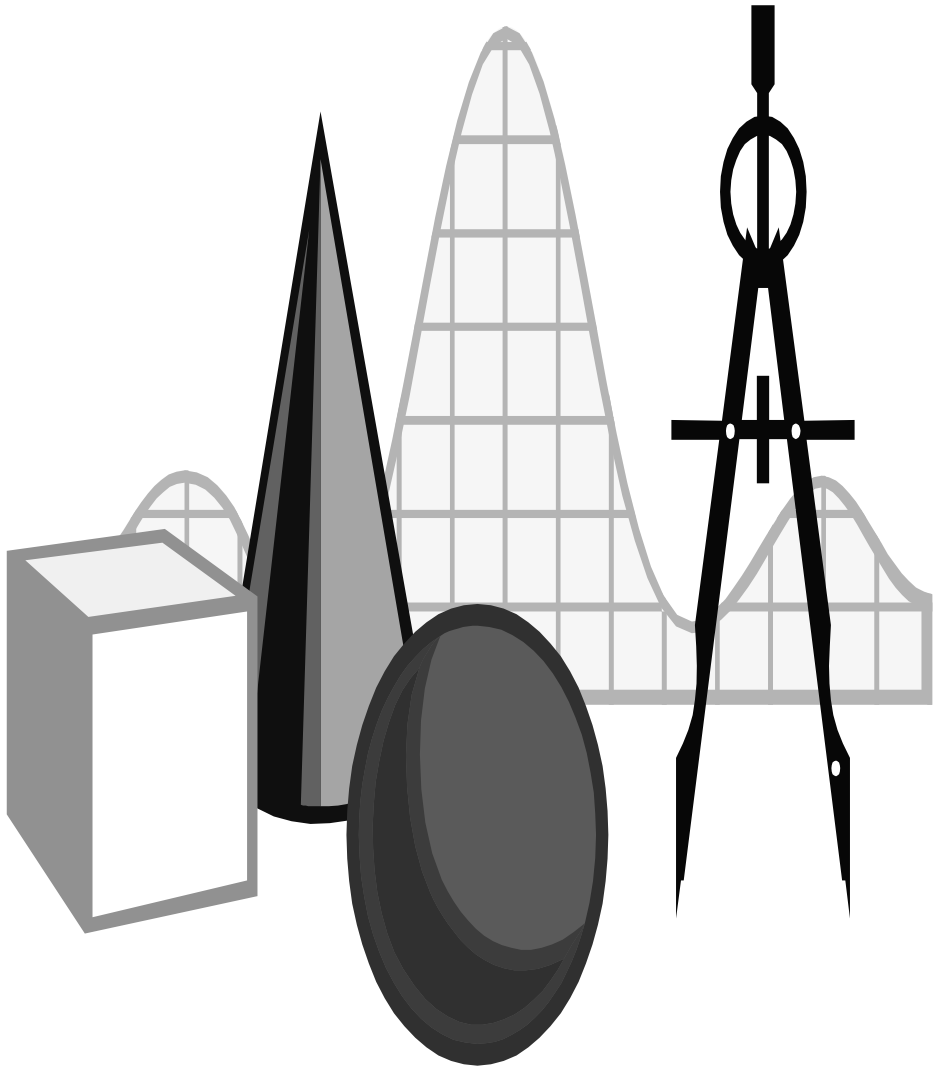
- Web English Teacher - Web English Teacher presents online English/Language Arts teaching resources: lesson plans, WebQuests, videos, biography, e-texts, criticism, jokes, puzzles, and classroom activities - http://www.webenglishteacher.com
- Teachers First Literature - http://www.teachersfirst.com/cnt-lit.htm
- Teachers First Writing - http://www.teachersfirst.com/cnt-writ.htm

- The English Page Reading List - http://www.educeth.ethz.ch/views/menuframe.html?filepath=/english/readinglist/index.html
- Graphic Organizers - Learn how to create a variety of graphic organizers. Also you can download and print a variety of organizers already created http://www.graphic.org/goindex.html
- Organizers - Another site with methods for utilizing graphic organizers in your classroom. http://www.sdcoe.k12.ca.us/score/actbank/sorganiz.htm
- Spark Notes - http://www.sparknotes.com
- Classroom Notes Plus - http://ncte.org/notesplus/ideas/

FREEWARE AND SHAREWARE:

- Read Please – http://www.readplease.com
- Help Read – http://www.helpread.com

MATHEMATICS
ALIGNED STANDARDS OF LEARNING FOR STUDENTS WITH SIGNIFICANT COGNITIVE DISABILITIES



Number and Number Sense

M-NS 1 The student, given two sets containing 10 or fewer concrete items, will identify and describe one set as having more, fewer, or the same number of members as the other set, using the concept of one - to - one correspondence.

M-NS 2 The student, given a set containing 10 or fewer concrete items, will
a) tell how many are in the set by counting the number of items orally;
b) select the corresponding numeral from a given set; and
c) write the numeral to tell how many are in the set.

M-NS 3 The student, given an ordered set of three objects and/or pictures, will indicate the ordinal position of each item, first through third, and the ordered position of each item from left-to-right, right-to-left, top-to-bottom, and/or bottom-to-top.

M-NS 4 The student will investigate and recognize patterns from counting by fives and tens to 30, using concrete objects and a calculator.

M-NS 5 The student will count forward to 30 and backward from 10.

M-NS 6 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.

M-NS 7 The student will group a collection of up to 100 objects into tens and ones and write the corresponding numeral to develop an understanding of place value.

M-NS 8 The student will count forward by ones, fives, and tens to 100, by twos to 20, and backward by ones from 20.

M-NS 9 The student will recognize and write numerals 0 through 100.

M-NS 10 The student will identify the ordinal positions first through tenth, using an ordered set of objects.

M-NS 11 The student will identify and represent the concepts of one-half and one-fourth, using appropriate materials or a drawing.

M-NS 12 The student will
a) read, write, and identify the place value of each digit in a three-digit numeral, using numeration models; and
b) round two-digit numbers to the nearest ten.

M-NS 13 The student will compare two whole numbers between 0 and 999, using symbols (>, <, or =) and words (*greater than, less than,* or *equal to*).

M-NS 14 The student will identify the ordinal positions first through twentieth, using an ordered set of objects.

M-NS 15 The student will identify the part of a set and/or region that represents fractions for one-half, one-third, one-fourth, one-eighth, and one-tenth and write the corresponding fraction.

M-NS 16 The student will
a) count forward by twos, fives, and tens to 100, starting at various multiples of 2, 5, or 10, using mental mathematics, paper and pencil, hundred chart, calculators, and/or concrete objects, as appropriate;
b) count backward by tens from 100;
c) group objects by threes and fours; and
d)recognize even and odd numbers, using objects

M-NS 17 The student will read and write six-digit numerals and identify the place value for each digit.

M-NS 18 The student will round a whole number, 9,999 or less, to the nearest ten, hundred, and thousand.

M-NS 19 The student will compare two whole numbers between 0 and 9,999, using symbols (>, <, or =) and words (*greater than, less than*, or *equal to*).

M-NS 20 The student will recognize and use the inverse relationships between addition/subtraction and multiplication/division to complete basic fact sentences. Students will use these relationships to solve problems such as 5 + 3 = 8 and 8 – 3 = ____.

M-NS 21 The student will
a) divide regions and sets to represent a fraction; and
b) name and write the fractions represented by a given model (area/region, length/measurement, and set). Fractions (including mixed numbers) will include halves, thirds, fourths, eighths, and tenths.

M-NS 22 The student will compare the numerical value of two fractions having like and Unlike denominators, using concrete or pictorial models involving areas/regions, lengths/measurements, and sets.

M-NS 23 The student will read and write decimals expressed as tenths and hundredths, using concrete materials and models.

M-NS 24 The student will
a) identify (orally and in writing) the place value for each digit in a whole number expressed through millions;
b) compare two whole numbers expressed through millions, using symbols (>, <, or =); and
c) round whole numbers expressed through millions to the nearest thousand, ten thousand, and hundred thousand.

M-NS 25 The student will
a) identify, model, and compare rational numbers (fractions and mixed numbers), using concrete objects and pictures;
b) represent equivalent fractions; and
c) relate fractions to decimals, using concrete objects.

M-NS 26 The student will compare the numerical value of fractions (with like and unlike denominators) having denominators of 12 or less, using concrete materials.

M-NS 27 The student will
a) read, write, represent, and identify decimals expressed through thousandths;
b) round to the nearest whole number, tenth, and hundredth; and
c) compare the value of two decimals, using symbols (<, >, or =), concrete materials, drawings, and calculators.

M-NS 28 The student will
a) read, write, and identify the place values of decimals through thousandths;
b) round decimal numbers to the nearest tenth or hundredth; and
c) compare the values of two decimals through thousandths, using the symbols >, <,or =.

M-NS 29 The student will
a) recognize and name commonly used fractions (halves, fourths, fifths, eighths, and tenths) in their equivalent decimal form and vice versa; and
b) order a given set of fractions and decimals from least to greatest. Fractions will include like and unlike denominators limited to 12 or less, and mixed numbers.

Computation and Estimation

M-CE 1 The student will add and subtract whole numbers, using up to 10 concrete items.

M-CE 2 The student, given a familiar problem situation involving magnitude, will
a) select a reasonable magnitude from three given quantities: a one-digit numeral, a two-digit numeral, and a three-digit numeral (e.g., 5, 50, and 500); and
b) explain the reasonableness of his/her choice.

M-CE 3 The student will recall basic addition facts — i.e., sums to 10 or less — and the corresponding subtraction facts.

M-CE 4 The student will create and solve story and picture problems involving one-step solutions, using basic addition and subtraction facts.

M-CE 5 The student will recall basic addition facts — i.e., sums to 18 or less — and the corresponding subtraction facts.

M-CE 6 The student, given two whole numbers whose sum is 99 or less, will
a) estimate the sum; and
b) find the sum, using various methods of calculation (mental computation, concrete materials, and paper and pencil).

M-CE 7 The student, given two whole numbers, each of which is 99 or less, will
a) estimate the difference; and
b) find the difference, using various methods of calculation (mental computation, concrete materials, and paper and pencil).

M-CE 8 The student will create and solve one-step addition and subtraction problems using data from simple tables, picture graphs, bar graphs, and practical situations.

M-CE 9 The student, given a simple addition or subtraction fact, will recognize and describe the related facts which represent and describe the inverse relationship between addition and subtraction (e.g., 3 + __ = 7, ___ + 3 = 7; 7 – 3 = __, and 7 – __ = 3).

M-CE 10 The student will solve problems involving the sum or difference of two whole numbers, each 9,999 or less, with or without regrouping, using various computational methods, including calculators, paper and pencil, mental computation, and estimation.

M-CE 11 The student will recall the multiplication and division facts through the nines table.

M-CE 12 The student will represent multiplication and division, using area and set models, and create and solve problems that involve multiplication of two whole numbers, one factor 99 or less and the second factor 5 or less.

M-CE 13 The student will add and subtract with proper fractions having like denominators of 10 or less, using concrete materials and pictorial models representing areas/regions, lengths/measurements, and sets.

M-CE 14 The student will add and subtract with decimals expressed as tenths, using concrete materials, pictorial representations, and paper and pencil.

M-CE 15 The student will estimate whole-number sums and differences and describe the method of estimation. Students will refine estimates, using terms such as *closer to, between,* and *a little more than*.

M-CE 16 The student will add and subtract whole numbers written in vertical and horizontal form, choosing appropriately between paper and pencil methods and calculators.

M-CE 17 The student will find the product of two whole numbers when one factor has two digits or fewer and the other factor has three digits or fewer, using estimation and paper and pencil. For larger products (a two-digit numeral times a three-digit numeral), estimation and calculators will be used.

M-CE 18 The student will estimate and find the quotient of two whole numbers, given a one-digit divisor.

M-CE 19 The student will

a) add and subtract with fractions having like and unlike denominators of 12 or less, using concrete materials, pictorial representations, and paper and pencil;
b) add and subtract with decimals through thousandths, using concrete materials, pictorial representations, and paper and pencil; and
c) solve problems involving addition and subtraction with fractions having like and unlike denominators of 12 or less and with decimals expressed through thousandths, using various computational methods, including calculators, paper and pencil, mental computation, and estimation.

M-CE 20 The student will create and solve problems involving addition, subtraction, multiplication, and division of whole numbers, using paper and pencil, estimation, mental computation, and calculators.

M-CE 21 The student will find the sum, difference, and product of two numbers expressed as decimals through thousandths, using an appropriate method of calculation, including paper and pencil, estimation, mental computation, and calculators.

M-CE 22 The student, given a dividend of four digits or fewer and a divisor of two digits or fewer, will find the quotient and remainder.

M-CE 23 The student, given a dividend expressed as a decimal through thousandths and a single-digit divisor, will find the quotient.

M-CE 24 The student will add and subtract with fractions and mixed numbers, with and without regrouping, and express answers in simplest form. Problems will include like and unlike denominators limited to 12 or less.

Measurement

M-M 1 The student will recognize a penny, nickel, dime, and quarter and will determine the value of a collection of pennies and/or nickels whose total value is 10 cents or less.

M-M 2 The student will identify the instruments used to measure length (ruler), weight (scale), time (clock: digital and analog; calendar: day, month, and season), and temperature (thermometer).

M-M 3 The student will tell time to the hour, using an analog or digital clock.

M-M 4 The student will compare two objects or events, using direct comparisons or nonstandard units of measure, according to one or more of the following attributes: length (shorter, longer), height (taller, shorter), weight (heavier, lighter), temperature (hotter, colder). Examples of nonstandard units include foot length, hand span, new pencil, paper clip, block.

M-M 5 The student will
a) identify the number of pennies equivalent to a nickel, a dime, and a quarter;
b) determine the value of a collection of pennies, nickels, and dimes whose total value is 100 cents or less.

M-M 6 The student will tell time to the half-hour, using an analog or digital clock.

M-M 7 The student will use nonstandard units to measure length and weight.

M-M 8 The student will compare the volumes of two given containers by using concrete materials (e.g., jelly beans, sand, water, rice).

M-M 9 The student will compare the weights of two objects, using a balance scale.

M-M 10 The student will
a) count and compare a collection of pennies, nickels, dimes, and quarters whose total value is $2.00 or less; and
b) identify the correct usage of the cent symbol (¢), dollar symbol ($), and decimal point (.).

M-M 11 The student will estimate and then use a ruler to make linear measurements to the nearest centimeter and inch, including measuring the distance around a polygon in order to determine perimeter.

M-M 12 The student, given grid paper, will estimate and then count the number of square units needed to cover a given surface in order to determine area.

M-M 13 The student will estimate and then count the number of cubes in a rectangular box in order to determine volume.

M-M 14 The student will estimate and then determine weight/mass of familiar objects in pounds and/or kilograms, using a scale.

M-M 15 The student will tell and write time to the quarter hour, using analog and digital clocks.

M-M 16 The student will use actual measuring devices to compare metric and U.S. Customary units (cups, pints, quarts, gallons, and liters) for measuring liquid volume, using the concepts of *more, less,* and *equivalent*.

M-M 17 The student will
a) use calendar language appropriately (e.g., months, *today, yesterday, next week, last week*);
b) determine past and future days of the week; and
c) identify specific dates on a given calendar.

M-M 18 The student will read the temperature on a Celsius and/or Fahrenheit thermometer to the nearest 10 degrees.

M-M 19 The student will determine by counting the value of a collection of bills and coins whose total value is $5.00 or less, compare the value of the coins or bills, and make change.

M-M 20 The student will estimate and then use actual measuring devices with metric and U.S. Customary units to measure
a) length — inches, feet, yards, centimeters, and meters;
b) liquid volume — cups, pints, quarts, gallons, and liters; and
c) weight/mass — ounces, pounds, grams, and kilograms.

M-M 21 The student will tell time to the nearest five-minute interval and to the nearest minute, using analog and digital clocks.

M-M 22 The student will identify equivalent periods of time, including relationships among days, months, and years, as well as minutes and hours.

M-M 23 The student will read temperature to the nearest degree from a Celsius thermometer and a Fahrenheit thermometer. Real thermometers and physical models of thermometers will be used.

M-M 24 The student will

a) estimate and measure weight/mass, using actual measuring devices, and describe the results in U.S. Customary/metric units as appropriate, including ounces, pounds, grams, and kilograms;
b) identify equivalent measurements between units within the U.S. Customary system (ounces and pounds) and between units within the metric system (grams and kilograms); and
c) estimate the conversion of ounces and grams and pounds and kilograms, using approximate comparisons (1 ounce is about 28 grams, or 1 gram is about the weight of a paper clip; 1 kilogram is a little more than 2 pounds). *

** The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

M-M 25 The student will

a) estimate and measure length, using actual measuring devices, and describe the results in both metric and U.S. Customary units, including part of an inch (1/2, 1/4, and 1/8), inches, feet, yards, millimeters, centimeters, and meters;
b) identify equivalent measurements between units within the U.S. Customary system (inches and feet; feet and yards; inches and yards) and between units within the metric system (millimeters and centimeters; centimeters and meters; and millimeters and meters); and
c) estimate the conversion of inches and centimeters, yards and meters, and miles and kilometers, using approximate comparisons (1 inch is about 2.5 centimeters, 1 meter is a little longer than 1 yard, 1 mile is slightly farther than 1.5 kilometers, or 1 kilometer is slightly farther than half a mile). *

* *The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

M-M 26 The student will

a) estimate and measure liquid volume, using actual measuring devices and using metric and U.S. Customary units, including cups, pints, quarts, gallons, milliliters, and liters;
b) identify equivalent measurements between units within the U.S. Customary system (cups, pints, quarts, and gallons) and between units within the metric system (milliliters and liters); and
c) estimate the conversion of quarts and liters, using approximate comparisons (1 quart is a little less than 1 liter, 1 liter is a little more than 1 quart).*

** The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U. S. Customary and metric units.*

M-M 27 The student will
a) identify and describe situations representing the use of perimeter and area; and
b) use measuring devices to find perimeter in both standard and nonstandard units of measure.

M-M 28 The student will describe and determine the perimeter of a polygon and the area of a square, rectangle, and right triangle, given the appropriate measures.

M-M 29 The student will identify and describe the diameter, radius, chord, and circumference of a circle.

M-M 30 The student will differentiate between perimeter, area, and volume and identify whether the application of the concept of perimeter, area, or volume is appropriate for a given situation.

M-M 31 The student will choose an appropriate measuring device and unit of measure to solve problems involving measurement of
a) length — part of an inch (1/2, 1/4, and 1/8), inches, feet, yards, miles, millimeters, centimeters, meters, and kilometers;
b) weight/mass — ounces, pounds, tons, grams, and kilograms;
c) liquid volume — cups, pints, quarts, gallons, milliliters, and liters;
d) area — square units; and
e) temperature — Celsius and Fahrenheit units.

Problems also will include estimating the conversion of Celsius and Fahrenheit units relative to familiar situations (water freezes at 0°C and 32°F, water boils at 100°C and 212°F, normal body temperature is about 37°C and 98.6°F).

M-M 32 The student will determine an amount of elapsed time in hours and minutes within a 24-hour period.

M-M 33 The student will measure and draw right, acute, and obtuse angles and triangles, using appropriate tools.

Geometry

M-G 1 The student will identify, describe, and draw two-dimensional (plane) geometric figures (circle, triangle, square, and rectangle).

M-G 2 The student will describe the location of one object relative to another (above, below, next to) and identify representations of plane geometric figures (circle, triangle, square, and rectangle) regardless of their position and orientation in space.

M-G 3 The student will compare the size (larger, smaller) and shape of plane geometric figures (circle, triangle, square, and rectangle).

M-G 4 The student will describe the proximity of objects in space (*near, far, close by, below, above, up, down, beside,* and *next to).*

M-G 5 The student will draw, describe, and sort plane geometric figures (triangle, square, rectangle, and circle) according to number of sides, corners, and square corners.

M-G 6 The student will identify and describe objects in his/her environment that depict plane geometric figures (triangle, rectangle, square, and circle).

M-G7 The student will identify, describe, and sort three-dimensional (solid) concrete figures, including a cube, rectangular solid (prism), square pyramid, sphere, cylinder, and cone, according to the number and shape of the solid's faces, edges, and corners.

M-G 8 The student will identify and create figures, symmetric along a line, using various concrete materials.

M-G 9 The student will compare and contrast plane and solid geometric shapes (circle/sphere, square/cube, and rectangle/rectangular solid).

M-G 10 The student will analyze two-dimensional (plane) and three-dimensional (solid) geometric figures (circle, square, rectangle, triangle, cube, rectangular solid [prism], square pyramid, sphere, cone, and cylinder) and identify relevant properties, including the number of corners, square corners, edges, and the number and shape of faces, using concrete models.

M- G 11 The student will identify and draw representations of line segments and angles, using a ruler or straightedge.

M-G 12 The student, given appropriate drawings or models, will identify and describe congruent and symmetrical, two-dimensional (plane) figures, using tracing procedures.

M-G 13 The student will investigate and describe the relationships between and among points, lines, line segments, and rays.

M-G 14 The student will
a) identify and draw representations of points, lines, line segments, rays, and angles, using a straightedge or ruler; and
b) describe the path of shortest distance between two points on a flat surface.

M-G 15 The student will identify and draw representations of lines that illustrate intersection, parallelism, and perpendicularity.

M-G 16 The student will
a) analyze and compare the properties of two-dimensional (plane) geometric figures (circle, square, rectangle, triangle, parallelogram, and rhombus) and three-dimensional (solid) geometric figures (sphere, cube, and rectangular solid [prism]);
b) identify congruent and noncongruent shapes; and
c) investigate congruence of plane figures after geometric transformations such as reflection (flip), translation (slide) and rotation (turn), using mirrors, paper folding, and tracing.

M-G 17 The student will identify the ordered pair for a point and locate the point for an ordered pair in the first quadrant of a coordinate plane.

M-G 18 The student will classify angles and triangles as right, acute, or obtuse.

M-G 19 The student, using two-dimensional (plane) figures (square, rectangle, triangle, parallelogram, rhombus, kite, and trapezoid) will
a) recognize, identify, describe, and analyze their properties in order to develop definitions of these figures;
b) identify and explore congruent, noncongruent, and similar figures;
c) investigate and describe the results of combining and subdividing shapes;
d) identify and describe a line of symmetry; and
e) recognize the images of figures resulting from geometric transformations such as translation (slide), reflection (flip), or rotation (turn).

M-G 20 The student will identify, compare, and analyze properties of three-dimensional (solid) geometric shapes (cylinder, cone, cube, square pyramid, and rectangular prism).

Probability and Statistics

M-PS 1 The student will gather data relating to familiar experiences by counting and tallying.

M-PS 2 The student will display objects and information, using objects graphs, pictorial graphs, and tables.

M-PS 3 The student will investigate and describe the results of dropping a two-colored counter or using a multicolored spinner.

M-PS 4 The student will investigate, identify, and describe various forms of data collection in his/her world (e.g., recording daily temperature, lunch count, attendance, and favorite ice cream), using tables, picture graphs, and object graphs.

M-PS 5 The student will interpret information displayed in a picture or object graph, using the vocabulary *more, less, fewer, greater than, less than,* and *equal to*.

M-PS 6 The student will read, construct, and interpret a simple picture and bar graph.

M-PS 7 The student will record data from experiments, using spinners and colored tiles/cubes, and use the data to predict which of two events is more likely to occur if the experiment is repeated.

M-PS 8 The student, given grid paper, will
a) collect and organize data on a given topic of his/her choice, using observations, measurements, surveys, or experiments; and
b) construct a line plot, a picture graph, or a bar graph to represent the results. Each graph will include an appropriate title and key.

M-PS 9 The student will read and interpret data represented in line plots, bar graphs, and picture graphs and write a sentence analyzing the data.

M-PS 10 The student will investigate and describe the concept of probability as chance and list possible results of a given situation.

M-PS 11 The student will
a) predict the likelihood of outcomes of a simple event, using the terms *certain, likely, unlikely, impossible*; and
b) determine the probability of a given simple event, using concrete materials.

M-PS 12 The student will collect, organize, and display data in line and bar graphs with scale increments of one or greater than one and use the display to interpret the results, draw conclusions, and make predictions.

M-PS 13 The student will

a) solve problems involving the probability of a single event by using tree diagrams or by constructing a sample space representing all possible results;
b) predict the probability of outcomes of simple experiments, representing it with fractions or decimals from 0 to 1, and test the prediction; and
c) create a problem statement involving probability and based on information from a given problem situation. Students will not be required to solve the created problem statement.

M-PS 14 The student will, given a problem situation, collect, organize, and display a set of numerical data in a variety of forms, using bar graphs, stem-and-leaf plots, and line graphs, to draw conclusions and make predictions.

M-PS 15 The student will find the mean, median, mode, and range of a set of data.

Patterns, Functions, and Algebra

M-PFA 1 The student will sort and classify objects according to similar attributes (size, shape, and color).

M-PFA 2 The student will identify, describe, and extend a repeating relationship (pattern) found in common objects, sounds, and movements.

M-PFA 3 The student will sort and classify concrete objects according to one or more attributes, including color, size, shape, and thickness.

M-PFA 4 The student will recognize, describe, extend, and create a wide variety of patterns, including rhythmic, color, shape, and numerical. Patterns will include both growing and repeating patterns. Concrete materials and calculators will be used by students.

M-PFA 5 The student will identify, create and extend a wide variety of patterns, using numbers concrete objects and pictures.

M-PFA 6 The student will solve by completing a numerical sentence involving the basic facts for addition and subtraction. Examples include: 3=__=7, or 9-__=2. Students will create story problems, using the numerical sentences.

M-PFA 7 The student will recognize and describe a variety of patterns formed using concrete objects, numbers, tables, and pictures, and extend the pattern, using the same or different forms (concrete objects, numbers, tables, and pictures).

M-PFA 8 The student will
a) investigate and create patterns involving numbers, operations (addition and multiplication), and relations that model the identity and commutative properties for addition and multiplication; and
b) demonstrate an understanding of equality by recognizing that the equal sign (=) links equivalent quantities, such as $4 \cdot 3 = 2 \cdot 6$.

M-PFA 9 The student will recognize, create, and extend numerical and geometric patterns, using concrete materials, number lines, symbols, tables, and words.

M-PFA 10 The student will recognize and demonstrate the meaning of equality, using symbols representing numbers, operations, and relations [e.g., $3 + 5 = 5 + 3$ and $15 + (35 + 16) = (15 + 35) + 16$].

M-PFA 11 The student will analyze the structure of numerical and geometric patterns (how they change or grow) and express the relationship, using words, tables, graphs, or a mathematical sentence. Concrete materials and calculators will be used.

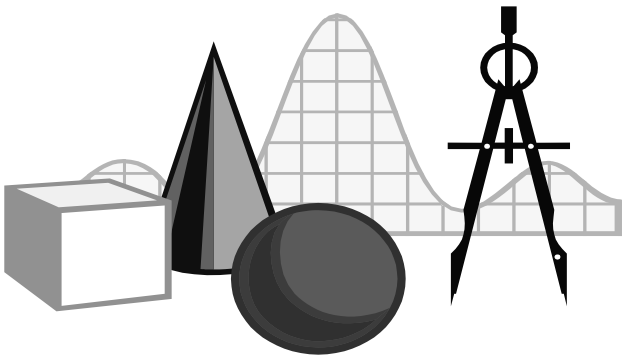
M-PFA 12 The student will
a) investigate and describe the concept of variable;
b) use a variable expression to represent a given quantitative expression involving one operation; and
c) write an open sentence to represent a given mathematical relationship, using a variable.

M-PFA 13 The student will create a problem situation based on a given open sentence using a single variable.

MATHEMATICS ALIGNED STANDARDS OF LEARNING FOR STUDENTS WITH SIGNIFICANT COGNITIVE DISABILITIES

ENHANCED SCOPE AND SEQUENCE

(Skill Groups 1-6)



Virginia Department of Education 2005

Introduction

The *Mathematics Aligned Standards of Learning Enhanced Scope and Sequence* is a resource intended to help teachers align their classroom instruction with the Mathematics Aligned Standards of Learning. The Mathematics Aligned Standards of Learning Enhanced Scope and Sequence is organized by topics and includes the content of the Aligned Academic Standards of Learning and the essential knowledge and skills from the Aligned Standards of Learning Curriculum Framework.

School divisions and teachers can use the Enhanced Scope and Sequence as a resource for developing sound curricular and instructional programs. Teachers who use the Enhanced Scope and Sequence should correlate the essential knowledge and skills with available instructional resources as noted in the materials and determine the pacing of instruction as appropriate. This resource is not a complete curriculum and is neither required nor prescriptive, but it can be a valuable instructional tool.

The Mathematics Enhanced Scope and Sequence contains the following:

- Essential knowledge and skills from the Mathematics Aligned Standard(s) of Learning Curriculum Framework
- Related Aligned Standard(s) of Learning
- Sample Activities – quick ideas to start instruction

Introduction to Early Math Skills for Students with Significant Cognitive Disabilities

According to Virginia's Foundation Blocks for Early Learning (VDOE, 2004), http://www.pen.k12.va.us/VDOE/Instruction/Elem_M/FoundationBlocks.pdf instruction to promote math skills should emphasize:

I. Number and Number Sense
II. Computation
III. Measurement
IV. Geometry
V. Data collection and Statistics
VI. Patterns and Relationships

Students who have cognitive disabilities, multiple disabilities, and sensory impairments may have missed many opportunities to engage in incidental learning activities and observation and interactions with the environment that provide a foundation for learning early math concepts. Teachers must, therefore, design instruction and provide learning opportunities that teach these concepts within the context of activities that are relevant to the student and appropriate to his/her learning style and communication skills.

I. Number and Number Sense

This group of skills focuses on learning to count objects, demonstrating 1:1 correspondence, and comparing concrete objects to five. To promote the development of number and number sense, team members must:

-Provide many opportunities for students to watch, listen (or feel, if visually impaired) and participate in (in whatever modality appropriate) counting activities that are part of routine events, such as counting plates for snack, counting coats, counting peers, counting toys, etc.

-Provide many opportunities for the student to participate in "supported" counting. For some students this might mean hand over hand guidance, verbal cues, hand under hand support, pointing to the objects while the child counts, etc. Reinforce any and all attempts on the part of the student to touch the objects as they are counted. If the student is physically unable to touch objects, provide adaptations, such as teaching the student to look at the adult to indicate that it is time to move to next object, tap finger to indicate next object, and/or use an augmentative and alternative communication device.

-Provide opportunities to explore commercial and teacher-generated number and counting books. Supplement text with objects, signs, auditory cues, visuals, and pictures to make the information as relevant to the student as possible.

II. Computation

Early computation skills are based on many opportunities to practice concrete addition and subtraction concepts as part of fun, daily activities. For instance, many fingerplays/songs provide a context for teaching the concepts of adding and subtracting (Five Little Monkeys, Ten in the Bed). Many routine activities can provide a context for thinking about what happens when things are added together and taken away. For instance, as students join the group for an activity, the teacher can encourage discussion about how many more students arrived and the total number of students in the group. Teachers working with students who have not had the opportunity to develop these skills will need to carefully consider activities that are relevant, age-appropriate and reflect the student's communication skills (signs, verbalizations, pictures, objects, textures, etc). To promote the development of early computation skills, educators must:

-Incorporate concepts of adding and subtracting into many daily routines. Make these activities as concrete as possible by having the student touch, point to, and/or identify the items/objects to be counted.

-Create games that include having the student physically manipulate the items to be added or taken away. For instance, during a fishing game the student might use a "net" to pull 2 fish out of the pond and then count the remainder left in the pond.

II. Measurement

Children develop concepts related to measurement through daily routines that focus on comparing common objects in the environment, such as which toy is bigger, which dog is smaller, which peer is tallest, etc. At an early age, many children are introduced to the vocabulary for basic measurement skills, including ruler, clock, calendar, scales, etc. Children with significant cognitive disabilities often have not had the incidental learning experiences that serve as a basis for these skills. Activities will need to focus on systematic and relevant participation in learning these skills and corresponding vocabulary. Again, planning must begin with a complete understanding of the student's communication skills. Activities to promote concepts of measurement include:

-Comparing common objects and using vocabulary such as *longer, shorter, bigger, smaller.* "Comparing" needs to be defined by the student's best modality for exploring the environment. Many students will need ample time to manipulate and explore the objects. Encourage this exploration.

-Incorporate measurement vocabulary into many routines and instructional activities. For instance, when referring to the student's personalized schedule, encourage use of words such as *time, calendar, morning, week*, etc.

-Prioritize the teaching of measurement skills that are most relevant and motivating to the student. For instance, if cooking is a highly preferred activity, focus on the measurement concepts related to cooking.

IV. Geometry

Beginning geometry concepts are based on children's experiences in manipulating a variety of shapes through routine activities. This experience in using objects that are various shapes provide opportunities to begin to notice differences in those shapes and identify shapes that are the same or different. As these experiences become familiar, children are ready to be introduced to shape words and related position vocabulary such as *next to, beside, above, below, under,* etc. Students who have significant cognitive disabilities may have had limited experiences with these concepts and, because of communication difficulties, may have no frame of reference for position vocabulary. It will be important to provide experiences that are meaningful, based on real-life activities and experiences, and build on the student's communication skills. To promote early geometry concepts/skills:

-Teach position words such as *next to, beside, above,* etc. as part of daily routines that the student has heard or used. For example, John is standing *next to* Jimmy.

-Provide many opportunities to identify how common objects are the same or different.

-Provide opportunities for students to explore various shapes. Use sizes and textures that are meaningful and motivating for the student.

-Provide opportunities for students to match like shapes and to find objects in the classroom that match the geometric shape he/she is holding.

V. Data Collection and Statistics

Young children learn that information gathered from various experiences can be displayed and compared. For instance, the teacher might lead a discussion about how many students packed lunch vs. how many will buy lunch. The comparison of these numbers might then be graphed and comparison words discussed, such as "more" and "fewer." Early on, these graphs or visual displays of this "data" must be as concrete as possible to enhance meaning. Small objects or pictures might represent numbers of children on the graph. Students with significant cognitive disabilities will need repeated practice with these concepts. As is true for all children, these experiences need to be based on activities and events that have meaning for the student. To promote concepts related to data collection:

-Use everyday routine and fun activities to have students participate in summarizing "data" and making comparisons. Students will need many opportunities to see, touch, and manipulate the data. Some students may need a smaller version of the group graph so that he/she can feel the pictures or manipulatives as the group is counting and comparing.

-Encourage use of related vocabulary such as *more* and *fewer* when opportunities present themselves. For instance during discussions about how many students chose cookies vs. crackers for snack, how many students like country music vs. rock music, etc could lead to a graphing activity.

VI. Patterns and Relationships

Basic concepts related to patterns and relationships form the basis for algebra. Children use their basic understanding of shapes and geometry to sort and describe objects and to begin to make simple predictions. Young children are provided many different types of objects and are encouraged to sort them and describe those sorts. Students with significant cognitive disabilities will need opportunities to experience patterns as part of everyday experiences. There are many patterns to be discovered in the school environment. Students should also have the opportunity to make basic predictions within the context of everyday activities. For instance, a simple AB pattern could be taught by having students line up boy, girl, boy, girl. The daily repetition of these activities will provide an introduction to ways that patterns are part of everyday routines. To promote concepts related to patterns and relationships:

-Point out various patterns in the environment and ask students to identify patterns that they notice.

-Encourage students to use communication skills to identify whether objects are the same/different and to describe and sort them by attributes (color, size, shape, etc.).

-Use concrete materials to introduce students to the idea of patterns. Encourage students to match concrete objects by various attributes (ex., find all the circles).

-Encourage students to make predictions about simple patterns. Touching and manipulating the objects/items used in the patterns will be important.

MATH for Skill Groups 1–6

Math for Skill Group1 through Skill Group 6 encompasses the following Mathematics Aligned Standards of Learning:

Skill Group 1 – M-NS1, M-NS2, M-NS3, M-NS4, M-NS5, M-CE1, M-M1, M-M2, M-M3, M-M4, M-G1, M-G2, M-G3, M-PS1, M-PS2, M-PS3, M-PFA1, M-PFA2

Skill Group 2 – M-NS6, M-NS7, M-NS8, M-NS9, M-NS10, M-NS11, M-CE2, M-CE3, M-CE4, M-M5, M-M6, M-M7, M-M8, M-M9, M-G4, M-G5, M-G6, M-PS4, M-PS5, M-PFA3, M-PFA4

Skill Group 3 – M-NS12, M-NS13, M-NS14, M-NS15, M-NS16, M-CE5, M-CE6, M-CE7, M-CE8, M-CE9, M-M10, M-M11, M-M12, M-M13, M-M14, M-M15, M-M16, M-M17, M-M18, M-G7, M-G8, M-G9, M-PS6, M-PS7, M-PFA5, M-PFA6

Skill Group 4 – M-NS17, M-NS18, M-NS19, M-NS20, M-NS21, M-NS22, M-NS23, M-CE10, M-CE11, M-CE12, M-CE13, M-CE14, M-M19, M-M20, M-M21, M-M 22, M-M23, M-G10, M-G11, M-G12, M-PS8, M-PS9, M-PS10, M-PFA7, M-PFA8

Skill Group 5 – M-NS24, M-NS25, M-NS26, M-NS27, M-CE15, M-CE16, M-CE17, M-CE18, M-CE19, M-M24, M-M25, M-M26, M-M27, M-G13, M-G14, M-G15, M-G16, M-G17, M-PS11, M-PS12, M-PFA9, M-PFA10

Skill Group 6 – M-NS28, M-NS29, M-CE20, M-CE21, M-CE 22, M-CE23, M-CE24, M-M28, M-M29, M-M30, M-M31, M-M32, M-M33, M-G18, M-G19, M-G20, M-PS13, M-PS14, M-PS15, M-PFA11, M-PFA12 M-PFA13

Math Aligned Standards can be divided into Organizing Topics, as shown in the following table.

Organizing Topics	Skill Group 1	Skill Group 2	Skill Group 3	Skill Group 4	Skill Group 5	Skill Group 6
Whole Numbers: Representations & Relationships	M-NS 1 M-NS 2 M-NS 3 M-NS 4 M-NS 5	M-NS 6 M-NS 7 M-NS 8 M-NS 9 M-NS 10 M-CE 2	M-NS 12 M-NS 13 M-NS 14 M-NS 16	M-NS 17 M-NS 18 M-NS 19 M-NS 20 M-CE 10 M-CE 11 M-CE 12	M-NS 24	
Whole Number Operations & Estimation: Addition and Subtraction	M-CE 1	M-CE 3 M-CE 4	M-CE 5 M-CE 6 M-CE 7 M-CE 8 M-CE 9	M-NS 20 M-CE 10	M-CE 15 M-CE 16	M-CE 20
Whole Number Operations & Estimation: Multiplication and Division				M-NS 20 M-CE 11 M-CE 12	M-CE 17 M-CE 18	M-CE 20 M-CE 22
Decimals: Representations & Relationships				M-NS 23 M-CE 14	M-NS 25 M-NS 27	M-NS 28 M-NS 29
Decimal Operations & Estimation: Addition & Subtraction				M-CE 14	M-CE 19	M-CE 21
Decimal Operations & Estimation: Multiplication and Division						M-CE 21 M-CE 23
Fractions: Representations & Relationships		M-NS 11	M-NS 15	M-NS 21 M-NS 22 M-CE 13	M-NS 25 M-NS 26	M-NS 29
Fraction Operations & Estimation: Addition and Subtraction					M-CE 19	M-CE 24
Measurement: Money	M-CE 1 M-M 1	M-M 5	M-M 10	M-M 19		
Measurement: Length	M-M 2 M-M4	M-M 7	M-M 11	M-M 20	M-M 25	M-M 31

Organizing Topics	Skill Group 1	Skill Group 2	Skill Group 3	Skill Group 4	Skill Group 5	Skill Group 6
Measurement: Weight/Mass	M-M 2 M-M 4	M-M7 M-M 9	M-M 14	M-M 20	M-M 24	M-M 31
Measurement: Volume		M-M 8	M-M 16	M-M 20	M-M 26	M-M 31
Measurement: Temperature	M-M 2 M-M 4		M-M 18	M-M 23		M-M 31
Measurement: Time	M-M 2 M-M 3	M-M 6	M-M 15 M-M 17	M-M 21 M-M22		M-M 32
Measurement: Perimeter, Area, Volume, Circumference			M-M 11 M-CE 6 M-M 12 M-M 13		M-M 27	M-M 28 M-M 29 M-M 30 M-M 31 M-M 33
Geometry: Two-Dimensional (plane)	M-G 1 M-G 2	M-G 5 M-G 6	M-G 9	M-G 10 M-G 11	M-G 13 M-G 14 MG 15	M-M 33 M-G 18 MG-19
Geometry: Three-Dimensional (solid)			M-G 7 M-G 9	M-G 10	M-G 16	M-G 20
Geometry: Transformations			M-G 8	M-G 12	M-G 16	M-G 19
Geometry: Spatial Relationships	M-G-3	M-G 4			M-G 17	
Statistics: Collect, Organize, Display, Analyze and Interpret Data	M-PS 1 M-PS 2	M-PS 4 M-PS 5	M-PS 6	M-PS 8 M-PS 9	M-PS 12	M-PS 14 M-PS 15
Probability	M-PS 3		M-PS 7	M-PS 10	M-PS 11	M-PS 13
Patterns and Functions: Representations & Relationships	M-PFA 1 M-PFA 2	M-PFA 3 M-PFA 4	M-PFA 5	M-PFA 7	M-PFA 9	M-PFA 11
Algebra: Representations & Relationships			M-PFA 6	M-PFA 8	M-PFA 10	M-PFA 12 M-PFA 13

SKILL GROUP INFORMATION

By

Organizing Topics

SKILL GROUP 1

SKILL GROUP 1

Organizing Topic→Whole Numbers: Representations, Relationships, Operations, Estimation, and Addition and Subtraction

Aligned Standard(s) of Learning

MNS1 The student, given two sets containing 10 or fewer concrete items, will identify and describe one set as having more, fewer, or the same number of members as the other set, using the concept of one-to-one correspondence.

MNS2 The student, given a set containing 10 or fewer concrete items, will

a) tell how many are in the set by counting the number of items orally;

b) select the corresponding numeral from a given set; and

c) write the numeral to tell how many are in the set.

MNS3 The student, given an ordered set of three objects and/or pictures, will indicate the ordinal position of each item, first through third, and the ordered position of each item from left-to-right, right-to-left, top-to-bottom, and/or bottom-to-top.

MNS4 The student will investigate and recognize patterns from counting by fives and tens to 30, using concrete objects and a calculator.

MNS5 The student will count forward to 30 and backward from 10.

MCE1 The student will add and subtract whole numbers, using up to 10 concrete items.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Match each member of one set with each member of another set, using the concept of one-to-one correspondence to compare the number of members between sets, where each set contains 10 or fewer items.
- Compare and describe two sets of 10 or fewer items, using the terms *more, fewer,* and *the same*.
- Count orally the number of items in a set containing 10 or fewer concrete items, using one-to-one correspondence, and identify the corresponding numeral.
- Identify written numerals from 0 through 10 presented in random order.
- Select the numeral from a given set of numerals that corresponds to a set of 10 or fewer concrete items.
- Write the numerals from 0 through 10.
- Write a numeral that corresponds to a set of 10 or fewer concrete items.
- Identify the ordinal positions first, second, and third, using ordered sets of three concrete objects and/or pictures of such sets presented from:

– left-to-right;

– right-to-left;

- top-to-bottom; and/or
- bottom-to-top.

- Group 30 or fewer objects together into sets of fives or tens and then count them by fives or by tens.
- Investigate and recognize the pattern of counting by fives and tens, using 30 or fewer concrete objects.
- Investigate and recognize the pattern of counting by fives and tens to 30, using a calculator.
- Count forward from 1 to 30.
- Count backward from 10 to 1.
- Combine two sets with known quantities in each set, and count the combined set to determine the sum, where the sum is not greater than 10 concrete items.
- Remove, "take away," or separate part of a set from a given set to determine the result of subtraction.

Sample resources

Eggciting Math – Using plastic eggs, students can do a variety of activities that will help them with one-to-one correspondence and with relating symbolic, pictorial, and concrete materials to number concepts. http://explorer.scrtec.org/explorer/explorer-db/html/817016193-81ED7D4C.html

The Autumn People: Addition – Worksheet featuring beginning addition with a few story problems. http://www.geocities.com/EnchantedForest/Dell/5232/work1.html

The Autumn People: Subtraction – Worksheet featuring beginning subtraction with a few story problems. http://www.geocities.com/EnchantedForest/Dell/5232/work2.html

Sample Activities

CONTENT AREA: MATH	
STRAND: Numbers & Number Sense	**STANDARD:** M-NS 1
ORGANIZING TOPIC: Whole Numbers: Representation + Relationships	
The student, given sets containing 10 or fewer concrete items, will identify and describe one set as having more, fewer, or the same, using one to one correspondence.	

SAMPLE ACTIVITY 1:	M-NS1

Description of Activity:

Students will compare two sets of pattern blocks and determine which set has more items, fewer items, or if they have the same number of items.

Materials Needed:

Three yellow hexagons, six red trapezoids, 4 orange squares, and nine green triangles

Worksheet with two columns with one shape designated per column (ex. yellow hexagons/red trapezoids or yellow hexagon/green triangle).

Steps of Activity:

1. Place objects/pattern blocks where they match.
2. Line up the shape from one column with shape from second column.
3. After you've matched, answer does one shape have any left over?
4. Respond to question related to which group has more, less, or the same.

***Possible Communication Skills*:**

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages

C9 The student will follow one-step or multi-step directions.

C12 The student will consistently respond to "Yes/No" questions across a variety of settings, situations and content areas.

CONTENT AREA: MATH	
STRAND: Numbers and Number Sense	**STANDARD: M-NS2**
ORGANIZING TOPIC: Whole Numbers: Representations and Relationships	
The student given a set of ten or fewer objects will: a) tell how many are in the set by counting orally. b) select the corresponding numeral from a given set.	

SAMPLE ACTIVITY 1:	M-NS2a

Description of Activity:

Given a set of 4 different types of pattern blocks, students are able to sort blocks by given attributes, and count orally how many blocks are in each subset.

Materials Needed:

1. Baggies with the follow pattern block inside: (3 yellow hexagons, 6 red trapezoids, 4 orange squares, and 9 green triangles
2. Paper with a preprinted number line from 0-10.

Steps of Activity:

1. Student sorts the large set of pattern blocks by color and shape
2. Student then counts orally (or in students form of communication) each subset

Possible Communication Skills:

C5 The student will follow basic rules for conversations including turn taking and listening to a speaker.

C8 The student will engage in communicative exchanges (conversations) with peers and adults.

C10 The student will use voice level appropriate for a variety of settings and situations.

SAMPLE ACTIVITY 2:	M-NS2b

Description of Activity:

Students will match oral numbers with their written equivalents.

Materials Needed:

1. Baggies with the follow pattern block inside: (3 yellow hexagons, 6 red trapezoids, 4 orange squares, and 9 green triangles
2. Paper with a preprinted number line from 0-10.

Steps of Activity:

1. Students take the yellow hexagon that he/she counted in MNS-2a
2. Student takes the number line provided and uses it to identify the appropriate number of yellow hexagons by circling the number
3. Student repeats process for each of the other three pattern blocks

Possible Communication Skills:

C1 The student will use gestures to respond to, support, accentuate and dramatize verbal messages.

C5 The student will follow basic rules for conversations including turn taking and listening to a speaker

C9 The student will follow one-step or multi-step directions.

CONTENT AREA: MATH	
STRAND: Number and number sense	**STANDARD:** M-NS 4
ORGANIZING TOPIC: Whole Numbers: Representations & Relationships	
Student will investigate and recognize patterns from counting by 5's and tens too, using concrete objects and a calculator.	

SAMPLE ACTIVITY 1:	M-NS4

Description of Activity:

Give students three rows of a hundreds board, the teacher and student will rote count in intervals of 5 or ten, placing a colored bead on each correct intervals of or 10.

Materials Needed:

Hundreds board

Number 5, 10 15, 20, 25, 30, on index cards.

Steps of Activity:

1.Identify a small group

2. Model for students a rhythmic pattern that establishes an interval of fives up to 30. For example, stomp, stomp, stomp, stomp, clap.

3. After numerous oral repetitions of the rhythmic pattern, have students place a colored bead on the pattern, have student place a colored bead on the 5, 10, 15, etc. (the "clap" number)

4. After multiple repetitions, begin having the students substitute the appropriate number for the clap (5's).

Possible Communication Skills:

C 4 The student will contribute to group interactions across content areas, settings, situations and audiences.

C 9 The student will follow one-step or multi-step directions

SAMPLE ACTIVITY 2:	M-NS4

Description of Activity:

Using a standard or adapted calculator the student will use the constant feature to count by 5's and 10's).

Materials Needed:

Calculator, adapted calculator, money calculator (with 5's, 10's nickels and dimes)

Steps of Activity:

Using a teaching calculator, the teacher will model the use of the calculator with the constant feature, emphasizing the auditory and visual pattern of skip counting.

Students will practice using the constant feature and learn the art of skip counting.

Finally, have the students predict the next number in the skip counting sequence, given a choice of numbers.

Possible Communication Skills:

C4 The student will contribute to group interactions across content areas, settings, situations and audiences.

C9 The student will follow one-step or multi-step directions

C11 The student will listen to and actively participate in a variety of language activities including choral speaking, rhymes, songs and stories with repeated patterns.

CONTENT AREA: MATH	
STRAND: Number and Number Sense	**STANDARD:** M-NS5
ORGANIZING TOPIC: Whole Numbers: Representations and Relationships	
The student will count forward to 30 and backward from 10.	

SAMPLE ACTIVITY 1:	M-NS5

Description of Activity

During morning calendar group, a number is added each morning. The students, individually or in a group, count the numbers as each number is presented.

Materials Needed:

Calendar, number cards

Steps of Activity:

1. Introduction of activity

2. Teacher will model the counting of numbers already on the calendar

3. Students are asked to predict what the next number will be. A designated student will count as a way to determine the correct number while touching each number as he counts. The group will again practice counting to the newly attached number

Possible Communication Skills:

C4 The student will contribute to group interactions across content areas, settings, situations and audiences.

C11 The student will listen to and actively participate in a variety of language activities including choral speaking, rhymes, songs and stories with repeated patterns.

SAMPLE ACTIVITY 2:	M-NS5

Description of Activity:

An individual interactive countdown number line and classroom display is used throughout the school year to countdown key events.

Materials Needed:

Interactive classroom display with a "countdown number line".

Individual descending order number line, 10 to 1.

Steps of Activity:

1. Teacher will use an interactive display to model counting backwards from 10 to 1 .

2. The teacher will point to each number as it is counted.

3. Then, the students will count along with the teacher as they slide their marker down on their individual descending order number line.

Possible Communication Skills:

C1 The student will use gestures to respond to, support, accentuate and dramatize verbal messages.

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C4 The student will contribute to group interactions across content areas, settings, situations and audiences.

Skill Group 1

Organizing Topic→ Measurement: Money, Length, Weight/Mass, Temperature, Time

Aligned Standard(s) of Learning

M-M1 The student will recognize a penny, nickel, dime, and quarter and will determine the value of a collection of pennies and/or nickels whose total value is 10 cents or less.

M-M2 The student will identify the instruments used to measure length (ruler), weight (scale), time (clock: digital and analog; calendar: day, month, and season), and temperature (thermometer).

M-M3 The student will tell time to the hour, using an analog or digital clock.

M-M4 The student will compare two objects or events, using direct comparisons or nonstandard units of measure, according to one or more of the following attributes: length (shorter, longer), height (taller, shorter), weight (heavier, lighter), temperature (hotter, colder). Examples of nonstandard units include foot length, hand span, new pencil, paper clip, and block.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Describe the properties/characteristics (e.g., color, relative size) of a penny, nickel, dime, and quarter.
- Identify a penny, nickel, dime, and quarter.
- Count a randomly placed collection of pennies and/or nickels (or models of pennies and/or nickels) whose value is 10 cents or less, and determine the value of the collection.
- Identify a ruler as an instrument to measure length.
- Identify different types of scales as instruments to measure weight.
- Identify different types of clocks (analog and digital) as instruments to measure time.
- Identify the components of a calendar, including days, months, and seasons.
- Identify different types of thermometers as instruments used to measure temperature.
- Tell time to the hour on an analog clock.
- Tell time to the hour on a digital clock.
- Compare and describe lengths of two objects (as shorter or longer), using direct comparison or nonstandard units of measure (e.g., foot length, hand span, new pencil, paper clip, block).
- Compare and describe heights of two objects (as taller or shorter), using direct comparison or nonstandard units of measure (e.g., book, hand span, new pencil, paper clip, block).
- Compare and describe weights of two objects (as heavier or lighter), using direct comparison or nonstandard units of measure (e.g., book, cubes, new pencil, paper clip, block).

- Compare and describe temperatures of two objects or environment (as hotter or colder), using direct comparison.

Sample resources

http://standards.nctm.org/document/chapter4/meas.htm#bp1 – Principles and Standards information related to measurement. For prekindergarten through Grade 2.

http://illuminations.nctm.org/lessonplans/prek-2/measurement/index.html#srs – a multi-day lesson plan entitled "Magnificent Measurement" containing 6 lessons that build early understandings about the attributes of measurement as well as the units, systems, and processes of measurement.

http://www.glc.k12.ga.us/BuilderV03/lptools/lpshared/lpdisplay.asp?Session_Stamp=&LPID=13142 – a hands-on lesson that includes a PowerPoint presentation in which students use length to order objects from longest to shortest.

http://www.glc.k12.ga.us/BuilderV03/lptools/lpshared/lpdisplay.asp?Session_Stamp=&LPID=15678 – a lesson plan that compares students' heights (taller/shorter) and compares lengths of straws longer/shorter.

http://www.sbgmath.com/grk/chapter7/start/index.html – a pennies activity with Internet links to information about American coins.

Sample activities

CONTENT AREA: MATH	
STRAND: Measurement	**STANDARD:** M-M1
ORGANIZING TOPIC: Measurement: Money	
The student will recognize a penny, nickel, dime, and quarter and will determine the value of a collection of pennies and/or nickels whose total value is 10 cents or less.	

SAMPLE ACTIVITY 1:	M-M 1

Description of Activity:

After visiting the school store and determining s/he wants to purchase a pencil priced up to 10 cents, student will sort of pile of pennies, nickels, dimes, and quarters into piles of matching coins. Student will then select the correct number of pennies and/or nickels to purchase the pencil worth up to ten cents.

Materials Needed:

Real or simulated school store

Pencils for purchase with price tag labeled up to ten cents

Collection of real coins (pennies, nickels, dimes, and quarters)

Steps of Activity:

Student visits school store with peer and picks a priced pencil to buy

Student returns to classroom and works with peer to sort coins into piles of size and/or color

Student then puts the biggest and smallest silver coins away

Student then counts the appropriate number of pennies and/or nickels to buy the pencil

Student and peer return to the school store to buy the pencil

Possible Communication Skills:

C6 The student will express wants and needs to others.

SAMPLE ACTIVITY 2:	M-M1

Description of Activity:

Given an assortment of pennies, nickels, dimes, and quarters student will select pennies and nickels to put into a sandwich bag to purchase a classroom privilege activity with a value of up to ten cents.

Materials Needed:

Collection of real coins (pennies, nickels, dimes, and quarters)

Sandwich bags

Choice list of classroom privilege activities (computer time, listening to music, etc.)

Steps of Activity:

Student is given a collection of real coins

Student is directed to put pennies and nickels into a sandwich bag

Student will withdraw pennies and/or nickels with a value of up to ten cents from sandwich bag

Student will purchase classroom privilege activity of their choice from the list worth ten cents

Possible Communication Skills:

Cl The student will use gestures to respond to, support, accentuate and dramatize verbal messages

C8 The student will engage in communicative exchanges (conversations) with peers and adults

CONTENT AREA: MATH	
STRAND: Measurement	**STANDARD:** M-M 2
ORGANIZING TOPIC: Measurement: Length, Weight/Mass, Temperature, Time	
The student will identify the instruments used to measure length (ruler), weight (scale), time (clock: digital and analog; calendar: day, month, and season), and temperature (thermometer).	

SAMPLE ACTIVITY 1:	M-M2

Description of Activity:

While writing a "Me Book"/biography with a peer to introduce themselves to the class, student will chose the appropriate measurement instrument to determine their foot length and weight.

Materials Needed:

"Me Book"/biography

Assortment of measurement instruments (ruler, scales, clock, and thermometer)

Voice output communication aide

Steps of Activity:

1. Student selects peer to write their "Me Book"/biography
2. Reading from the "Me Book" or biography template, peer will state: "We need your foot length, which instrument do I use to measure your foot length?" and "We need your weight, which instrument do I use to measure your weight?"
3. Student will scan assortment of measurement instruments and select appropriate instrument to determine how to measure their foot length and weight.
4. Peer will measure and record student's foot length and weight in the "Me Book"/biography
5. Peer will verbally record the student's foot length and weight into a voice output communication aide for student to present their classmates during their introduction.

Possible Communication Skills:

C4 The student will contribute to group interactions across content areas, settings, situations and audiences.

C13 The student will share stories or information with an audience.

SAMPLE ACTIVITY 2:	M-M 2

Description of Activity:

In small group, when asked, "If I want to know when your birthday is, what would I look at?" or "If I want to know when you ate breakfast, what would I look at?" student will select appropriate visual representation of a calendar or analog and digital clocks.

Materials Needed:

Visual representation(object, photo, line drawing) of a calendar and analog and digital clocks on a two-sided board attached to a tongue depressor

Steps of Activity:

Student and peers are seated in a circle

All students are given a visual representation of a calendar and analog and digital clocks

Adult will ask the questions about birthday and breakfast

All students will answer questions by holding up their visual representation of the calendar or analog and digital clocks

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C4 The student will contribute to group interactions across content areas, settings, situations and audiences.

CONTENT AREA: MATH	
STRAND: Measurement	**STANDARD:** M-M 3
ORGANIZING TOPIC: Measurement: Time	
The student will tell time to the hour, using an analog or digital clock.	

SAMPLE ACTIVITY 1:	M- M 3

Description of Activity:

At 9:00 a.m. teacher will set a timer with auditory feedback (bell) for 60 minutes. When the timer rings, teacher will say to the class, "It was 9:00 when I set the timer, what time is it now?" The student will show 10:00 on an instructional clock, or draw or use highlighting tape to place the clock hands to 10:00 on a stamped worksheet or clock board.

Materials Needed:

Classroom analog clock

Timer with auditory feedback

Instructional clocks

Highlighting tape

Clock stamped worksheets

Clock board

Steps of Activity:

Teacher gains all students' attention

Teacher sets timer with auditory feedback at 9:00

Timer rings at 10:00

Teacher asks question

Student answers question and shows it to peer for check

Teacher repeats activity

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C8 The student will engage in communicative exchanges (conversations) with peers and adults.

SAMPLE ACTIVITY 2:	M-M 3

Description of Activity:

Using a computer, student will follow requests from a time telling software program. For example, the computer will ask the student to find 7:00. Student will use a switch to select the analog or digital representation of 7:00 on the monitor.

Materials Needed:

Computer

Time telling software program

Switch

Switch interface

Steps of Activity:

Student will read individual schedule and move to computer station

Student will access the computer by using switch to turn on and select time telling software program

Student will follow directions of the program

Student will save their answers on the computer

Possible Communication Skills:

C9 The student will follow one-step or multi-step directions.

CONTENT AREA: MATH	
STRAND: Measurement	**STANDARD: M-M 4**
ORGANIZING TOPIC: Length, Weight, Temperature	
The student will compare two objects or events, using direct comparisons or nonstandard units of measure, according to one or more of the following attributes: length (shorter, longer), height (taller, shorter), weight (heavier, lighter), temperature (hotter, colder). Examples of nonstandard units include foot length, hand span, new pencil, paper clip, block.	

SAMPLE ACTIVITY 1:	M-M 4

Description of Activity:

Giving the student props, s/he will communicate comparison between length, as longer or shorter; weight as heavier or lighter; temperature as hotter or colder; or height as taller or shorter.

Materials Needed:

A short pencil and an exaggeratedly long pencil

A heavy ball and a ping pong ball

Hot cocoa and iced tea

2 people of differing heights

Steps of Activity:

1. Given a two pencils of varying length, student will identify shorter versus longer.
2. Repeat process for height using shortest and tallest person in the room.
3. Repeat process for weight using heaviest and lightest with the 2 balls.
4. Repeat process for temperature using hotter or colder with the 2 beverages.

Possible Communication Skills:

C1 The student will use gestures to respond to, support, accentuate and dramatize verbal messages

C2 The student will use facial expressions to respond to, support, accentuate and dramatize verbal messages

C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.

SAMPLE ACTIVITY 2:	M-M 4

Description of Activity:

Teacher will trace one foot of each student. Peers will cut out traced feet. Shown their cut out foot length, student will then find a peer's foot cut out that is shorter than their's.

Materials Needed:

Paper

Pencil

Scissors

Students

Steps of Activity:

Teacher will trace one foot of each student

Peers will cut out traced feet

Shown their cut out foot length, student will then find a peer's foot cut out that is shorter than theirs.

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C13 The student will share stories or information with an audience.

SKILL GROUP 1

Organizing Topic→Geometry: Two-dimensional (plane), Spatial Relationships

Aligned Standard(s) of Learning

M-G1 The student will identify, describe, and draw two-dimensional (plane) geometric figures (circle, triangle, square, and rectangle).

M-G2 The student will describe the location of one object relative to another (above, below, next to) and identify representations of plane geometric figures (circle, triangle, square, and rectangle) regardless of their position and orientation in space.

M-G3 The student will compare the size (larger, smaller) and shape of plane geometric figures (circle, triangle, square, and rectangle).

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Identify a circle, triangle, square, and rectangle.
- Describe the properties of triangles, squares, and rectangles, including number of sides and number of corners.
- Describe a circle.
- Draw a circle, triangle, square, and rectangle.
- Identify pictorial representations of a circle, triangle, square, and rectangle, regardless of their position and orientation in space.
- Describe the location of one object relative to another, using the terms *above*, *below*, and *next to*.
- Compare and group plane geometric figures (circle, triangle, square, and rectangle) according to their relative sizes (larger, smaller).
- Compare and group plane geometric figures (circle, triangle, square, and rectangle) according to their shapes.

Sample resources

http://standards.nctm.org/document/chapter4/geom.htm#bp4 – NCTM Principles and Standards information related to geometry for prekindergarten through Grade 2.

http://www.glc.k12.ga.us/BuilderV03/lptools/lpshared/lpdisplay.asp?Session_Stamp=&LPID=13293 – a hands-on lesson in which students sort geometric figures by color, size, and shape.

http://www.successlink.org/great2/g1720.html – a unit on shapes with poetry, songs, games, activities, and Internet site suggestions.

http://illuminations.nctm.org/lessonplans/prek-2/investi_shapes/ – Investigating Shapes is an Internet lesson plan available from NCTM in which students identify characteristics of triangles, manipulate triangles on an electronic geoboard, and name the triangle's relative location.

"*Geometry for Elementary School Teachers*"
http://www.pen.k12.va.us/VDOE/Instruction/Elem_M/geo_elem.html – a VDOE professional development training module containing activities that can be adapted for student use.

Navigating through Geometry in Prekindergarten through Grade 2 – available from NCTM. Contains additional lessons for geometric activities.

Sample activities

CONTENT AREA: MATH	
STRAND: Geometry	**STANDARD:** M-G 1
ORGANIZING TOPIC: Geometry: Two-Dimensional (plane)	
The student will identify, describe, and draw two-dimensional (plane) geometric figures (circle, triangle, square, and rectangle).	

SAMPLE ACTIVITY 1:	M-G 1

Description of Activity:

Given a dance mat with geometrical shapes, (circle, triangle, square, and rectangle), the student will follow the directions of a spinner or music to touch a foot or hand to the named shape.

Materials Needed:

Store bought or individually adapted dance mat with shapes, commercial music or teacher created tape, spinner with matching shapes, (optional: visual representation of directions on a monitor, such as "Dance, Dance Revolution").

Steps of Activity:

During a free time social activity period, the teacher will place a different shape on each of the student's shoes or hands. Then, during a musical directed activity, the student will match the correct foot/hand to the named shape. As the music plays, and the teacher or tape says, "Square" the student will place the corresponding foot/hand on the square shape on the dance mat. Similarly when the teacher/tape says "Circle," the student will match his/her corresponding foot or hand to the circle shape on the dance mat. Additional shapes can be introduced as discrimination between two shapes is evidenced.

Possible Communication Skills:

C 9 The student will follow one-step or multi-step directions.

SAMPLE ACTIVITY 2:	M-G 1

Description of Activity:

During a small learning group activity with typically developing peers, the student will handle and manipulate shape materials to select a named shape upon request, and then either trace or imprint the shape onto paper.

Materials Needed:

Lotto board, foam, sandpaper, or puzzle piece shapes, or sponge shapes, paint, ink pad or maker

Steps of Activity:

1. Give students concrete flat shape representations of a circle and square, and are encouraged to feel and explore them.
2. The teacher models the identification of a circle by saying, "This is a ROUND circle." The teacher has student feel the roundness of the circle by running his/her hand around the perimeter of the shape, then asks, "Can you find a ROUND circle?"
3. The student matches a circle shape to a template of a circle.
4. Over time the template prompt is faded, and the student identifies the round circle upon request, and uses a variety of art supplies to trace or imprint the shape outline on paper.
5. A similar procedure is followed to teach square, triangle, and/or rectangle.
6. Finally, the student demonstrates discrimination between shapes by selecting and imprinting the named shape upon request.

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

SAMPLE ACTIVITY 2:	M-G 1

Description of Activity:

Given a dance mat with geometrical shapes, (circle, triangle, square, and rectangle), the student will follow the directions of a spinner or music to touch a foot or hand to the named shape.

Materials Needed:

Store bought or individually adapted dance mat with shapes, commercial music or teacher created tape, spinner with matching shapes, (optional: visual representation of directions on a monitor, such as "Dance, Dance Revolution").

Steps of Activity:

During a free time social activity period, the teacher will place a different shape on each of the student's shoes or hands. Then, during a musical directed activity, the student will match the correct foot/hand to the named shape. As the music plays, and the teacher or tape says, "Square" the student will place the corresponding foot/hand on the square shape on the dance mat. Similarly when the teacher/tape says "Circle," the student will match his/her corresponding foot or hand to the circle shape on the dance mat. Additional shapes can be introduced as discrimination between two shapes is evidenced.

Possible Communication Skills:

C 9 The student will follow one-step or multi-step directions.

CONTENT AREA: MATH	
STRAND: Geometry	**STANDARD:** M-G 2
ORGANIZING TOPIC: Geometry: Two-Dimensional (plane)	
The student will describe the location of one object relative to another (above, below, next to) and identify representations of plane geometric figures (circle, triangle, square, and rectangle) regardless of their position and orientation in space.	

SAMPLE ACTIVITY 1:	M-G 2

Description of Activity:

Given a shape scavenger hunt with typically developing peers, the student will identify real life representations of geometric figures, (circle, triangle, square, and rectangle).

Materials Needed:

Shape chart, varied classroom/school objects

Steps of Activity:

1. Student is given a chart of the 4 named shapes.
2. The student looks at the first shape on the chart and is asked to select from at least two choices the real-life representation of that named shape. For example, when looking for a circle, the student would select whether a clock face or a door was a circle, a computer screen or an eraser was a rectangle, and/or a team pennant or a desktop was a triangle.
3. Continue in the same manner until the chart is complete.

Possible Communication Skills:

C 3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

SAMPLE ACTIVITY 2:	M-G 2

Description of Activity:

Given an interactive electronic learning activity played by self or with a peer, the student will place a named shape in a stated relational position upon request.

Materials Needed:

Computer software such as Intellimathics, or KidPix studio, a modified keyboard with an overlay

Steps of Activity:

1. Student or teacher initiates selected computer software.
2. The student will use a mouse, switch, or overlay to respond to computer generated cue to place a shape in a named position, (above, below, next to).
3. Initially, the student will duplicate an example generated by the program.
4. In the next phase of instruction, the student will place the shape in the named position without a model.
5. Relational positions will be taught in isolation until mastery is reached.
6. Finally, discrimination between one position or another will be demonstrated by the student selecting yes/no responses to relational position questions, such as "Is the circle above the square?" or "Is the square next to the triangle?"

Possible Communication Skills:

C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.

CONTENT AREA: MATH	
STRAND: Geometry	**STANDARD:** M-G 3
ORGANIZING TOPIC: Geometry: Spatial Relationships	
The student will compare the size (larger, smaller) and shape of plane geometric figures (circle, triangle, square and rectangle)	

SAMPLE ACTIVITY 1:	M-G 3

Description of Activity:

Given large and small geometrical figures, the student will sort shapes by a named attribute, either size or shape in a peer-learning group.

Materials Needed:

Attribute blocks, relational attribute blocks, power blocks, or tangrams

Steps of Activity:

1. The student is given large and small circles and triangles.
2. The student sorts by the shape attribute only, separating circles from triangles.
3. The student sorts each shape by size attribute only: large triangles, small triangles, large circles, and small circles.
4. The student sorts by shape and/or size, all large shapes, all small shapes.
5. The student completes similar sorts on remaining shapes in the manner described above.

Possible Communication Skills:

C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.

SAMPLE ACTIVITY 2:	M-G3

Description of Activity:

Given a shape of either large or small size, the student will join a group of other students with a shape of the same attribute.

Materials Needed:

Circle, triangle, rectangle and square shape cards in large and small sizes

Steps of Activity:

1. Teacher passes out large and small representations of the four named shapes so that each student has a shape card.
2. Teacher directs students to group themselves by the same shape.
3. Teacher directs students to group themselves by same size, large or small.

Possible Communication Skills:

C 9 The student will follow one-step or multi-step directions.

SKILL GROUP 1

Organizing Topic→Probability

Aligned Standard(s) of Learning

M-PS3 The student will investigate and describe the results of dropping a two-colored counter or using a multicolored spinner.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Conduct investigations of probability through hands-on activities, such as dropping a two-colored counter or using a multicolored spinner.
- Describe verbally, pictorially, and/or with tally marks the outcome of dropping a two-colored counter or using a multicolored spinner (e.g., the number of times the red side of the counter landed up compared to the number of times the counter was dropped).

Sample resources

http://shazam.econ.ubc.ca/flip/ – Ken's Coin Flipping Page allows students to have the computer generate the coin flips

http://explorer.scrtec.org/explorer/explorer-db/html/820889837-81ED7D4C.html – instructions for how to make a spinner that gives fair and random results

"Probability and Statistics for Elementary and Middle School Teachers" http://www.pen.k12.va.us/VDOE/Instruction/Elem_M/prob_stat.html – a VDOE professional development training module containing activities related to this strand that can be modified for student use

Navigating through Data Analysis and Probability in Prekindergarten through Grade 2 – available from NCTM. Contains additional lessons for data analysis activities.

SKILL GROUP 1

Organizing Topic→Statistics

Aligned Standard(s) of Learning

M-PS1 The student will gather data relating to familiar experiences by counting and tallying.

M-PS2 The student will display objects and information, using object graphs, pictorial graphs, and tables.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Gather data on given categories by counting and tallying (e.g., favorites, number of days of various types of weather during a given month, types of pets, types of shoes).
- Display data by arranging concrete objects into organized groups to form a simple object graph.
- Display data, using pictorial representations of the data to form a simple pictorial graph (e.g., a picture graph of the types of shoes worn by students on a given day).
- Display information in tables, either in rows or columns (e.g., a table showing the number of bunnies in one column and the number of ears the bunnies have in another, or a table showing the time schedule for classroom activities).

Sample resources

http://standards.nctm.org/document/chapter4/data.htm#bp2 – information from NCTM's Principles and Standards in relation to data analysis for prekindergarten through Grade 2.

http://www.glc.k12.ga.us/BuilderV03/lptools/lpshared/lpdisplay.asp?Session_Stamp=&LPID=35982 – a lesson plan which revolves around the student's favorite things. The items are graphed according to selected categories, and the students create "My Favorite Things" books about themselves.

http://www.glc.k12.ga.us/BuilderV03/lptools/lpshared/lpdisplay.asp?Session_Stamp=&LPID=11245 – a lesson plan describing graphing activities related to students' types of homes.

http://ericir.syr.edu/cgi-bin/printlessons.cgi/Virtual/Lessons/Mathematics//Process_Skills/MPS0004.html – a lesson plan describing graphing and sorting activities with jellybeans.

"Probability and Statistics for Elementary and Middle School Teachers" http://www.pen.k12.va.us/VDOE/Instruction/Elem_M/prob_stat.html – a VDOE professional development training module containing activities related to this strand that can be modified for student use

Navigating through Data Analysis and Probability in Prekindergarten through Grade 2 – available from NCTM. Contains additional lessons for data analysis activities.

Sample activities

CONTENT AREA: MATH	
STRAND: Probability & Statistics	**STANDARD:** M-PS 1
ORGANIZING TOPIC: Statistics: Collect, Organize and Display, Analyze and Interpret Data	
The student will gather data relating to familiar experience by counting and tallying	

SAMPLE ACTIVITY 1:	M-PS 1

Description of Activity:

- Students will count and tally different pattern blocks using a prepared tally and counting sheet.

Materials Needed:

- 3 yellow hexagons, 3 yellow cubes, 6 red trapezoids, 4 orange squares, 9 green triangles
- Counting and tally sheet (sample below)

Pattern Block	Tally	Cubes	Number

Steps of Activity:

- Students will sort the pattern blocks by color and shape
- Students will put all the yellow hexagons together under first column
- Students will put one mark for each hexagon (3)
- Students will place match up each tally mark with a cube
- Students will count and put the number in the number column
- Repeat process for the rest of the pattern blocks
- Student will compare their tally sheet with another student or with an adult. If there is difference, students or student/adult pair attempt to resolve the differences

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C6 The student will express wants and needs to others

C9 The student will follow one-step or multi-step directions

CONTENT AREA: MATH	
STRAND: Probability and Statistics	**STANDARD:** M-PS2
ORGANIZING TOPIC: Statistics: Collect, organize, display, analyze and interpret data	
The student will display objects and information using objects and information using objects, graphs, pictorial graphs and tables.	

SAMPLE ACTIVITY 1:	MPS-2

Description of Activity:

Class will create a "real life" graph using unifex cubes or laminated squares (brown, blue, green) with magnetic tapes to represent eye color of the students in the class.

Materials Needed:

Unifex cubes or laminated squares with magnetic tape. Also, there should be a large bar graph set up on board or front tables. Graph entitled "Class Eye Color." Axis labeled appropriately (Eye Color in the x-axis and Number of students on the y-axis.

Steps of Activity:

1. Each student comes up and chooses a unifex cube or laminated square that matches the color of his/her eyes.
2. Each student places his cube or square in the correct column (with assist, if needed), creating "bars" for each grouping.
3. Class discussion focuses on identifying greatest color, least color, any colors the same, how the graph "picture" helped, etc. As an optional step, have each student duplicate the class graph on to a preprinted graph at his/her desk.

Possible Communication Skills:

C5 The student will follow basic rules for conversations including turn taking and listening to a speaker.

C6 The student will express wants and needs to others

C8 The student will engage in communicative exchanges (conversations) with peers and adults.

SKILL GROUP 1

Organizing Topic→Patterns and Functions: Representations, Relationships

Aligned Standard(s) of Learning

M-PFA1 The student will sort and classify objects according to similar attributes (size, shape, and color).

M-PFA2 The student will identify, describe, and extend a repeating relationship (pattern) found in common objects, sounds, and movements.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Sort objects into appropriate groups (categories) based on one attribute, such as size, shape, or color.
- Classify sets of objects into three groups (categories) of one attribute (e.g., for size — small, medium, and large).
- Observe and identify the basic repeating pattern found in repeating patterns of common objects, sounds, and movements that occur in real-life situations, where there are four or fewer elements in the basic repeating pattern.
- Describe the basic repeating pattern found in a repeating pattern, where there are four or fewer elements in the basic repeating pattern.
- Extend a repeating pattern by adding at least two repetitions to the pattern.

Sample resources

http://standards.nctm.org/document/chapter4/alg.htm#bp1 – information from NCTM's "Principles and Standards for School Mathematics" Web site related to patterns, functions, and algebra for the prekindergarten through Grade 2 strand.

http://www.illuminations.nctm.org/lessonplans/prek-2/button/index.html – lesson plan from NCTM's "Illuminations" Web site related to sorting and organizing objects.

"Patterns, Functions and Algebra for Elementary School Teachers" http://www.pen.k12.va.us/VDOE/Instruction/Elem_M/mathtrain.html – a VDOE professional development training module containing activities related to this strand that can be modified for student use

Navigating through Algebra in Prekindergarten through Grade 2 – available from NCTM. Contains additional lessons for pattern and function activities.

Sample activities

CONTENT AREA: Math	
STRAND: Patterns, Functions & Algebra	**STANDARD:** M-PFA2
ORGANIZING TOPIC: Patterns and Functions: Representations & Relationships	
The student will identify, describe, and extend a repeating relationship (pattern) found in common objects, sounds, and movements.	

SAMPLE ACTIVITY 1:	M-PFA2

Description of Activity:

In music class the teacher claps a pattern, and the students repeat the patterns. After the teacher has demonstrated two patterns (e.g., clap, rest, clap, rest) a student is asked to extend the repeating pattern (e.g. clap, clap, rest, clap, clap, rest, clap clap).

Materials Needed:

Hands, feet, clappers, flat services, (accommodate as needed for physical abilities)

Steps of Activity:

1. Teacher models a clapping pattern.
2. Ask the students to echo the pattern.
3. Ask for a volunteer to identify the pattern (by pointing to a diagram, using their voice, etc.)
4. Ask for a volunteer to describe how the pattern could be extended (e.g., by adding a clap or rest etc.)
5. Have a student model an extension that the class echoes.

Possible Communication Skills:

C1 The student will use gestures to respond to, support, accentuate and dramatize verbal messages.

C4 The student will contribute to group interactions across content areas, settings, situations and audiences.

C11 The student will listen to and actively participate in a variety of language activities including choral speaking, rhymes, songs and stories with repeated patterns.

SAMPLE ACTIVITY 2:	M-PFA2

Description of Activity:

Using unifex cubes the teacher creates a pattern. The students copy the pattern with their own cubes and then color a drawing of unifex cubes to represent the pattern. Students are asked to then extend beyond the teacher's model.

Materials Needed:

Variety of unifex cubes

Worksheet with drawing of unifex cubes

Crayons, markers, paints, etc.

Computer model of unifex cubes that student can "color" electronically

Steps of Activity:

1. Teacher models a unifex cube, color pattern (e.g. 1 red, 1 blue, 1 red…).
2. Ask the students to copy the pattern with their own unifex cubes.
3. The students then color one row of the worksheet with their pattern.
4. Students then extend the pattern by adding and/or subtracting cubes ((2 red, 1 blue, 2 red.)

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C9 The student will follow one-step or multi-step directions.

SKILL GROUP 2

SKILL GROUP 2

Organizing Topic→Whole Numbers: Representations, Relationships, Operations, Estimation, Addition and Subtraction

Aligned Standard(s) of Learning

M-NS6 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.

M-NS7 The student will group a collection of up to 100 objects into tens and ones and write the corresponding numeral to develop an understanding of place value.

M-NS8 The student will count forward by ones, fives, and tens to 100, by twos to 20, and backward by ones from 20.

M-NS9 The student will recognize and write numerals 0 through 100.

M-NS10 The student will identify the ordinal positions first through tenth, using an ordered set of objects.

M-CE2 The student, given a familiar problem situation involving magnitude, will

a) select a reasonable magnitude from three given quantities: a one-digit numeral, a two-digit numeral, and a three-digit numeral (e.g., 5, 50, and 500); and

b) explain the reasonableness of his/her choice.

M-CE3 The student will recall basic addition facts — i.e., sums to 10 or less — and the corresponding subtraction facts.

M-CE4 The student will create and solve story and picture problems involving one-step solutions, using basic addition and subtraction facts.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Count by rote from 1 to 100.
- Write numerals for the numbers 1 to 100.
- Count a randomly placed collection of objects containing between 1 and 100 items and write the corresponding numeral.
- Group a collection of objects into sets of tens and ones.
- Write the numeral that corresponds to the total number of objects in a given collection of objects that have been grouped into sets of tens and ones.
- Count by ones, fives, and tens to 100, using concrete objects, such as counters, connecting cubes, pennies, nickels, and dimes.
- Skip-count orally by fives and tens to 100.
- Count by twos to 20, using concrete objects, such as counters, connecting cubes, and pennies.

- Skip-count orally by twos to 20.
- Count backward by ones from 20.
- Say the correct name for each numeral 0 through 100.
- Write each numeral 0 through 100, using correct numeral formation.
- Count an ordered set of objects, using the ordinal-number words *first* through *tenth*.
- Identify the ordinal positions, first through tenth, using an ordered set of objects.
- Identify the ordinal positions, first through tenth, using an ordered set of objects presented in lines or rows from

– left-to-right;

– right-to-left;

– top-to-bottom; and

– bottom-to-top.

- Select a reasonable magnitude for a given set from three given quantities: a one-digit numeral, a two-digit numeral, and a three-digit numeral (e.g., 5, 50, and 500 jelly beans in jars) in a familiar problem situation.
- Given a familiar problem situation involving magnitude, explain why a particular estimate was chosen as the most reasonable from three given quantities: an one-digit numeral, a two-digit numeral, and a three-digit numeral.
- Identify + as a symbol for addition and – as a symbol for subtraction.
- Recall and state orally the basic addition facts for sums to 10 or less and the corresponding subtraction facts.
- Recall and write the basic addition facts for sums to 10 or less and the corresponding subtraction facts, when addition or subtraction problems are presented in either horizontal or vertical written format.
- Interpret and solve oral or written story and picture problems involving one-step solutions, using basic addition and subtraction facts (sums to 10 or less and the corresponding subtraction facts).
- Identify a correct number sentence to solve an oral or written story or picture problem, selecting from among basic addition and subtraction facts.

Sample resources

www.k111.k12.il.us/king/math.htm –This Web site has lots of interactive activities for the primary grades. Many of the activities require the Shockwave plug-in.

http://standards.nctm.org/document/chapter4/numb.htm#bp1 – This link contains information about numbers and operations from the NCTM's Principles and Standards document.

http://illuminations.nctm.org/lessonplans/prek-2/dominoes/index.html#l1 – This instructional unit focuses on addition for students who have learned to count but have not yet mastered addition of one-digit numbers. These lessons also explore foundational algebraic understandings.

www.aaamath.com – This site contains interactive games and lesson plans.

CONTENT AREA: MATH	
STRAND: Number and Number Sense	**STANDARD:** M-NS6
ORGANIZING TOPIC: Whole Numbers: Representations and Relationships	
The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.	

SAMPLE ACTIVITY 1:	M-NS6

Description of Activity:

The student will count in rote sequence, using objects, and places them on corresponding number on hundreds board.

Materials Needed:

Hundreds board and manipulative.

Steps of Activity:

1. On a daily basis, the teacher will give students a pre-determined number of objects to count. Student count the object and places objects on corresponding number on hundreds board.

Possible Communication Skills:

C9 The student will follow one-step or multi-step directions.

SAMPLE ACTIVITY 2:	M-NS6

Description of Activity:

When given a sorting/counting job in the workroom, students will count and write the corresponding number. Student may work individually or with a partner.

Materials Needed:

1. Variety of materials appropriate for sorting and counting
2. Worksheets with pictures/number of objects and line or box for indicating the correct numeral.

Steps of Activity:

1. Student is given a counting/sorting job. Students sort them and count the papers, materials, etc.
2. The student will complete the counting then write the correct number (using identified accommodations/modification.

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C4 The student will contribute to group interactions across content areas, settings, situations and audiences.

C8 The student will engage in communicative exchanges (conversations) with peers and adults.

CONTENT AREA: MATH	
STRAND: Number and Number Sense	STANDARD: M- NS7
ORGANIZING TOPIC: Whole Numbers: Representations and Relationships	
The student will group a collection of up to 100 objects into tens and ones and write the corresponding numeral to develop an understanding of place value.	

SAMPLE ACTIVITY 1:	M- NS7

Description of Activity:

Given a stack of materials, the student will sort by single digits then check their work by counting in stacks of ten and ones.

Materials Needed:

Handouts or materials to be sorted.

Examples:

1. Stacks of papers in the class
2. Crayons or markers
3. Matchbox cars
4. Base ten blocks or unifex cubes

Steps of Activity:

1. Given the student the specific number of papers to be sorted. Have the student sort and count by singe digits.
2. Then have the student check their sorting by counting the materials by 10's and ones.
3. Have the student record/write the number counted.
4. Repeat activity with other materials

Possible Communication Skills:

C1 The student will use gestures to respond to, support, accentuate and dramatize verbal messages.

C9 The student will follow one-step or multi-step directions

SAMPLE ACTIVITY 2:	M- NS7

Description of Activity:

Given a set of craft sticks, the student will count a set of 10 then bind into a set to represent one ten. Left over craft sticks will represent ones.

Materials Needed:

Craft Sticks

Steps of Activity:

1. Have the student count craft sticks until they get to 10.
2. Have the student bind the sticks together as representations of ONE ten.
3. Left over sticks will represent ones.
4. Have the student count sets of ten and ones and place on a place value mat
5. Then, ask the student to write/record the corresponding number

Possible Communication Skills:

C1 The student will use gestures to respond to, support, accentuate and dramatize verbal messages.

C9 The student will follow one-step or multi-step directions.

CONTENT AREA: MATH	
STRAND: Number and Number Sense	**STANDARD:** M-NS8
ORGANIZING TOPIC: Whole Numbers: Representations and Relationships	
The student will count forward by ones, fives, and tens to 100, by 2's to 20, and backward by ones from 20.	

SAMPLE ACTIVITY 1:	M-NS8

Description of Activity:

In pairs and larger groups, have the student count by 1's, 2's, 5's and 10's to the number 20. Using instruments to keep a rhythmic beat.

Materials Needed:

Musical instruments

Steps of Activity:

1. Give each student a musical instrument.
2. Model for class the rhythmic pattern of skip counting.
3. Break the students into smaller groups and have them practice counting.

Possible Communication Skills:

C9 The student will follow one-step or multi-step directions.

SAMPLE ACTIVITY 2:	M-NS8

Description of Activity:

Using a long rope, the students will travel along the rope by walking, rolling crawling etc. while skip counting using numbers attached to the rope.

Materials Needed:

Long rope.

Numbers attached to rope.

Steps of Activity:

1. Lay the rope on the ground.
2. Attach numbers to the rope with the numbers from a skip counting group (1, 2, 5 or 10)
3. Demonstrate for the students how to move up the rope and count.
4. Have each student move along the rope and skip count.

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages

C4 The student will contribute to group interactions across content areas, settings, situations and audiences.

C10 The student will use voice level appropriate for a variety of settings and situations.

CONTENT AREA: MATH	
STRAND: Number and Number Sense	**STANDARD:** M-NS9
ORGANIZING TOPIC: Whole Numbers: Representations and Relationships	
The student will recognize and write numerals 0 through 100.	

SAMPLE ACTIVITY 1:	M-NS9

Description of Activity:

The student will supply the missing numeral in a number line by writing the number in the blank or gluing the number in the appropriate space.

Materials Needed:

Display number line for sets 0-10, 11-20, 21-30, etc..

Worksheet of number line with random numbers missing.

Writing instrument/preprinted number with glue stick.

Steps of Activity:

1. Teach displays large number line.
2. The teacher points to each number in the number line as she/he labels the number.
3. The teacher repeats line 2 with the students touching the named numerals on their number lines.
4. The teacher randomly points to numbers on the display number line and calls out that number.
5. Each student will look at their worksheet and point to the number.
6. If a blank is in that space, the correct number will be written or glued on the worksheet.

Possible Communication Skills:

C1 The student will use gestures to respond to, support, accentuate and dramatize verbal messages.

C9 The student will follow one-step or multi-step directions.

SAMPLE ACTIVITY 2:	M-NS9

Description of Activity:

The student will practice writing numerals using a combination of 0-9. The student will have the opportunity to practice the correct formation of numerals using kinesthetic materials.

Materials Needed:

Sand, sandpaper, finger paints, clay, etc.

Steps of Activity:

1. The teacher will demonstrate making lines and circles using the tactile material.
2. The student will select the materials for the activity.
3. Using the writing materials or finger, the student will follow the example of the teacher.

Possible Communication Skills:

C1 The student will use gestures to respond to, support, accentuate and dramatize verbal messages.

C2 The student will use facial expressions to respond to, support, accentuate and dramatize verbal messages.

C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.

CONTENT AREA: MATH	
STRAND: Number and Number Sense	**STANDARD:** M-NS 10
ORGANIZING TOPIC: Whole Numbers: Representations and Relationships	
The student will identify the ordinal positions first through tenth, using an ordered set of objects.	

SAMPLE ACTIVITY 1:	M-NS 10

Description of Activity:

The student will follow picture schedule reading off ordinate numbers related to activities.

Materials Needed:

Picture schedule

Ordinal number words on flash cards along with number representations

Steps of Activity:

Students will be directed to picture schedule and asked to read ordinal positions of activities in correct order.

Possible Communication Skills:

C9 The student will follow one-step or multi-step directions.

CONTENT AREA: Math	
STRAND: Computation and Estimation	**STANDARD:** M-CE2
ORGANIZING TOPIC: Whole numbers: Representations and Relationships	

The student, given a familiar problem situation involving magnitude, will

a) Select a reasonable magnitude from three given quantities: a one-digit numeral, a two-digit numeral, and a three-digit numeral (e.g., 5, 50, and 500); and

b) Explain the reasonableness of his/her choice.

SAMPLE ACTIVITY 1:	M-CE2a

Description of Activity:

Working in a collaborative group and given collections of objects and a 4x4 " grid with 1, 2, and 3, digit numerals filled in, the student will indicate the approximate quantity of a given set by pointing to the corresponding numeral on the grid.

Materials Needed:

Collections of: 5 pennies, 50 pennies, 500 pennies, (or other tactile manipulatives) in sealable bags. (2 buttons, 20 buttons, 200 buttons, etc.)

Laminated estimation grid (so you can change the numerals as needed).

Overhead marker

Optional: Base 10 blocks (ones, tens, hundreds)

One Digit	Two Digit	Three Digit
5	50	500

Steps of Activity:

1. Students will gather their supplies of manipulatives (and base 10 blocks if needed).
2. Students will examine the contents of one bag at a time.
3. Students will discuss the quantities.
4. Each student in the group will indicate the amount they think is represented in each bag.

Possible Communication Skills:
C1: The student will use gestures to respond to, support, accentuate and dramatize verbal messages. C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C4 The student will contribute to group interactions across content areas, settings, situations and audiences. C9 The student will follow one-step or multi-step directions.

SAMPLE ACTIVITY 2:	M-CE2a

Description of Activity:

As a year-long activity, each Monday in their homeroom class the students discuss where they went over the weekend (e.g. home to Walmart, Roanoke to Richmond, Virginia to New York). Each student then estimates about how many miles he or she traveled on an individual trip. Record estimations on a large graph for future activities.

Materials Needed:

Sticky notes, stickers, or index cards on which to note their trip

A large empty bar graph with 3 columns labeled 0-9 miles, 10-99 miles, and 100+ miles.

Steps of Activity:

1. In homeroom students talk about where they went over the weekend.
2. Note one estimation on a "card".
3. Select the appropriate column and attach their estimate to the bar graph.

Possible Communication Skills:
C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C4 The student will contribute to group interactions across content areas, settings, situations and audiences. C5 The student will follow basic rules for conversations including turn taking and listening to a speaker. C13 The student will share stories or information with an audience.

CONTENT AREA: Math	
STRAND: Computation and Estimation	**STANDARD:** M-CE3
ORGANIZING TOPIC: Whole numbers Operations & Estimation: Addition & Subtraction	
The student will recall basic addition facts — i.e., sums to 10 or less — and the corresponding subtraction facts.	

SAMPLE ACTIVITY 1:	M-CE3

Description of Activity:

In an elementary classroom using story props, read a story (e.g. *Goldilocks and the Three Bears*). Ask the students how many bears and humans are in the house throughout the story.

Materials Needed:

Goldilocks and the Three Bears

Props such as puppets

Steps of Activity:

1. The teacher reads the story, using props to represent the comings and goings of the 3 bears and Goldilocks.
2. Pause at different points to ask addition and subtraction questions related to the story (e.g., how many bears and humans are in the bedroom when Goldilocks is asleep. Then after Goldilocks runs away ask how many bears and humans are in the bedroom now).
3. Each student records their answer in their own way (e.g., one might tally, another might use a number grid and point to an answer that her neighbor writes down).
4. At the end of the story ask for the final total in the house.

Possible Communication Skills:

C1 The student will use gestures to respond to, support, accentuate and dramatize verbal messages.

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C9 The student will follow one-step or multi-step directions.

SAMPLE ACTIVITY 2:	M-CE3

Description of Activity:

In a high school game club, provide adapted dice with numerals 0-5 and a spinner that indicates to add or subtract. The students progress through the game as the rules prescribe.

Materials Needed:

Adapted dice

Game such as Parcheesi

Steps of Activity:

1. Students spin the spinner to learn if they are to add or subtract the numerals on the dice.
2. The students roll dice and add or subtract face values and move the corresponding amount (e.g. Spin an "add" and roll a 4 and 5, move nine. Spin a "subtract" and roll a 5 and 4 move one)
3. Game continues as agreed upon.

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C5 The student will follow basic rules for conversations including turn taking and listening to a speaker.

C10 The student will use voice level appropriate for a variety of settings and situations.

CONTENT AREA: Math	
STRAND: Computation and Estimation	**STANDARD:** M-CE4
ORGANIZING TOPIC: Whole numbers Operations & Estimation: Addition & Subtraction	
The student will create and solve story and picture problems involving one-step solutions, using basic addition and subtraction facts.	

SAMPLE ACTIVITY 1:	M-CE4

Description of Activity:

The elementary general education teacher models telling a story about the children in the class using paper dolls on an overhead projector so all can see and describe number problems for the students to solve. Then each student comes to the overhead and creates a story for their classmates. Provide manipulatives to any students who need hands on at their desks.

Materials Needed:

Overhead projector

Small paper dolls

Counters for individual students

Steps of Activity:

1. Tell a math story and represent it on an overhead projector (e.g., 3 girls were sitting at a table and 2 more girls sat with them. How many girls are sitting at the table now?)/
2. Call one student at a time to create a story of their own (for anyone who uses an aug com device have a problem programmed).
3. Students use counters to determine their answers, and note their answer in their preferred mode (e.g. some will write the numeral, others will point to a number on a grid).

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C9 The student will follow one-step or multi-step directions.

C13 The student will share stories or information with an audience.

SAMPLE ACTIVITY 2:	M-CE4

Description of Activity:

Given a picture recipe, the student checks supplies in the Family and Consumer Science refrigerator and cupboards and creates a grocery list for needed items (e.g. recipe calls for 2 cans of tomatoes, and there is only one can, how many cans do they need to buy?)

Materials Needed:

A classroom stocked with cooking supplies

A picture recipe book with corresponding picture ingredients list.

Pencil, pen, marker, sticker, bingo stamp or other means of marking the shopping list.

Steps of Activity:

1. The students will choose a recipe to make with their group.
2. They will check for supplies in the classroom.
3. Students will indicate needed supplies on the picture shopping list.

Possible Communication Skills:

C4 The student will contribute to group interactions across content areas, settings, situations and audiences.

C6 The student will express wants and needs to others.

C12 The student will consistently respond to "Yes/No" questions across a variety of settings, situations and content areas.

SKILL GROUP 2

Organizing Topic→Fractions

Aligned Standard(s) of Learning

M-NS11 The student will identify and represent the concepts of one-half and one-fourth, using appropriate materials or a drawing.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Represent a whole to show it having two equal parts.
- Represent a whole to show it having four equal parts.
- Identify and model one-half and one-fourth of a whole, using
    - region/area models (e.g., pie pieces, pattern blocks, geoboards, drawings); and
    - measurement models (e.g., cuisenaire rods, connecting cubes, fraction strips, drawings).

Sample resources

www.k111.k12.il.us/king/math.htm – Click on fractions for interactive games and activities for students.

http://www.indianastandardsresources.org/math/mant_1_1_7.pdf– lesson plan that uses parts of a whole in an appropriate fraction lesson.

SKILL GROUP 2

Organizing Topic→Measurement: Money, Length, Weight/Mass, Volume (Liquid), Time

Aligned Standard(s) of Learning

M-M5 The student will

a) identify the number of pennies equivalent to a nickel, a dime, and a quarter; and

b) determine the value of a collection of pennies, nickels, and dimes whose total value is 100 cents or less.

M-M6 The student will tell time to the half-hour, using an analog or digital clock.

M-M7 The student will use nonstandard units to measure length and weight.

M-M8 The student will compare the volumes of two given containers by using concrete materials (e.g., jelly beans, sand, water, rice).

M-M9 The student will compare the weights of two objects, using a balance scale.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Identify the value of a nickel, a dime, and a quarter in terms of pennies.
- Recognize the characteristics of pennies, nickels, and dimes (e.g., color, size).
- Identify the value of a collection of pennies, nickels, and dimes whose total value is 100 cents or less.
- Count by ones to determine the total value of a collection of pennies whose total value is 100 cents or less.
- Count by fives to determine the total value of a collection of nickels whose total value is 100 cents or less.
- Count by tens to determine the total value of a collection of dimes whose total value is 100 cents or less.
- Tell time to the hour on an analog clock.
- Tell time to the hour on a digital clock.
- Match a written time to the time shown on a digital or analog clock to the half hour.
- Measure the length of objects, using nonstandard units (e.g., connecting cubes, paper clips, erasers).
- Measure the weight of objects, using nonstandard units (e.g., paper clips, bean bags, cubes).

- Compare the volumes of two containers to determine if the volume of one is greater than, less than, or the same as the other, using nonstandard units of measure (e.g., a spoonful, scoopful, or teacupful).
- Compare the volumes of two containers to determine if the volume of one is greater than, less than, or the same as the other by pouring the contents of one container into the other.
- Compare the weights of two objects, using the terms *lighter, heavier*, or *the same*, using a balance scale.

Sample resources

http://illuminations.nctm.org/lessonplans/prek-2/number_cents/index.html#l3 – This lesson plan contains activities in which students find sets of coins equivalent to a quarter, using pennies, nickels, and dimes. They also estimate and count coin collections and count by fives and tens, using calculators, and pose and answer coin puzzles.

http://standards.nctm.org/document/chapter4/meas.htm#bp1 – Principles and Standards information related to measurement for prekindergarten through Grade 2.

http://illuminations.nctm.org/lessonplans/prek-2/measurement/index.html#srs – A multi-day lesson plan, entitled "Magnificent Measurement," contains six lessons that build early understandings about the attributes of measurement as well as the units, systems, and processes of measurement.

http://www.glc.k12.ga.us/BuilderV03/lptools/lpshared/lpdisplay.asp?Session_Stamp=&LPID=13142 – a hands-on lesson that includes a PowerPoint presentation in which students use length to order objects from longest to shortest.

http://www.glc.k12.ga.us/BuilderV03/lptools/lpshared/lpdisplay.asp?Session_Stamp=&LPID=15678 – a lesson plan that compares students' heights (taller/shorter) and compares lengths of straws longer/shorter.

http://www.sbgmath.com/grk/chapter7/start/index.html – a pennies activity with Internet links to information about American coins.

Sample activities

CONTENT AREA: MATH	
STRAND: Measurement	**STANDARD:** M-M 5
ORGANIZING TOPIC: Measurement: Money	
The student will: a) Identify the number of pennies equivalent to a nickel, a dime, and a quarter; b) Determine the value of a collection of pennies, nickels, and dimes whose total value is 100 cents or less.	

SAMPLE ACTIVITY 1:	M- M 5a
Description of Activity: Given a nickel, dime, and quarter, student will move and place the correct number of pennies equaling the amounts next to the nickel, dime, and quarter. **Materials Needed:** Nickels Dimes Quarters **Steps of Activity:** Student is given a nickel, dime or quarter Student is given a pile of pennies Student moves the correct number of pennies next to the nickel, dime, or quarter	
Possible Communication Skills:	
C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.	

SAMPLE ACTIVITY 2:	M-M 5 b

Description of Activity:

Student will make choice of desired soda or snack from local grocery store. Prior to purchasing their choice student will use template to fill in appropriate monetary amount (eg. 7 dimes, 5 pennies 1 nickel for an 80 cent item).

Materials Needed:

Coins

Items to be purchased

Store setting

Templates for purchase prices

Steps of Activity:

Student provide opportunity to choose item for purchase

Student provided template for purchase amount

Then student will fill in template with appropriate coins

Student will purchase and receive item with coins

Possible Communication Skills:

C3: The student will use object and or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C6: Student will express wants and needs to others.

CONTENT AREA: MATH	
STRAND: Measurement	**STANDARD:** M-M6
ORGANIZING TOPIC: Measurement: Time	
The student will tell time to the half-hour, using an analog or digital clock.	

SAMPLE ACTIVITY 1:	M-M6

Description of Activity:

In a large group setting with typical peers, the student will be able to tell time to the hour and half-hour by playing Tic-Tac-Toe/BINGO. Students will be using digital/analog representations on game cards. Game variations: Teacher can call out the time only and students locate the time on their card; Teacher can show time in digital/analog form and student matches to his card; Teacher can show the students the time in digital form and ask the students to locate the corresponding analog form on their cards; Teacher can show the analog time and ask the students to locate the corresponding digital time on their cards.

Materials Needed:

Individual student game cards with analog and digital times

A variety of decks of cards with various time and half times identified in analog and digital form

Marker, stamp, chips to mark answers

Optional: Digital clock and Analog clock

Steps of Activity:

1. Allow students to choose own game card
2. Allow students to select own form of marking answers
3. Teacher will randomly select from a deck of cards and direct the students to either identify/match original or to visual representation.
4. Student will indicate his/her answer by using his marker/chip/stamp

Possible Communication Skills:

C1 The student will use gestures to respond to, support, accentuate and dramatize verbal messages.

SAMPLE ACTIVITY 2:	M-M6

Description of Activity:

With a peer, utilizing a visual schedule labeled in hour and half-hour increments, the student will identify the next activity by matching the time and activity with the teacher's model.

Materials Needed:

Visual representation of student's daily activities (objects; picture representation card labeled with word; word card only)

Schedule card/form with Velcro

Teacher models (objects; picture representation card labeled with word; word card only)

Steps of Activity:

1. Teacher will prompt by "It's 9:30, check your schedule. What's next?"
2. The student responds to question by indicating corresponding activity to the time.

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C9 The student will follow one-step or multi-step directions.

CONTENT AREA: MATH	
STRAND: Measurement	**STANDARD:** M-M7
ORGANIZING TOPIC: Measurement: Length	
The student will use nonstandard units to measure length and weight.	

SAMPLE ACTIVITY 1:	M-M7

Description of Activity:

Using different size candy bars (mini; snack; regular; king-size), students will measure length and weight of a variety of objects around the classroom and school building. In cooperative groups/ stations/school exploration, students will compare results of different units of measure.

Materials Needed:

Wrapped candy bars of different sizes

Objects to measure (length of paper; weight of eraser; length of table/desk; shoe; etc.)

Form/worksheet to record answers in paper or digital form

Balance scale

Steps of Activity:

1. Divide students into small groups
2. Give each group several candy bars of the same size.
3. Measure length and weight of sample objects and record answer.
4. Teacher may provide four stations of sample objects and students can rotate in groups around them.
5. As a class, the students could graph final results.

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

CONTENT AREA: MATH	
STRAND: Measurement	**STANDARD:** M-M8
ORGANIZING TOPIC: Measurement: Volume	
The student will compare the volumes of two given containers by using concrete materials (e.g., jelly beans, sand, water rice).	

SAMPLE ACTIVITY 1:	M-M8

Description of Activity:

While working with typical peers, students will work with peers to compare the volumes of small medium and large drinking cups, using scoops of concrete objects.

Materials Needed:

Scoops

Jelly beans/rice/sand

A variety of small, medium and large containers/drinking cups

Form to record results in digital or paper form.

Steps of Activity:

1. Students will use scoops (of jelly beans, sand, water, rice) to fill small, medium, and large drinking cups.
2. Students will record results.
3. Using the results the students will compare the containers to determine which had the same amount, greater amount or least amount of volume.

Possible Communication Skills:

C9 The student will follow one-step or multi-step directions.

CONTENT AREA: MATH	
STRAND: Measurement	**STANDARD:** M-M9
ORGANIZING TOPIC: Measurement: Weight/Mass	
The student will compare the weights of two objects, using a balance scale.	

SAMPLE ACTIVITY 1:	M-M9

Description of Activity:

While working with typical peers in an activity (cooking; recycling; science etc.), the students will to predict and compare the weights of two objects using their bodies and a balance scale.

Materials Needed:

Objects-(i.e. books of different weights; aluminum cans; paper; magazines; bean bags; foam pillows)

Balance scale

Plastic grocery bags

Form/worksheet to record answers in digital or paper form

Large dowel rod to use across a wheelchair to compare weights.

Steps of Activity:

1. Holding bags/backpacks/objects on each side of body (using hands, shoulders), students will predict the weights of two objects (bean bag vs. foam pillow; dictionary vs. paperback; aluminum cans-few vs. many), using the terms *lighter, heavier,* or *the same.* Students will indicate answers using their individual mode of communication.
2. Using a balance scale, students/ teacher will validate and compare the results of step #1.
3. Record answers in digital or paper form.

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.

SKILL GROUP 2
Organizing Topic→Geometry: Two-dimensional (Plane), Spatial Relationships

Aligned Standard(s) of Learning

M-G4 The student will describe the proximity of objects in space (near, far, close by, below, above, up, down, beside, and next to).

M-G5 The student will draw, describe, and sort plane geometric figures (triangle, square, rectangle, and circle) according to number of sides, corners, and square corners.

M-G6 The student will identify and describe objects in his/her environment that depict plane geometric figures (triangle, rectangle, square, and circle).

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Identify the spatial relationships of objects, using the terms *near, far, close by, below, above, up, down, beside*, and *next to*.
- Draw triangles, squares, rectangles, and circles.
- Describe triangles, squares, and rectangles by the number of sides, corners, and square corners.
- Describe circles.
- Identify the name of the shape when given information about the number of sides, corners, and/or square corners.
- Identify representations of circles, squares, rectangles, and triangles in the environment at school and home and tell why they represent those shapes.
- Describe representations of circles, squares, rectangles, and triangles in the environment (e.g., "I know it's a rectangle because it looks like a door, and I know that a door is a rectangle.").

Sample resources

http://standards.nctm.org/document/chapter4/geom.htm#bp1 – information on geometry for the prekindergarten through Grade Two strand; from NCTM's Principles and Standards document

http://www.glc.k12.ga.us/BuilderV03/lptools/lpshared/lpdisplay.asp?Session_Stamp=&LPID=4078 – a lesson plan for identifying two-dimensional figures, with shape-flashcard and worksheet masters

http://standards.nctm.org/document/chapter4/geom.htm#bp4 – information on spatial relationships for the prekindergarten through Grade Two strand; from NCTM's Principles and Standards document

http://www.glc.k12.ga.us/BuilderV03/lptools/lpshared/lpdisplay.asp?Session_Stamp=&LPID=13293 – a hands-on lesson in which students sort geometric figures by color, size, and shape

http://www.successlink.org/great2/g1720.html – a unit on shapes, with suggestions for poetry, songs, games and other activities, and other related Internet sites

http://illuminations.nctm.org/lessonplans/prek-2/investi_shapes/ – "Investigating Shapes" is an Internet lesson plan available from NCTM in which students identify characteristics of triangles, manipulate triangles on an electronic geoboard, and name the triangle's relative location.

http://matti.usu.edu/nlvm/nav – National Library of Virtual Manipulatives

VDOE Geometry Instructional Module – professional development training module that contains activities that can be adapted for student use

Sample Activities

CONTENT AREA: MATH	
STRAND: Geometry	**STANDARD:** M-G 4
ORGANIZING TOPIC: Geometry: Spatial Relations	
The student will describe the proximity of objects in space (near, far, close, below, above, up, down, beside, and next to).	

SAMPLE ACTIVITY 1:	M-G 4

Description of Activity:

During a group movement activity, the student will select the visual representation that correctly describes the proximity of peers to objects.

Materials Needed:

Picture/symbolic representation of listed vocabulary

Steps of Activity:

1. The teacher or a peer will place an object in a location in the classroom.
2. The teacher will ask a location question, and model the appropriate response, such as: "Where is the balloon? The balloon is near me." Or "The balloon is far from me."
3. The teacher asks the student, "Where is the balloon?" and models the correct response for the student.
4. The teacher asks the student, "Where is the balloon, and the student selects symbolic or picture representations of either near and far to name the location of the balloon.
5. Continue teaching remaining vocabulary in the same manner until all vocabulary is mastered.

Possible Communication Skills:

C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.

SKILL GROUP 2
Organizing Topic→Statistics: Collect, Organize, Display, Analyze and Interpret Data

Aligned Standard(s) of Learning

M-PS4 The student will investigate, identify, and describe various forms of data collection in his/her world (e.g., recording daily temperature, lunch count, attendance, and favorite ice cream), using tables, picture graphs, and object graphs.

M-PS5 The student will interpret information displayed in a picture or object graph, using the vocabulary *more, less, fewer, greater than, less than,* and *equal to*.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Investigate various forms of data collection, including counting and tallying, informal surveys, observations, and voting.
- Identify and describe various forms of data collection in his or her world (e.g., recording daily temperature, lunch count, attendance, and favorite ice cream.)
- Demonstrate the meaning of the terms *more*, *less*, *fewer*, *greater than*, *less than*, and *equal to*, using concrete materials.
- Compare one category to another in a graph, indicating which has more and which has less.
- Interpret information displayed in object graphs and picture graphs, using the words *more*, *less*, *fewer*, *greater than*, *less than*, and *equal to*.
- Find answers to questions, using graphs (e.g., "Which category has more?" "Which category has less?").

Sample resources

http://www.glc.k12.ga.us/BuilderV03/lptools/lpshared/lpdisplay.asp?Session_Stamp=&LPID=35982 – a lesson plan that revolves around the student's favorite things. The items are graphed according to selected categories, and the student creates a "My Favorite Things" book about himself.

http://www.glc.k12.ga.us/BuilderV03/lptools/lpshared/lpdisplay.asp?Session_Stamp=&LPID=11245 – a lesson plan describing graphing activities related to students' types of homes.

http://ericir.syr.edu/cgi-bin/printlessons.cgi/Virtual/Lessons/Mathematics//Process_Skills/MPS0004.html – a lesson plan describing graphing and sorting activities with jellybeans.

Probability and Statistics Professional Development Module available from VDOE Web site – contains activities related to this strand that can be modified for student use.

Sample activities

CONTENT AREA: MATH	
STRAND: Probability and Statistics	**STANDARD:** M-PS5
ORGANIZING TOPIC: Measurement; Money	
The student will compare the weights of two objects, using a balance scale.	

SAMPLE ACTIVITY 1:	M-PS5
When the elementary teacher asks the class questions about graphs the student will respond by pointing to his answer on an enlarged bar graph (e.g., "Which group had more dogs?" or "Which class has fewer students?").	
Possible Communication Skills:	
C1 The student will use gestures to respond to, support, accentuate and dramatize verbal messages. C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.	

SAMPLE ACTIVITY 2:	M-PS5
Given a discussion of the recent presidential election in a middle school social studies class the student will refer to a graph of the blue and red states and will respond to the question, "Which party carried more states?"	
Possible Communication Skills:	
C8 The student will engage in communicative exchanges (conversations) with peers and adults. C13 The student will share stories or information with an audience. C14 The student will use vocabulary for different functions: reject, initiate, describe, request, gain attention, comment, etc.	

SAMPLE ACTIVITY 3:	M-PS5

In a high school health class the teacher will provide copies of a news magazine story on HIV infection in the world. Students will use the graphs included in the story to determine the country and continent with more and fewer cases of HIV, and will discuss possible reasons why. Peers will ask yes/no questions of the student regarding her interpretation of the graphs.

Possible Communication Skills:

C5 The student will follow basic rules for conversations including turn taking and listening to a speaker.

C8 The student will engage in communicative exchanges (conversations) with peers and adults.

C12 The student will consistently respond to "Yes/No" questions across a variety of settings, situations and content areas.

SKILL GROUP 2
Organizing Topic→Patterns and Functions: Representations and Relationships

Aligned Standard(s) of Learning

M-PFA3 The student will sort and classify concrete objects according to one or more attributes, including color, size, shape, and thickness.

M-PFA4 The student will recognize, describe, extend, and create a wide variety of patterns, including rhythmic, color, shape, and numerical. Patterns will include both growing and repeating patterns. Students will use concrete materials and calculators.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Sort and classify objects into appropriate subsets (categories) based on one or two attributes, such as size, shape, color, or thickness.
- Recognize the pattern in a given rhythmic, color, shape, or numerical sequence.
- Describe the pattern in a given rhythmic, color, shape, or numerical sequence.
- Extend a pattern, using manipulatives, geometric figures, numbers, or calculators.
- Create a repeating or growing pattern, using manipulatives, geometric figures, numbers, or calculators (e.g., the growing patterns 2, 3, 2, 4, 2, 5, 2, 6, 2, …)
- Create an arithmetic number pattern, using a calculator (e.g., when skip-counting by fives, use the constant feature on the calculator by pressing 5 + 5 = = = … to produce the pattern 5, 10, 15, 20, …).

Sample resources

http://standards.nctm.org/document/chapter4/alg.htm#bp1 – information from NCTM's Principles and Standards related to patterns, functions, and algebra for the prekindergarten to Grade 2 strand

http://www.illuminations.nctm.org/lessonplans/prek-2/button/index.html – lesson plan from NCTM's "Illuminations" site related to sorting and organizing objects

Patterns, Functions, and Algebra Professional Development Module available from VDOE Web site – contains activities relating to this strand that can be modified for student use

Navigating through Algebra in Prekindergarten through Grade 2 – available from NCTM; contains additional lessons for pattern and function activities.

Sample activities

CONTENT AREA: Math	
STRAND: Patterns, Functions & Algebra	**STANDARD:** M-PFA3
ORGANIZING TOPIC: Patterns and Functions: Representations & Relationships	
The student will sort and classify concrete objects according to one or more attributes, including color, size, shape, and thickness.	

SAMPLE ACTIVITY 1:	M-PFA3

Description of Activity:

Working in cooperative groups using theme based foam cut outs (e.g. hearts) students will sort hearts by color and size and glue them to cards to give to family members.

Materials Needed:

A tub of foam hearts (available at craft stores).

Card stock

Glue

Steps of Activity:

1. Provide student groups with a pile of hearts.
2. Instruct students to discuss and decide within their group on how they will separate the hearts by attribute (e.g. small, large, pink, or red).
3. Students work together to sort the hearts.
4. Students then select hearts from sorted piles to glue on their cards.

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C4 The student will contribute to group interactions across content areas, settings, situations and audiences.

C6 The student will express wants and needs to others.

C8 The student will engage in communicative exchanges (conversations) with peers and adults.

CONTENT AREA: Math	
STRAND: Patterns, Functions & Algebra	**STANDARD:** M-PFA4
ORGANIZING TOPIC: Patterns and Functions: Representations & Relationships	
The student will recognize, describe, extend, and create a wide variety of patterns, including rhythmic, color, shape, and numerical. Patterns will include both growing and repeating patterns. Concrete materials and calculators will be used by students.	

SAMPLE ACTIVITY 1:	M-PFA4

Description of Activity:

Using a calculator, students will create a pattern by repeatedly adding the same number (e.g., 1+3=4, 4+3=7, 7+3=10, 10+3=13…). Results will be recorded on a hundreds chart.

Materials Needed:

Calculators

Hundreds chart

Marking pens, stickers or stamps

Steps of Activity:

1. The teacher will demonstrate on an overhead calculator how to repeatedly add the same number to create a number sequence.
2. Using their own calculator, students will create their own number sequence by repeatedly adding the same number.
3. After adding the repeated number the student will record the sum on their hundreds chart.

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C9 The student will follow one-step or multi-step directions.

SKILL GROUP 3

SKILL GROUP 3
Organizing Topic→Whole Numbers: Representations, Relationships, Operations and Estimation: Addition and Subtraction

Aligned Standard(s) of Learning

M-NS12 The student will

a) read, write, and identify the place value of each digit in a three-digit numeral, using numeration models; and

b) round two-digit numbers to the nearest ten.

M-NS13 The student will compare two whole numbers between 0 and 999, using symbols (>, <, or =) and words (*greater than, less than,* or *equal to*).

M-NS14 The student will identify the ordinal positions first through twentieth, using an ordered set of objects.

M-NS16 The student will

a) count forward by twos, fives, and tens to 100, starting at various multiples of 2, 5, or 10, using mental mathematics, paper and pencil, hundred chart, calculators, and/or concrete objects, as appropriate;

b) count backward by tens from 100;

c) group objects by threes and fours; and

d) recognize even and odd numbers, using objects.

M-CE5 The student will recall basic addition facts — i.e., sums to 18 or less — and the corresponding subtraction facts.

M-CE6 The student, given two whole numbers whose sum is 99 or less, will

a) estimate the sum; and

b) find the sum, using various methods of calculation (mental computation, concrete materials, and paper and pencil).

M-CE7 The student, given two whole numbers, each of which is 99 or less, will

a) estimate the difference; and

b) find the difference, using various methods of calculation (mental computation, concrete materials, and paper and pencil).

M-CE8 The student will create and solve one-step addition and subtraction problems using data from simple tables, picture graphs, bar graphs, and practical situations.

M-CE9 The student, given a simple addition or subtraction fact, will recognize and describe the related facts which represent and describe the inverse relationship between addition and subtraction (e.g., 3+__=7, __+ 3= 7; 7-3= __, and 7-__ = 3).

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Demonstrate the understanding of the ten-to-one relationships among ones, tens, and hundreds, using manipulatives (e.g., beans and cups, base-10 blocks, bundles of 10 Popsicle sticks).
- Determine the place value of each digit in a three-digit numeral presented as a pictorial representation (e.g., a picture of base-10 blocks) or as a physical representation (e.g., actual base-10 blocks).
- Write numerals, using a base-10 model or picture.
- Read three-digit numbers when shown a numeral, a base-10 model of the number, or a pictorial representation of the number.
- Identify the place value (ones, tens, hundreds) of each digit in a three-digit numeral.
- Round two-digit numbers to the nearest ten.
- Identify numbers that are greater than or less than a given number between 0 and 999.
- Compare two numbers between 0 and 999, represented pictorially or with concrete objects (e.g., base-10 blocks), using the terms *greater than, less than,* or *equal to*.
- Compare the numerical value of two whole numbers between 0 and 999 by identifying one as greater than, less than, or equal to the other.
- Write the symbols for less than (<), greater than (>), and equal to (=) to compare two numbers between 0 and 999.
- Count an ordered set of objects, using the ordinal number words *first* through *twentieth*.
- Identify the ordinal positions first through twentieth, using an ordered set of objects.
- Identify the ordinal positions first through twentieth, using an ordered set of objects presented in lines or rows from

– left to right;

– right to left;

– top to bottom; and

– bottom to top.

- Determine patterns created by counting by twos, fives, and tens on a hundred chart.
- Skip count by twos, fives, and tens to 100, using manipulatives, a hundred chart, mental mathematics, and/or paper and pencil.
- Skip count by twos, fives, and tens to 100, using the constant feature on the calculator.
- Count backward by tens from 100.
- Group objects by threes.
- Group objects by fours.
- Use objects to determine whether a number is odd or even.
- Recall and write the basic addition facts for sums to 18 or less and the corresponding subtraction facts.

- Recall and write the basic addition facts for sums to 18 or less and the corresponding subtraction facts, when addition or subtraction problems are presented in either horizontal or vertical written format.
- Regroup 10 ones for 1 ten, using base-10 models, when finding the sum of two whole numbers whose sum is 99 or less.
- Estimate the sum of two whole numbers whose sum is 99 or less and recognize whether the estimation is reasonable.
- Determine the sum of two whole numbers whose sum is 99 or less, using base-10 models, such as base-10 blocks and bundles of tens.
- Solve problems presented vertically or horizontally that require finding the sum of two whole numbers whose sum is 99 or less, using paper and pencil.
- Solve problems, using mental computation strategies, involving addition of two whole numbers whose sum is 99 or less.
- Regroup 1 ten for 10 ones, using base-10 models, such as base-10 blocks and bundles of tens.
- Estimate the difference of two whole numbers each 99 or less and recognize whether the estimation is reasonable.
- Determine the difference of two whole numbers each 99 or less, using base-10 models, such as base-10 blocks and bundles of tens.
- Solve problems presented vertically or horizontally that require finding the difference between two whole numbers each 99 or less, using paper and pencil.
- Solve problems, using mental computation strategies, involving subtraction of two whole numbers each 99 or less.
- Identify the appropriate data and the operation needed to solve an addition or subtraction problem where the data is presented in a simple table, picture graph, or bar graph.
- Solve addition and subtraction problems requiring a one-step solution, using data from simple charts, picture graphs, bar graphs, and everyday-life situations.
- Create a one-step addition or subtraction problem using data from simple tables, picture graphs, and bar graphs. For subtraction, the difference will be between two whole numbers each 99 or less.
- Determine the missing number in a number sentence (e.g., 3 + __ = 5 or __+ 2 = 5; 5 – __ = 3 or 5 – 2 = __).
- Write the related facts for a given addition or subtraction fact (e.g., given 3 + 4 = 7, write 7 – 4 = 3 and 7 – 3 = 4).

Sample resources

http://standards.nctm.org/document/chapter4/numb.htm – NCTM Principles and Standards for School Mathematics chapter on the Number and Operations Standard for PreK-2.

http://illuminations.nctm.org/lessonplans/prek-2/begin_with_buttons/lesson1.html – a lesson that reviews ordinal number names as well as patterns.

http://standards.nctm.org/document/eexamples/chap4/4.5/calc_full/part2.htm – a lesson that uses an interactive calculator and hundred chart to demonstrate patterns on the hundred chart.

http://www.utm.edu/~cesme/K-2.pdf – lesson using grids/arrays to count objects by ones, twos, fours, fives and tens; fact families using unifex cubes, place value lesson that includes copies of workmats, lessons and models of 10 frames, lessons that encourage the reasonableness of estimations

http://www.mathcats.com/explore/factfamilycards.html – demonstrates how to make fact family cards in the shape of hexagons

http://www.mathcats.com/microworlds/subtractionquiz_overview.html – subtraction using virtual base 10 manipulatives

Sample activities

CONTENT AREA: Math	
STRAND: Computation and Estimation	**STANDARD:** M-CE8
ORGANIZING TOPIC: Whole Number, Operations and Estimation; Addition and Subtraction	
The student will create and solve one-step addition and subtraction problems using data from simple tables, picture graphs, bar graphs, and practical situations.	

SAMPLE ACTIVITY 1:	M-CE8
The student will manipulate real object representations of graphed data to count and state the sum of two different categories when asked, "How many students went to see *Star Wars* on Friday or Saturday?" during a cooperative learning group with non-disabled peers. The student will count one purple ticket for each square graphed on a bar graph for Friday, and one red ticket for each square graphed on a bar graph for Saturday. The student will then count the total number of tickets and select the appropriate number to represent the sum from a 4-celled choice board. Manipulation of objects may be done manually or electronically.	
Possible Communication Skills:	
C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages. C8 The student will engage in communicative exchanges (conversations) with peers and adults.	

SAMPLE ACTIVITY 2:	M-CE8

The student will select the appropriate number of worksheets to give to peers in a general education classroom when given the practical situation to solve, "Five students were at your table. Two have gone to band. How many students are now at the table? How many worksheets do you need to put on the table?"

Possible Communication Skills:

C4 The student will contribute to group interactions across content areas, settings, situations and audiences.

C8 The student will engage in communicative exchanges (conversations) with peers and adults.

SAMPLE ACTIVITY 3:	M-CE8

The student will create an addition problem from information displayed in a table representing the general education classroom's favorite football teams and ask a peer to solve it. During a cooperative learning group, the student will partially participate to create a *Boardmaker* overlay for an augmentative communication device that, when activated, asks a question regarding data in the table, such as, "Which team did the most boys select?" or "Which team did the girls like the least?"

Possible Communication Skills:

C3 The student will use objects and /or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C7 The student will initiate communication.

SKILL GROUP 3

Organizing Topic→Fractions: Representations and Relationships

Aligned Standard(s) of Learning

M-NS15 The student will identify the part of a set and/or region that represents fractions for one-half, one-third, one-fourth, one-eighth, and one-tenth and write the corresponding fraction.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Recognize fractions as representing equal-size parts of a whole.
- Identify the fractional parts of a whole or a set for $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{8}$, and $\frac{1}{10}$.
- Identify the fraction names for the fraction notations $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{8}$, and $\frac{1}{10}$. Represent fractional parts of a whole for $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{8}$, and $\frac{1}{10}$, using
  - region/area models (e.g., pie pieces, pattern blocks, geoboards);
  - sets (e.g., chips, counters, cubes); and
  - measurement models (e.g., fraction strips, cuisenaire rods, connecting cubes).

Sample resources

http://standards.nctm.org/document/chapter4/numb.htm – NCTM Principles and Standards for School Mathematics chapter on the Number and Operations Standard for PreK-2.

http://www.utm.edu/~cesme/K-2.pdf – lesson (pages 10–12) using the area model of fractions by dividing snack cakes evenly between various numbers of students

SKILL GROUP 3
Organizing Topic→Measurement: Money, Length, Weight/Mass, Volume (Liquid), Temperature, Time, Perimeter, Area, Volume

Aligned Standard(s) of Learning

M-M 10 The student will

a) count and compare a collection of pennies, nickels, dimes, and quarters whose total value is $2.00 or less; and

b) identify the correct usage of the cent symbol (¢), dollar symbol ($), and decimal point (.).

M-M 11 The student will estimate and then use a ruler to make linear measurements to the nearest centimeter and inch, including measuring the distance around a polygon in order to determine perimeter.

M-M 12 The student, given grid paper, will estimate and then count the number of square units needed to cover a given surface in order to determine area.

M-M 13 The student will estimate and then count the number of cubes in a rectangular box in order to determine volume.

M-M 14 The student will estimate and then determine weight/mass of familiar objects in pounds and/or kilograms, using a scale.

M-M 15 The student will tell and write time to the quarter hour, using analog and digital clocks.

M-M 16 The student will use actual measuring devices to compare metric and U.S. Customary units (cups, pints, quarts, gallons, and liters) for measuring liquid volume, using the concepts of *more, less*, and *equivalent*.

M-M 17 The student will

a) use calendar language appropriately (e.g., months, today, yesterday, next week, last week);

b) determine past and future days of the week; and

c) identify specific dates on a given calendar.

M-M18 The student will read the temperature on a Celsius and/or Fahrenheit thermometer to the nearest 10 degrees.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Identify all coins and a one-dollar bill, recording the value, using the cent symbol (¢), dollar symbol ($), and decimal point (.).
- Determine the value of a collection of coins and one-dollar bills whose total value is $2.00 or less.
- Compare the values of two sets of coins and one-dollar bills (each set having a total value of $2.00 or less), using the terms *greater than, less than*, or *equal to*.
- Simulate everyday opportunities to count and compare a collection of coins and one-dollar bills whose total value is $2.00 or less.
- Identify an inch as a U.S. customary unit for measuring length.

- Estimate and measure the length of various line segments and objects to the nearest inch.
- Identify a centimeter as a metric unit for measuring length.
- Estimate and measure the length of various line segments and objects to the nearest centimeter.
- Measure each side of a variety of concrete polygons and add them to determine the distance around the polygon (its perimeter).
- Determine the distance around a polygon (its perimeter), given the measurements of the sides in centimeters or inches.
- Investigate covering a given surface with square units, using concrete materials (e.g., inch tiles, geoboards, grid paper).
- Determine the area of a given surface on grid paper by estimating and then counting the number of square units needed to cover the surface.
- Investigate the concept of volume by filling boxes and building box shapes, using cubes.
- Determine the volume of a rectangular box by counting the number of cubes needed to fill it.
- Determine the volume of a rectangular box by
  - counting the number of cubes in the top layer of cubes; and
  - adding that number for each layer of cubes.
- Identify a pound as the U.S. customary unit for measuring weight.
- Estimate and then measure the weight of familiar objects to the nearest pound, using a scale.
- Identify a kilogram as a metric unit for measuring mass.
- Estimate and then measure the mass of familiar objects to the nearest kilogram, using a scale.
- Show and tell time to the quarter hour, using a model analog clock.
- Write the time indicated on a digital clock to the nearest quarter hour.
- Write the time indicated on an analog clock to the nearest quarter hour.
- Match a written time to a time shown on a clock face to the quarter hour.
- Identify the metric and U.S. customary units for measuring liquid volume (e.g., cups, pints, quarts, gallons, and liters).
- Compare customary and metric units of liquid volume (e.g., cups to quarts, liters to quarts), using actual measuring devices and the concepts of *more*, *less*, and *equivalent*.
- Read a calendar to locate a given day or date.
- Identify the seven days in a week.
- Determine the days/dates before and after a given day/date.
- Determine the date that is a specific number of days or weeks in the past or in the future from a given date, using a calendar.
- Identify specific dates (e.g., the third Monday in a given month.

- Read temperature to the nearest 10 degrees from real Celsius and Fahrenheit thermometers and from physical models (including pictorial representations) of such thermometers.

Sample resources

http://standards.nctm.org/document/chapter4/meas.htm – NCTM Principles and Standards for School Mathematics chapter on the Measurement Standard for PreK-2.

http://standards.nctm.org/document/eexamples/chap4/4.3/Part3.htm – lessons on Learning Geometry and Measurement Concepts by Creating Paths and Navigating Mazes: Ladybug Mazes

http://mathforum.org/paths/measurement/e.measlessons.html – elementary measurement lessons and materials for teachers

http://illuminations.nctm.org/swr/list.asp?Ref=1&Std=3Grd=-1 – measurement lessons endorsed by NCTM

http://youth.net/cec/cecmath/cecmath.21.txt – lesson using *Jack and the Beanstalk*, estimation and measuring with centimeters

http://www.utm.edu/~cesme/K-2.pdf – lesson and worksheet moving from nonstandard measurement to inches

http://www.mathcats.com/microworlds/usingmoney_overview.html – interactive site that allows students to read a problem and use virtual money manipulatives to solve it

http://www.mathcats.com/explore/weather.html – displays weather from around the world

http://www.mathcats.com/explore/polygons.html – compare sizes of virtual 2d shapes

http://www.usmint.gov/kids/index.cfm?Filecontents=/kids/games/index.cfm&pick=4 – games and facts that deal with coins

http://www.time-for-time.com/swf/myclox.swf – excellent interactive clock that has digital and analog faces.

Sample Activities

CONTENT AREA: MATH	
STRAND: Measurement	**STANDARD:** M-M10
ORGANIZING TOPIC: Measurement: Money	
The student will: a. Count and compare a collection of pennies, nickels, dimes, and quarters whose total value is $2.00 or less; b. Identify the correct usage of the cent symbol (¢), dollar symbol ($), and decimal point (.).	

SAMPLE ACTIVITY 1:	M-M10a

Description of Activity:

When buying lunch in the school cafeteria/school store, when given two envelopes of coins the student will count contents of each to determine which one to use to pay for their purchase.

Materials Needed:

Envelopes

Variety of coins (pennies, nickels, dimes and quarters) totaling less than $2.00

Items to purchase

Appropriate setting (cafeteria; school store; restaurant)

Steps of Activity:

1. Student will communicate desired purchase.
2. Peer will assist student to select two envelopes
3. Peer will assist student in manipulating the coins to count in each envelope
4. Student will indicate which envelope contains the needed amount for his purchase.
5. Student will pay for his desired purchase.

Possible Communication Skills:

C8 The student will engage in communicative exchanges (conversations) with peers and adults.

C6 The student will express wants and needs to others.

CONTENT AREA: MATH	
STRAND: Measurement	**STANDARD:** M-M11
ORGANIZING TOPIC: Measurement: Length	
The student will estimate and then use a ruler to make linear measurements to the nearest centimeter and inch, including the distance around a polygon in order to determine perimeter.	

SAMPLE ACTIVITY 1:	M-M11

Description of Activity:

In the school mailroom, the students will predict which size envelopes will fit into teacher's mailboxes. The students will estimate the size of each item, predict "will it fit?" test using trial and error by putting items in box, and finally measure mailbox and items for actual size. Students will record information on chart to assist with analyzing results and apply it to future tasks.

Materials Needed:

Ruler (standard form; talking measuring tape)

Teacher mailboxes and access to mailroom

Chart in paper or digital form

Media in variety of sizes (envelopes; boxes; magazines/newsletters; newspaper)

Steps of Activity:

1. Create a chart that includes: estimated perimeter, actual perimeter, will it fit in teacher's mailbox
2. Given a variety of media the students will estimate whether the items will fit into the teachers' mailboxes.
3. Students will test predictions through trial and error.
4. Students will measure media using a ruler to the nearest inch/centimeter and compare it to the width of the teacher's mailbox as well as the original estimate.

Possible Communication Skills:

C3 The student will use objects and/or visual aids to gain understanding of, respond to, support, accentuate and dramatize verbal messages.

C12 The student will consistently respond to "Yes/No" questions across a variety of settings, situations and content areas.

C9 The student will follow one-step or multi-step directions.

SKILL GROUP 3
Organizing Topic→Geometry: Two-Dimensional (plane), Three-Dimensional (solid), Transformations

Aligned Standard(s) of Learning

M-G7 The student will identify, describe, and sort three-dimensional (solid) concrete figures, including a cube, rectangular solid (prism), square pyramid, sphere, cylinder, and cone, according to the number and shape of the solid's faces, edges, and corners.

M-G8 The student will identify and create figures, symmetric along a line, using various concrete materials.

M-G9 The student will compare and contrast plane and solid geometric shapes (circle/sphere, square/cube, and rectangle/rectangular solid).

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Compare three-dimensional (solid) shapes (i.e., cube, rectangular solid [prism], square pyramid, sphere, cylinder, and cone) to similar objects in everyday life (e.g., a party hat is like a cone).
- Identify and name cubes, rectangular solids (prisms), square pyramids, spheres, cylinders, and cones by their appearance.
- Identify and describe cubes, rectangular solids (prisms), square pyramids, spheres, cylinders, and cones according to the number and shape of their faces (sides, bases), edges, and corners.
- Investigate symmetry, using paper folding, mirrors/miras, pattern blocks, wax paper, patty paper or tracing paper.
- Identify and demonstrate a line of symmetry in an object or an arrangement of objects.
- Draw the line(s) of symmetry — horizontal, vertical, and diagonal — in a figure.
- Identify and create figures that are symmetrical along a line, using various concrete materials.
- Determine similarities and differences between plane and solid shapes (e.g., circle/sphere, square/cube, and rectangle/rectangular solid), using models and cutouts.
- Trace faces of solid shapes (e.g., cube and rectangular solid) to create the set of plane figures related to the solid shape.
- Compare and contrast plane and solid geometric shapes (e.g., circle/sphere, square/cube, and rectangle/rectangular solid) according to the number and shape of their faces (sides, bases), edges, and corners.

Sample resources

VDOE Geometry Instructional Module – professional development training module that contains activities that can be adapted for student use.

Navigating through Geometry in Prekindergarten through Grade 2 – available from NCTM. Contains additional lessons for geometric activities.

http://standards.nctm.org/document/chapter4/geom.htm – NCTM Principles and Standards for School Mathematics chapter on the Geometry Standard for PreK-2.

http://standards.nctm.org/document/eexamples/chap4/4.2/index.htm#applet – lesson that investigates the properties of triangles and polygons using geoboards

http://standards.nctm.org/document/eexamples/chap4/4.4/index.htm#applet – lesson on "Developing Geometry Understandings and Spatial Skills through Puzzlelike Problems with Tangrams: Tangram Puzzles"
http://standards.nctm.org/document/eexamples/chap4/4.3/Part3.htm – lessons on "Learning Geometry and Measurement Concepts by Creating Paths and Navigating Mazes: Ladybug Mazes"

http://www.illuminations.nctm.org/pages/preK-2.html – K-2 activities for geometry recommended by NCTM

http://www.utm.edu/~cesme/K-2.pdf – lessons that involve exploring and sorting geometric solids and identifying solids by their shadow and touch alone

http://www.mathcats.com/explore/bodygeometry.html – ideas to get your class making geometric figures using their bodies

http://www.mathcats.com/explore/polygons.html – make patterns and symmetrical pictures using the virtual 2d figures

SKILL GROUP 3

Organizing Topic→Probability

Aligned Standard(s) of Learning

M-PS 7 The student will record data from experiments, using spinners and colored tiles/cubes, and use the data to predict which of two events is more likely to occur if the experiment is repeated.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Conduct probability experiments, using multicolored spinners, colored tiles, or number cubes.
- Record the results of probability experiments, using tables, charts, and tally marks.
- Interpret the results of probability experiments (e.g., the two-colored spinner landed on red 5 out of 10 times).
- Predict which of two events is more likely to occur if an experiment is repeated.

Sample resources

http://standards.nctm.org/document/chapter4/data.htm – NCTM Principles and Standards for School Mathematics chapter on the Data Analysis and Probability Standard for PreK-2.

http://www.educate.org.uk/teacher_zone/classroom/numeracy/numeracy_34.htm – worksheets using probability terminology

http://illuminations.nctm.org/lessonplans/prek-2/combinations-p2/index.html – a lesson that has students generalize the number of clown faces that can be made from a given number of possibilities

http://www.mathcats.com/microworlds/coinflipper.html – experiments and records 100 flips of a virtual coin

SKILL GROUP 3

Organizing Topic→Statistics: Collect, Organize, Display, Analyze and Interpret Data

Aligned Standard(s) of Learning

M-PS6 The student will read, construct, and interpret a simple picture and bar graph.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Read the information presented horizontally and vertically on a simple bar or picture graph.
- Collect no more than 16 pieces of data to answer a given question.
- Organize data, using lists, tables, objects, pictorial representations, tally marks, and charts, in order to construct a graph.
- Represent data by constructing a simple picture or bar graph.
- Label the axes on a bar graph, limiting the number of categories (categorical data) to four and the increments to multiples of whole numbers (e.g., multiples of 1, 2, or 5).
- Label the axes on a picture graph, limiting the number of categories to four and including a key where appropriate.
- Interpret information from simple picture and bar graphs by writing at least one statement that covers one or both of the following:

– Describe the categories of data and the data as a whole (e.g., the total number of responses).

– Identify parts of the data that have special characteristics, including categories with the greatest, the least, or the same.

- Select the best interpretation of a graph from a set of possible interpretations of the graph.

Sample resources

http://standards.nctm.org/document/chapter4/data.htm – NCTM Principals and Standards for School Mathematics chapter on the Data Analysis and Probability Standard for PreK-2.

http://illuminations.nctm.org/swr/list.asp?Ref=1&Std=4&Grd=-1 – lessons that focus on data collection and representation with manipulatives such as shoes, M & Ms and personal characteristics

http://illuminations.nctm.org/lessonplans/prek-2/button/index.html#l6 – lesson that involves sorting, classifying, organizing and displaying data using buttons

SKILL GROUP 3

Organizing Topic→ Patterns, Functions, and Algebra: Representations and Relationships

Aligned Standard(s) of Learning

M-PFA5 The student will identify, create, and extend a wide variety of patterns, using numbers concrete objects and pictures.

M-PFA6 The student will solve problems by completing a numerical sentence involving the basic facts for addition and subtraction. Examples include: 3 + __ = 7, or 9 – __ = 2. Students will create story problems, using the numerical sentences.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Identify a growing and/or repeating pattern from a given geometric or numeric sequence.
- Predict the next number, geometric figure, symbol, or object in a given pattern.
- Extend a given pattern, using numbers, geometric figures, symbols, or objects.
- Create a new pattern, using numbers, geometric figures, symbols, or objects.
- Recognize the same pattern in different manifestations.
- Solve problems by completing a numerical sentence involving the basic facts for addition and subtraction (e.g., 3 + __ = 7, or 9 – __ = 2).
- Create a story problem for a given numerical sentence.

Sample resources

http://standards.nctm.org/document/chapter4/alg.htm – NCTM Principals and Standards for School Mathematics chapter on the Algebra Standard for PreK-2.

http://standards.nctm.org/document/eexamples/chap4/4.1/index.htm – a lesson that has students creating, describing, and extending patterns

http://www.utm.edu/~cesme/K-2.pdf – lessons that use patterns on the 100s chart (includes a 100 chart puzzle worksheet), growing patterns using cubes, and patterns in songs such as Old MacDonald (includes pictures of the barn/animals and animal noises)

SKILL GROUP 4

SKILL GROUP 4

Organizing Topic→Whole Numbers: Representations, Relationships, Operations and Estimation

Aligned Standard(s) of Learning

M-NS17 The student will read and write six-digit numerals and identify the place value for each digit.

M-NS18 The student will round a whole number, 9,999 or less, to the nearest ten, hundred, and thousand.

M-NS19 The student will compare two whole numbers between 0 and 9,999, using symbols (>, <, or =) and words (*greater than, less than*, or *equal to*).

M-NS20 The student will recognize and use the inverse relationships between addition/subtraction and multiplication/division to complete basic fact sentences. Students will use these relationships to solve problems such as 5 + 3 = 8 and 8 – 3 = ____.

M-CE10 The student will solve problems involving the sum or difference of two whole numbers, each 9,999 or less, with or without regrouping, using various computational methods, including calculators, paper and pencil, mental computation, and estimation.

M-CE11 The student will recall the multiplication and division facts through the nines table.

M-CE12 The student will represent multiplication and division, using area and set models, and create and solve problems that involve multiplication of two whole numbers, one factor 99 or less and the second factor 5 or less.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Investigate and identify the place value for each digit in a six-digit numeral, using base-10 manipulatives (e.g., base-10 blocks).
- Read six-digit numerals orally.
- Write six-digit numerals that are stated verbally or written in words.
- Round a given whole number, 9,999 or less, to the nearest ten, hundred, and thousand.
- Solve problems, using rounding of numbers, each 9,999 or less, to the nearest ten, hundred, and thousand.
- Describe the meaning of the terms *greater than, less than*, and *equal to*.
- Determine which of two whole numbers between 0 and 9,999 is greater.
- Determine which of two whole numbers between 0 and 9,999 is less.
- Compare two whole numbers between 0 and 9,999, using the symbols >, <, or =.
- Use the inverse relationships between addition/subtraction and multiplication/division to solve related basic fact sentences. For example, 5 + 3 = 8 and 8 – 3 = __; 4 × 3 = 12 and 12 ÷ 4 = __.

- Write three related basic fact sentences when given one basic fact sentence for addition/subtraction and for multiplication/ division. For example, given $3 \times 2 = 6$, write $\_\_ \times 3 = 6$,

  $6 \div 3 = \_\_$, and $6 \div \_\_ = 3$.
- Determine whether to add or subtract in problem situations.
- Determine whether an estimate is an appropriate solution for addition and subtraction problems.
- Add or subtract two whole numbers, each 9,999 or less.
- Estimate and find the sum of two whole numbers, each 9,999 or less, with or without regrouping, using calculators, paper and pencil, or mental computation.
- Estimate and find the difference of two whole numbers, each 9,999 or less, with or without regrouping, using calculators, paper and pencil, or mental computation.
- Solve problems involving the sum or difference of two whole numbers, each 9,999 or less, with or without regrouping.
- Recall and state the multiplication and division facts through the nines table.
- Recall and write the multiplication and division facts through the nines table.
- Model multiplication, using area and set models.
- Model division, using area and set models.
- Solve multiplication problems, using the standard multiplication algorithm, where one factor is 99 or less and the second factor is 5 or less.
- Create and solve word problems involving multiplication, where one factor is 99 or less and the second factor is 5 or less.

Sample resources

http://standards.nctm.org/document/chapter5/numb.htm#bp1 – NCTM Principals and Standards for School Mathematics chapter on the Number and Operations Standard for Grades 3-5.

http://www.linkslearning.org/Teachers/1_Math/6_Learning_Resources/1_Illustrated_Lessons/3_Place_Value/index.html – Students work with place value using whole numbers as well as decimals. This interactive, computer-based lesson includes activities and assessments.

http://www.arcytech.org/java/b10blocks/description.html – Visual representations of base-10 place value and multi-digit operations, a valuable tool for teachers to use in class or for students to use on their own.

http://edweb.sdsu.edu/courses/edtec670/Cardboard/Card/N/NumberClub.html – Instructions for a card game that reinforces place value concepts.

http://www.naturalmath.com/mult/ – A tutorial to help students learn the multiplication facts.

SKILL GROUP 4
Organizing Topic→ Decimals: Representations, Relationships, Operations and Estimation, Addition and Subtraction

Aligned Standard(s) of Learning

M-NS23 The student will read and write decimals expressed as tenths and hundredths, using concrete materials and models.

M-CE14 The student will add and subtract with decimals expressed as tenths, using concrete materials, pictorial representations, and paper and pencil.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Investigate the ten-to-one relationship of the decimal places, using base-10 place-value models.
- Read and write decimals expressed as tenths, which are represented with base-10 blocks, grid paper, circular fraction pieces, and/or ten-frames.
- Read and write decimals expressed as hundredths, which are represented with base-10 blocks and/or grid paper.
- Add and subtract with decimals expressed as tenths, using concrete materials (e.g., grid paper, base-10 materials, and circular regions divided into tenths).
- Add and subtract with decimal numbers expressed as tenths, using paper and pencil.

Sample resources

http://standards.nctm.org/document/chapter5/numb.htm#bp3 – NCTM Principals and Standards for School Mathematics chapter on the Number and Operations Standard for Grades 3-5.

http://askeric.org/cgi-bin/printlessons.cgi/Virtual/Lessons/Mathematics/Number_Sense/NUS0200.html – an activity in which students arrange themselves into decimal numbers.

SKILL GROUP 4

Organizing Topic→ Fractions: Representations and Relationships

Aligned Standard(s) of Learning

M-NS21 The student will

a) divide regions and sets to represent a fraction; and

b) name and write the fractions represented by a given model (area/region, length/measurement, and set). Fractions (including mixed numbers) will include halves, thirds, fourths, eighths, and tenths.

M-NS22 The student will compare the numerical value of two fractions having like and unlike denominators, using concrete or pictorial models involving areas/regions, lengths/measurements, and sets.

M-CE 13 The student will add and subtract with proper fractions having like denominators of 10 or less, using concrete materials and pictorial models representing areas/regions, lengths/measurements, and sets.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Name and write fractions and mixed numbers represented by drawings or concrete materials for halves, thirds, fourths, eighths, and tenths.
- Represent a given fraction or mixed number, using concrete materials, pictures, and symbols for halves, thirds, fourths, eighths, and tenths. For example, write the symbol for one-fourth, and represent it with concrete materials and pictures.
- Compare the values of two fractions having like denominators where the denominators are 2, 3, 4, 8, or 10, using concrete or pictorial models. Use the terms *greater than, less than*, or *equal to* or symbols >, <, or = to compare their values.
- Compare the values of two unit fractions (a fraction in which the numerator is one), having unlike denominators, where the denominators are 2, 3, 4, 8, or 10, using concrete or pictorial models. Use the terms *greater than, less than*, or *equal to* or symbols >, <, or = to compare their values.
- Compare the values of two fractions having unlike denominators where the denominators are 2, 3, 4, 8, and 10, using concrete or pictorial models. Use the terms *greater than, less than*, or *equal to* or symbols >, <, or = to compare their values.
- Demonstrate a fractional part (halves, thirds, fourths, eighths, and tenths) of a whole, using
  - region/area models (e.g., pie pieces, pattern blocks, geoboards, drawings);
  - set models (e.g., chips, counters, cubes, drawings); and
  - measurement models (e.g., nonstandard units such as cuisenaire rods, connecting cubes, and drawings).

- Name and write fractions and mixed numbers represented by drawings or concrete materials for halves, thirds, fourths, eighths, and tenths.
- Represent a given fraction or mixed number, using concrete materials, pictures, and symbols, for halves, thirds, fourths, eighths, and tenths. For example, write the symbol for one-fourth and represent it with concrete materials and/or pictures.
- Add and subtract with proper fractions having denominators of 10 or less, using concrete materials and pictorial models representing area/regions (circles, squares, and rectangles), length/measurements (fraction bars and strips), and sets (counters).

Sample resources

Thinking Rationally about Fractions, Decimals, and Percent – lesson plans available from VDOE at http://www.pen.k12.va.us/VDOE/Instruction/Math/FractionsDecimalsPercent.pdf

http://math.rice.edu/~lanius/Patterns/ – Students use pattern blocks to investigate and build relations among fractions.

http://mathforum.org/paths/fractions/e.fraclessons.html – Extensive list of lesson plans and software related to fraction concepts.

http://www.col-ed.org/cur/math/math19.txt – Students construct words based on the fractional parts of other words in order to create a clue for a hidden candy bar.

http://mathcentral.uregina.ca/RR/database/RR.09.95/hanson4.html –This lesson plan uses pattern blocks to help students understand fractions and operations on fractions.

http://www.teachnet.com/lesson/math/fractioncity.html – This lesson provides instructions for an in-class activity in which students compare fractional parts

SKILL GROUP 4

Organizing Topic→ Measurement: Money, Length, Weight/Mass, Volume, Temperature, Time

Aligned Standard(s) of Learning

M-M19 The student will determine by counting the value of a collection of bills and coins whose total value is $5.00 or less, compare the value of the coins or bills, and make change.

M-M20 The student will estimate and then use actual measuring devices with metric and U.S. Customary units to measure

a) length — inches, feet, yards, centimeters, and meters;

b) liquid volume — cups, pints, quarts, gallons, and liters; and

c) weight/mass — ounces, pounds, grams, and kilograms.

M-M21 The student will tell time to the nearest five-minute interval and to the nearest minute, using analog and digital clocks.

M-M22 The student will identify equivalent periods of time, including relationships among days, months, and years, as well as minutes and hours.

M-M23 The student will read temperature to the nearest degree from a Celsius thermometer and a Fahrenheit thermometer. Real thermometers and physical models of thermometers will be used.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Count the value of collections of coins and bills up to $5.00.
- Compare the values of two sets of coins or bills, up to $5.00, using the terms *greater than, less than*, and *equal to*.
- Make change from $5.00 or less.
- Identify and use the following units of length: centimeters, meters, inches, feet, and yards.
- Identify and use the following units of liquid volume: cups, pints, quarts, gallons, and liters.
- Identify and use the following units of weight/mass: ounces, pounds, grams, and kilograms.
- Estimate and then measure lengths of objects to the nearest centimeter and meter and the nearest inch, foot, and yard.
- Estimate and then measure the weight/mass of objects to the nearest ounce and pound and the nearest gram and kilogram.
- Estimate and then measure liquid volume to the nearest cup, pint, quart, gallon, and liter.
- Tell time to the hour, half-hour, quarter-hour, nearest five-minute interval, and nearest minute, using analog and digital clocks.
- Match the times shown on analog and digital clocks to written times.

- Identify equivalent relationships observed in a calendar, including the number of days in a given month, the number of days in a week, the number of days in a year, and the number of months in a year.
- Identify the number of minutes in an hour and the number of hours in a day.
- Read temperature to the nearest degree from real Celsius and Fahrenheit thermometers and from physical models (including pictorial representations) of such thermometers

Sample resources

Curriculum and Evaluation Standards for School Mathematics, NCTM publication, 1989

Principles and Standards for School Mathematics, NCTM publication, 2000

Learning and Teaching Measurement: 2003 Yearbook with Classroom Activities Companion Booklet, NCTM, 2003 Information related to measurement and activities that go beyond the content.

http://standards.nctm.org/document/chapter5/meas.htm – Information on measurement from Principles and Standards for School Mathematics.

http://mathforum.org/paths/measurement/inchbyinch.html – A lesson from the Math Forum that uses literature to explore the concept of length.

http://mathforum.org/paths/measurement/e.measlessons.html – Ideas and resources for teaching measurement that includes lesson plans, materials, common questions, and software.

http://www.aimsedu.org/Activities/minimetrics/mini-metrics.pdf – A Mini-Metric Olympics activity from the AIMS organization.

www.mathcats.com – metric and US conversions, weather from around the world in Celsius and Fahrenheit.

http://www.time-for-time.com/swf/myclox.swf – excellent interactive clock site with analog and digital faces.

SKILL GROUP 4

Organizing Topic→ Geometry: Two-Dimensional (Plane), Three-Dimensional (Solid), Transformations

Aligned Standard(s) of Learning

M-G 10 The student will analyze two-dimensional (plane) and three-dimensional (solid) geometric figures (circle, square, rectangle, triangle, cube, rectangular solid [prism], square pyramid, sphere, cone, and cylinder) and identify relevant properties, including the number of corners, square corners, edges, and the number and shape of faces, using concrete models.

M-G 11 The student will identify and draw representations of line segments and angles, using a ruler or straightedge.

M-G 12 The student, given appropriate drawings or models, will identify and describe congruent and symmetrical, two-dimensional (plane) figures, using tracing procedures.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Identify, by name, models and pictures of plane geometric figures (circle, square, rectangle, and triangle) and solid geometric figures (cube, rectangular solid, square pyramid, sphere, cone, and cylinder).
- Identify plane geometric figures by counting the number of sides, corners, and square corners.
- Identify geometric solids by counting the number of corners, square corners, and edges, and by the shapes of the faces.
- Classify, compare, and contrast plane and solid geometric figures (e.g., circle/sphere, square/cube, triangle/pyramid, and rectangle/rectangular solid), using corners, square corners, faces, and edges.
- Identify and locate examples of a point, line segment, and angle.
- Draw line segments and angles, using a ruler or straightedge.
- Locate examples of symmetrical figures, and verify their symmetry by using tracing procedures.
- Determine if given figures have a line or lines of symmetry (vertical, horizontal, diagonal), using tracing procedures.
- Locate examples of congruent figures and verify their congruency by laying one on top of the other.
- Determine if given figures are congruent, using tracing procedures.

Sample resources

http://standards.nctm.org/document/chapter5/geom.htm – - NCTM Principles and Standards information related to geometry in Grades 3-5.

http://illuminations.nctm.org/imath/3-5/GeometricSolids/index.html – an I-math investigation of geometric solids.

http://www.learnnc.org/LearnNC/lessonp.nsf/docunid/E59C22A90A8A43F485256831007443D4?opendocument – a lesson plan on congruent figures.

http://www.learnnc.org/LearnNC/lessonp.nsf/docunid/272DFA – a lesson plan on constructing three-dimensional figures.

http://www.learner.org/teacherslab/math/geometry/space/ – lessons plans that focus on visualization of three-dimensional objects.

VDOE Geometry Instructional Module – professional development training module that contains activities that can be adapted for student use.

Navigating through Geometry in Grade 3 through Grade 5 - available from NCTM. Contains additional lessons for geometric activities.

Van Hiele Levels of Geometric Thought CD – available through the Virginia Department of Education – contains assessments to determine children's level of geometric thinking

SKILL GROUP 4

Organizing Topic→Statistics

Aligned Standard(s) of Learning

M-PS8 The student, given grid paper, will

a) collect and organize data on a given topic of his/her choice, using observations, measurements, surveys, or experiments; and

b) construct a line plot, a picture graph, or a bar graph to represent the results. Each graph will include an appropriate title and key.

M-PS9 The student will read and interpret data represented in line plots, bar graphs, and picture graphs and write a sentence analyzing the data.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Formulate questions to investigate.
- Design data investigations to answer formulated questions, limiting the number of categories for data collection to four.
- Collect data, using surveys, polls, questionnaires, scientific experiments, and observations.
- Organize data and construct a bar graph on grid paper representing 16 or fewer data points for no more than four categories.
- Label bar graphs with a title, a description of each axis, and a key where appropriate. Limit increments on the numerical axis to whole numbers representing multiples of 1, 2, 5, or 10.
- Read the information presented on a simple bar or picture graph (e.g., the title, the categories, the description of the two axes, the key).
- Read information presented in line plots.
- Analyze and interpret information from simple picture and bar graphs, with data points limited to 16 and categories to 4, by writing at least one statement.
- Analyze and interpret information from line plots, with data points limited to 16, by writing at least one statement.
- Describe the categories of data and the data as a whole (e.g., data were collected on four types of eggs — scrambled, fried, hard boiled, and egg salad — eaten by students).
- Identify parts of the data that have special characteristics, including categories with the greatest, the least, or the same (e.g., most students prefer scrambled eggs).
- Select a correct interpretation of a graph from a set of interpretations of the graph, where one is correct and the remaining three are incorrect. For example, a bar graph containing data on four types of eggs — scrambled, fried, hard boiled, and egg salad — eaten by students shows that more students prefer scrambled eggs. A correct answer response, if given, would be that more students prefer scrambled eggs than any other type of eggs.

Sample resources

http://illuminations.nctm.org/swr/list.asp?Ref=1&Std=4&Grd=-1 – lessons that focus on data collection and representation with manipulatives such as shoes, M & Ms and personal characteristics.

Curriculum and Evaluation Standards for School Mathematics, NCTM publication, pp.54-57

Principles and Standards for School Mathematics, NCTM publication, 2000

NCTM Addenda Series, Grade 4

www.nces.ed.gov/nceskids/Graphing/ -– An interactive Web site for students that allows them to create several types of graphs

http://illuminations.nctm.org/swr/list.asp?Ref=1&Std=4&Grd=3 – list of web resources reviewed by NCTM containing activities for data and probability.

http://standards.nctm.org/document/chapter5/data.htm – information from NCTM Principles and Standards in relation to data analysis for Grade 3 through Grade 5.

Probability and Statistics Professional Development Module available from VDOE Web site – contains activities related to this strand that can be modified for student use.

Navigating through Data Analysis and Probability in Grade 3 through Grade 5 - available from NCTM. Contains additional lessons for data analysis activities.

SKILL GROUP 4

Organizing Topic→Probability

Aligned Standard(s) of Learning

M-PS 10 The student will investigate and describe the concept of probability as chance and list possible results of a given situation.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Define probability as the chance that an event will happen.
- List all possible outcomes for a given situation (e.g., heads and tails are the two possible outcomes of flipping a coin).
- Identify the possible outcomes for a common event, using terms such as *impossible*, *unlikely*, *equally likely*, *likely*, and *certain*.

Sample resources

http://standards.nctm.org/document/chapter5/data.htm#bp4 – NCTM's Principles and Standards information about probability at the 3-5 grade levels.

http://www.pbs.org/teachersource/mathline/lessonplans/esmp/chances/chances_procedure.shtm – PBS lesson plan on probability.

SKILL GROUP 4

Organizing Topic→Patterns, Functions, and Algebra: Representations and Relationships

Aligned Standard(s) of Learning

M-PFA7 The student will recognize and describe a variety of patterns formed using concrete objects, numbers, tables, and pictures, and extend the pattern, using the same or different forms (concrete objects, numbers, tables, and pictures).

M-PFA8 The student will

a) investigate and create patterns involving numbers, operations (addition and multiplication), and relations that model the identity and commutative properties for addition and multiplication; and

b) demonstrate an understanding of equality by recognizing that the equal sign (=) links equivalent quantities, such as $4 \bullet 3 = 2 \bullet 6$.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Recognize repeating and growing numeric and geometric patterns (e.g., skip counting, addition tables, and multiplication tables).
- Describe repeating and growing numeric and geometric patterns formed using concrete objects, numbers, tables, and/or pictures, using the same or different forms.
- Extend repeating and growing numeric and geometric patterns formed using concrete objects, numbers, tables, and/or pictures, using the same or different forms.
- Recognize that the equals sign relates equivalent quantities.
- Write number sentences to represent equivalent mathematical relationships (e.g., $4 \cdot 3 = 2 \cdot 6$).
- Identify number sentences that show appropriate use of the equals sign.

Sample resources

Patterns, Functions, and Algebra Staff Development Module – available at the VDOE Web site.

http://standards.nctm.org/document/chapter5/alg.htm#bp1 – NCTM Principles and Standards information related to the algebra strand in Grades 3-5.

http://www.pbs.org/teachersource/mathline/lessonplans/atmp/snake/snake_procedure.shtm – Students describe, use and extend several stages of an imaginary snake's growth pattern.

http://www.illuminations.nctm.org/lessonplans/3-5/variablemach/index.html – a lesson plan that provides an introduction to the use of variables.

SKILL GROUP 5

SKILL GROUP 5

Organizing Topic→ Whole Numbers: Representations, Relationships, Operations, Estimation, Addition, Subtraction, Multiplication, Division

Aligned Standard(s) of Learning

M-NS24 The student will

a) identify (orally and in writing) the place value for each digit in a whole number expressed through millions;

b) compare two whole numbers expressed through millions, using symbols (>, <, or =); and

c) round whole numbers expressed through millions to the nearest thousand, ten thousand, and hundred thousand.

M-CE15 The student will estimate whole-number sums and differences and describe the method of estimation. The student will refine estimates, using terms such as *closer to, between*, and *a little more than*.

M-CE16 The student will add and subtract whole numbers written in vertical and horizontal form, choosing appropriately between paper and pencil methods and calculators.

M-CE17 The student will find the product of two whole numbers when one factor has two digits or fewer and the other factor has three digits or fewer, using estimation and paper and pencil. For larger products (a two-digit numeral times a three-digit numeral), estimation and calculators will be used.

M-CE18 The student will estimate and find the quotient of two whole numbers, given a one-digit divisor.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Identify and communicate, both orally and in written form, the place value for each digit in whole numbers expressed through the one millions place.
- Read whole numbers through the one millions place that are presented in standard format, and select the matching number in written format.
- Write whole numbers through the one millions place in standard format when the numbers are presented orally or in written format.
- Identify and use the symbols for *greater than*, *less than*, and *equal to*.
- Compare two whole numbers expressed through the one millions, using symbols >, <, or =.
- Round whole numbers expressed through the one millions place to the nearest thousand, ten thousand, and hundred thousand place.
- Estimate whole-number sums and differences, using rounding, front-end strategies, and compatible number strategies. Describe the method of estimation used.

- Refine estimates by adjusting the final amount, using terms such as *closer to, between*, and *a little more than*.
- Determine the sum or difference of two whole numbers, each 999,999 or less, in vertical form with or without regrouping.

Sample resources

http://standards.nctm.org/document/chapter5/numb.htm#bp1 – NCTM Principals and Standards for School Mathematics chapter on the Number and Operations Standard for Grades 3–5.

http://www.linkslearning.org/Teachers/1_Math/6_Learning_Resources/1_Illustrated_Lessons/3_Place_Value/index.html – Students work with place value using whole numbers as well as decimals. This interactive, computer-based lesson includes activities and assessments.

http://www.arcytech.org/java/b10blocks/description.html – Visual representations of base-10 place value and multi-digit operations, a valuable tool for teachers to use in class or for students to use on their own.

http://edweb.sdsu.edu/courses/edtec670/Cardboard/Card/N/NumberClub.html – Instructions for a card game that reinforces place-value concepts.

http://www.naturalmath.com/mult/ – A tutorial to help students learn the multiplication facts.

SKILL GROUP 5

Organizing Topic→ Decimals: Representations, Relationships, Operations, Estimation, Addition and Subtraction

Aligned Standard(s) of Learning

M-NS25 The student will

c) relate fractions to decimals, using concrete objects.

M-NS27 The student will

a) read, write, represent, and identify decimals expressed through thousandths;

b) round to the nearest whole number, tenth, and hundredth; and

c) compare the value of two decimals, using symbols (<, >, or =), concrete materials, drawings, and calculators.

M-CE 19 The student will

b) add and subtract with decimals through thousandths, using concrete materials, pictorial representations, and paper and pencil; and

c) solve problems involving addition and subtraction with fractions having like and unlike denominators of 12 or less and with decimals expressed through thousandths, using various computational methods, including calculators, paper and pencil, mental computation, and estimation.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Represent fractions for halves, fourths, fifths, and tenths as decimals through thousandths, using concrete objects (e.g., demonstrate the relationship between the fraction $\frac{1}{4}$ and its decimal equivalent 0.25).
- Relate fractions to decimals, using concrete objects (e.g., 10-by-10 grids, meter sticks, number lines, decimal squares, money [coins]).
- Investigate the ten-to-one place-value relationship for decimals through thousandths, using base-10 manipulatives (e.g., place-value mats/charts, decimal squares, base-10 blocks, money).
- Represent and identify decimals expressed through thousandths, using base-10 manipulatives, pictorial representations, calculators, and numerical symbols (e.g., relate the appropriate drawing to 0.005).
- Read and write decimals expressed through thousandths, using base-10 manipulatives, drawings, calculators, and numerical symbols. Any decimal less than 1 will include a leading zero (e.g., 0.125).
- Round decimals to the nearest whole number, tenth, and hundredth.
- Compare the value of two decimals, using the symbols >, <, =.

- Add and subtract with decimals through thousandths, using concrete materials, pictorial representations, and paper and pencil.
- Solve problems that involve adding and subtracting with decimals through thousandths.

Sample resources

Thinking Rationally about Fractions, Decimals, and Percent: Instructional Activities for Grades 4 through 8 – Lesson plans available from VDOE at

http://standards.nctm.org/document/chapter5/numb.htm#bp1 – NCTM Principles and Standards for School Mathematics chapter on the Number and Operations Standard for Grades 3–5.

http://funbrain.com/football/index.html – Power Football provides interactive practice with the decimal concepts.

http://askeric.org/cgi-bin/printlessons.cgi/Virtual/Lessons/Mathematics/Number_Sense/NUS0200.html

An activity in which students physically arrange themselves into decimal numbers, this lesson can be used to assess students' understanding about decimals.

http://www.pen.k12.va.us/VDOE/Instruction/Math/FractionsDecimalsPercent.pdf.

SKILL GROUP 5

Organizing Topic→ Fractions: Representations, Relationships, Estimation and Operations

Aligned Standard(s) of Learning

M-NS25 The student will

a) identify, model, and compare rational numbers (fractions and mixed numbers), using concrete objects and pictures;

b) represent equivalent fractions; and

c) relate fractions to decimals, using concrete objects.

M-NS26 The student will compare the numerical value of fractions (with like and unlike denominators) having denominators of 12 or less, using concrete materials.

M-CE19 The student will

a) add and subtract with fractions having like and unlike denominators of 12 or less, using concrete materials, pictorial representations, and paper and pencil;

b) add and subtract with decimals through thousandths, using concrete materials, pictorial representations, and paper and pencil; and

c) solve problems involving addition and subtraction with fractions having like and unlike denominators of 12 or less and with decimals expressed through thousandths, using various computational methods, including calculators, paper and pencil, mental computation, and estimation.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Identify, model, and compare fractions and mixed numbers through twelfths, using
  - region/area models (e.g., fraction circles, pattern blocks, geoboards, color tiles, graph paper);
  - set models (e.g., two-sided counters, chips); and measurement models (e.g., cuisenaire rods, unifex cubes, fraction strips, number lines).
- Represent fractions for halves, fourths, fifths, and tenths as decimals through thousandths, using concrete objects (e.g., demonstrate the relationship between the fraction $\frac{1}{4}$ and its decimal equivalent 0.25).
- Relate fractions to decimals, using concrete objects (e.g., 10-by-10 grids, meter sticks, number lines, decimal squares, money [coins]).

- Identify and represent equivalent fractions through twelfths, using region/area models, set models, and measurement models.
- Compare two fractions having denominators of 12 or less, using manipulative models and drawings, such as
  - region/area models (e.g., fraction circles, pattern blocks, geoboards, color tiles, graph paper, drawings);
  - set models (e.g., two-sided counters, chips, drawings); and
  - measurement models (e.g., cuisenaire rods, unifex cubes, fraction strips, rulers/number lines, drawings).
- Compare two fractions with like denominators by comparing numerators (e.g., $\frac{1}{5} < \frac{3}{5}$).
- Compare two fractions having unlike denominators of 12 or less by comparing the fractions to common benchmarks (e.g., $\frac{1}{2}$ or 1) to determine their relationship or by finding a common denominator.
- Use the symbols >, <, and = to compare the numerical value of two fractions having denominators of 12 or less.
- Add and subtract with fractions having like denominators of 12 or less, using concrete materials, pictorial representations, and paper and pencil.
- Add and subtract with fractions having unlike denominators of 12 or less, using concrete materials pictorial representations and paper and pencil.
- Solve problems that involve adding and subtracting with fractions having like and unlike denominators of 12 or less.

Sample resources

Thinking Rationally about Fractions, Decimals, and Percent: Instructional Activities for Grades 4 through 8 – Lesson plans available from VDOE at http://www.pen.k12.va.us/VDOE/Instruction/Math/FractionsDecimalsPercent.pdf.

http://math.rice.edu/~lanius/Patterns/ – Students use pattern blocks to investigate and build relations among fractions.

http://mathforum.org/paths/fractions/e.fraclessons.html – Extensive list of lesson plans and software related to fraction concepts.

http://www.col-ed.org/cur/math/math19.txt – Students construct words based on the fractional parts of other words in order to create a clue for a hidden candy bar.

http://mathcentral.uregina.ca/RR/database/RR.09.95/hanson4.html – This lesson plan uses pattern blocks to help students understand fractions and operations on fractions.

http://www.teachnet.com/lesson/math/fractioncity.html – This lesson provides instructions for an in-class activity in which students compare fractional parts.

SKILL GROUP 5

Organizing Topic→ Measurement: Length, Weight/Mass, Volume, Perimeter, Area,

Aligned Standard(s) of Learning

M-M 24 The student will

a) estimate and measure weight/mass, using actual measuring devices, and describe the results in U.S. Customary/metric units as appropriate, including ounces, pounds, grams, and kilograms;

b) identify equivalent measurements between units within the U.S. Customary system (ounces and pounds) and between units within the metric system (grams and kilograms); and

c) estimate the conversion of ounces and grams and pounds and kilograms, using approximate comparisons (1 ounce is about 28 grams, or 1 gram is about the weight of a paper clip; 1 kilogram is a little more than 2 pounds). *

** The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

M-M 25 The student will

a) estimate and measure length, using actual measuring devices, and describe the results in both metric and U.S. Customary units, including part of an inch (1/2, 1/4, and 1/8), inches, feet, yards, millimeters, centimeters, and meters;

b) identify equivalent measurements between units within the U.S. Customary system (inches and feet; feet and yards; inches and yards) and between units within the metric system (millimeters and centimeters; centimeters and meters; and millimeters and meters); and

c) estimate the conversion of inches and centimeters, yards and meters, and miles and kilometers, using approximate comparisons (1 inch is about 2.5 centimeters, 1 meter is a little longer than 1 yard, 1 mile is slightly farther than 1.5 kilometers, or 1 kilometer is slightly farther than half a mile). *

** The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

M-M 26 The student will

a) estimate and measure liquid volume, using actual measuring devices and using metric and U.S. Customary units, including cups, pints, quarts, gallons, milliliters, and liters;

b) identify equivalent measurements between units within the U.S. Customary system (cups, pints, quarts, and gallons) and between units within the metric system (milliliters and liters); and

c) estimate the conversion of quarts and liters, using approximate comparisons (1 quart is a little less than 1 liter, 1 liter is a little more than 1 quart).*

** The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U. S. Customary and metric units.*

M-M 27 The student will

a) identify and describe situations representing the use of perimeter and area; and

b) use measuring devices to find perimeter in both standard and nonstandard units of measure.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Determine an appropriate unit of measure (e.g., ounce, pound, gram, kilogram) to use when measuring everyday objects in both metric and U.S. Customary units.
- Measure objects in both metric and U.S. Customary units (e.g., ounce, pound, gram, or kilogram) to the nearest appropriate measure, using a variety of measuring instruments.
- Record the mass of an object including the appropriate unit of measure (e.g., 24 grams).
- Estimate conversions between U.S. Customary and metric units, using ballpark comparisons, such as

– 1 ounce is about 28 grams;

– 1 nickel has the mass of about 5 grams; and

– 1 kilogram is a little more than 2 pounds.

- Determine an appropriate unit of measure (e.g., inch, foot, yard, millimeter, centimeter, and meter) to use when measuring everyday objects in both metric and U.S. Customary units.
- Estimate the length of everyday objects (e.g., books, windows, tables) in both metric and U.S. Customary units of measure.
- Measure the lengths of objects in both metric and U.S. Customary units, measuring to the nearest inch ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$), foot, yard, millimeter, centimeter, or meter, and record the length including the appropriate unit of measure (e.g., 24 inches).
- Compare estimates of the length of objects with the actual measurement of the length of objects.
- Identify equivalent measures of length between U.S. Customary measurements and between metric measurements.
- Estimate conversions between the U.S. Customary and metric units, using ballpark comparisons, such as

– 1 inch is about 2.5 centimeters;

– 1 meter is a little longer than 1 yard;

– 1 mile is slightly farther than 1.5 kilometers; and

– 1 kilometer is slightly farther than half a mile.

- Determine an appropriate unit of measure (cups, pints, quarts, gallons, milliliters, or liters) to use when measuring liquid volume in both metric and U.S. Customary units.
- Estimate the liquid volume of containers in both metric and U.S. Customary units of measure to the nearest cup, pint, gallon, milliliter, or liter.
- Measure the liquid volume of everyday objects in both metric and U.S. Customary units, including cups, pints, quarts, gallons, milliliters, and liters, and record the volume including the appropriate unit of measure (e.g., 24 gallons).
- Identify equivalent measures of volume between U.S. Customary and metric measurements.

- Estimate conversion between U.S. Customary and metric units, using ballpark comparisons, such as 1 quart is a little less than 1 liter, and 1 liter is a little more than 1 quart.
- Identify and describe situations where the perimeter of an object should be found (e.g., the distance around the edge of walls of the classroom; the length of fencing needed to enclose a playground).
- Identify and describe situations in which the area should be found (e.g., laying tile for the floor of the classroom).
- Measure the perimeter of an object, using nonstandard units of measure (e.g., unsharpened pencil, board eraser, toothpick, chalk, crayon, paper clip) and record the perimeter including the nonstandard unit of measure used (e.g., 24 paper clips).
- Measure the perimeter of concrete objects in both metric and U.S. Customary units of measure to the nearest inch, foot, yard, millimeter, centimeter, or meter.
- Determine the perimeter of an object or pictorial representation of an object and label it with the appropriate standard or nonstandard unit of measure.

Sample resources

Curriculum and Evaluation Standards for School Mathematics, NCTM publication, 1989.

Principles and Standards for School Mathematics, NCTM publication, 2000.

Learning and Teaching Measurement: 2003 Yearbook with Classroom Activities Companion Booklet, NCTM, 2003 Information related to measurement and activities that go beyond the content.

http://standards.nctm.org/document/chapter5/meas.htm – Information on measurement from Principles and Standards for School Mathematics.

http://mathforum.org/paths/measurement/inchbyinch.html – A lesson from the Math Forum that uses literature to explore the concept of length.

http://mathforum.org/paths/measurement/e.measlessons.html – Ideas and resources for teaching measurement that includes lesson plans, materials, common questions, and software.

http://www.aimsedu.org/Activities/minimetrics/mini-metrics.pdf – A Mini-Metric Olympics activity from the AIMS organization.

www.funbrain.com/poly/ – Activities involving area and perimeter.

www.shodor.org/interactivate/lessons/lpa.html – This lesson is designed to examine the mathematical concepts of length, perimeter, and area. These activities and discussions may be used to develop students' understanding of these mathematical concepts.

www.mste.uiuc.edu/users/carvell/rectperim/RectPerim2.html – Interactive Web site that examines the relationship between area and perimeter.

www.mathgoodies.com/lessons/vol1/area_rectangle.html – Lessons and problems involving area and perimeter.

http://its.guilford.k12.nc.us/webquest/areaperim/areaperim.htn– A Webquest, using area and perimeter to design a “Fun House.”

SKILL GROUP 5

Organizing Topic→ Geometry: Two-Dimensional (Plane), Three-Dimensional (Solid), Transformations, Spatial Relationships

Aligned Standard(s) of Learning

M-G13 The student will investigate and describe the relationships between and among points, lines, line segments, and rays.

M-G14 The student will

a) identify and draw representations of points, lines, line segments, rays, and angles, using a straightedge or ruler; and

b) describe the path of shortest distance between two points on a flat surface.

M-G15 The student will identify and draw representations of lines that illustrate intersection, parallelism, and perpendicularity.

M-G16 The student will

a) analyze and compare the properties of two-dimensional (plane) geometric figures (circle, square, rectangle, triangle, parallelogram, and rhombus) and three-dimensional (solid) geometric figures (sphere, cube, and rectangular solid [prism]);

b) identify congruent and noncongruent figures; and

c) investigate congruence of plane figures after geometric transformations such as reflection (flip), translation (slide) and rotation (turn), using mirrors, paper folding, and tracing.

M-G17 The student will identify the ordered pair for a point and locate the point for an ordered pair in the first quadrant of a coordinate plane.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Differentiate among a point, line, line segment, and ray by using the definitions to compare.
- Investigate and describe the relationships between and among points, lines, line segments, and rays.
- Identify points, lines, line segments, rays, and angles, using their definitions.
- Draw representations of lines, line segments, rays, and angles, using a straightedge, ruler, or angle ruler.
- Identify lines that are parallel, intersecting, or perpendicular, using their definitions.
- Draw representations of intersecting, parallel, and perpendicular lines.
- Identify and describe the properties of squares, rectangles, triangles, parallelograms, rhombi, and circles.

- Identify and describe the properties of spheres, cubes, and rectangular solids (prisms).
- Identify congruent and noncongruent figures.
- Analyze and compare the properties of
  - circles and spheres;
  - squares and cubes; and
  - rectangles and rectangular solids (prisms).
- Recognize the congruence of plane figures resulting from geometric transformations such as translation, reflection, and rotation.
- Identify the ordered pair for a point in the first quadrant of a coordinate plane, given the coordinates (x, y).
- Locate points in the first quadrant on a coordinate grid, given the coordinates (x, y).

Sample resources

http://standards.nctm.org/document/chapter5/geom.htm – NCTM Principles and Standards information related to geometry in Grades 3–5.

http://illuminations.nctm.org/imath/3-5/GeometricSolids/index.html – An I-math investigation of geometric solids.

http://standards.nctm.org/document/eexamples/chap5/5.3/index.htm – An interactive exploration of the properties of rectangles and parallelograms.

http://www.learnnc.org/LearnNC/lessonp.nsf/docunid/E59C22A90A8A43F485256831007443D4?opendocument – A lesson plan on congruent figures.

http://ericir.syr.edu/cgi-bin/printlessons.cgi/Virtual/Lessons/Mathematics//Geometry/GEO0200.html – A lesson plan on points, rays, lines, line segments, parallel, perpendicular and intersecting lines.

http://www.learnnc.org/LearnNC/lessonp.nsf/docunid/272DFA – A lesson plan on constructing three-dimensional figures.

http://www.glc.k12.ga.us/BuilderV03/lptools/lpshared/lpdisplay.asp?Session_Stamp=&LPID=15265 – A lesson plan on graphing coordinate points on a grid.

http://artsedge.kennedy-center.org/teaching_materials/curricula/curriculum.cfm?curriculum_id=213&mode=full

Using the context of lighthouses, this lesson plan focuses on the geometric figures required to construct structures.

http://www.learner.org/teacherslab/math/geometry/space/ – Lessons plans that focus on visualization of three-dimensional objects.

VDOE Geometry Instructional Module – Professional development training module that contains activities that can be adapted for student use.

Navigating through Geometry in Grade 3 through Grade 5 – Available from NCTM. Contains additional lessons for geometric activities.

Van Hiele Levels of Geometric Thought CD – Available through the Virginia Department of Education. Contains assessments to determine children's level of geometric thinking.

SKILL GROUP 5
Organizing Topic→Statistics: Collect, Organize, Display, Analyze and Interpret Data

Aligned Standard(s) of Learning

M-PS12 The student will collect, organize, and display data in line and bar graphs with scale increments of one or greater than one and use the display to interpret the results, draw conclusions, and make predictions.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Collect data, using, for example, observations, measurement, surveys, scientific experiments, polls, or questionnaires.
- Organize data into a chart or table.
- Construct and display data in bar graphs, labeling one axis with equal whole-number increments of 1 or more (numerical data) (e.g., multiples of 5, 10, or 100) and the other axis with categories related to the title of the graph (categorical data) (e.g., swimming, fishing, boating, and water skiing as the categories of "Favorite Summer Sports").
- Construct and display data in line graphs, labeling the vertical axis with equal whole-number increments of 1 or more and the horizontal axis with continuous data commonly related to time (e.g., hours, days, months, years, and age). Line graphs will have no more than four identified points along a continuum for continuous data. For example, growth charts showing age versus height place age on the horizontal axis (e.g., 1 month, 2 months, 3 months, and 4 months).
- Title the given graph or identify the title in a given graph and label the axes.
- Analyze information from simple line and bar graphs by describing the characteristics of the data and the data as a whole (e.g., the category with the greatest/least, categories with the same number of responses, similarities and differences, the total number). Data points will be limited to 20 and categories to 4.
- Interpret the data to answer the question posed, and compare the answer to the prediction (e.g., "The summer sport preferred by most is swimming, which is what I predicted before collecting the data.").
- Write at least one sentence to describe the analysis and interpretation of the data, identifying parts of the data that have special characteristics, including categories with the greatest, the least, or the same.
- Select from among four choices a correct analysis of the data presented in a bar or line graph. For example, given a line graph showing the number of soccer players (in millions) in the U.S. over the time period 1980 to 2000 in five-year intervals, select the correct answer response that relates to the graphs, such as, "The greatest increase in number of soccer players occurred between 1985 and 1990."

Sample resources

Curriculum and Evaluation Standards for School Mathematics, NCTM publication, pp. 54–57.

Principles and Standards for School Mathematics, NCTM publication, 2000.

NCTM Addenda Series, Grade 4.

www.nces.ed.gov/nceskids/Graphing/ – An interactive Web site for students that allows them to create several types of graphs.

http://illuminations.nctm.org/swr/list.asp?Ref=1&Std=4&Grd=3 – List of Web resources reviewed by NCTM containing activities for data and probability.

http://standards.nctm.org/document/chapter5/data.htm – Information from NCTM's Principles and Standards in relation to data analysis for Grade 3 through Grade 5.

Probability and Statistics Professional Development Module available from VDOE Web site – Contains activities related to this strand that can be modified for student use.

Navigating through Data Analysis and Probability in Grade 3 through Grade 5 – Available from NCTM. Contains additional lessons for data analysis activities.

SKILL GROUP 5

Organizing Topic→Probability

Aligned Standard(s) of Learning

M-PS11 The student will

a) predict the likelihood of outcomes of a simple event, using the terms *certain, likely, unlikely, impossible*; and

b) determine the probability of a given simple event, using concrete materials.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Model and determine all possible outcomes of a given simple event where there are no more than 12 possible outcomes, using a variety of manipulatives, such as coins, number cubes, and spinners.
- Conduct experiments to determine the probability of an event occurring for a given number of trials (no more than 12 trials), using manipulatives (e.g., the number of times "heads" occurs when flipping a coin 10 times; the chance that when the names of 12 classmates are put in a shoebox, a name that begins with *D* will be drawn).
- Write the probability of a given simple event as a fraction, where the total number of possible outcomes is 12 or fewer.
- Identify the likelihood of an event occurring and relate it to its fractional representation (e.g., impossible/0; equally likely/$\frac{1}{2}$; certain/1).

Sample resources

http://standards.nctm.org/document/chapter5/data.htm#bp4 – NCTM's Principles and Standards information about probability at the 3–5 grade levels.

http://www.pbs.org/teachersource/mathline/lessonplans/esmp/chances/chances_procedure.shtm – PBS lesson plan on probability.

SKILL GROUP 5

Organizing Topic→ Patterns, Functions; Representations and Relationships, Algebra; Representations and Relationships

Aligned Standard(s) of Learning

M-PFA9 The student will recognize, create, and extend numerical and geometric patterns, using concrete materials, number lines, symbols, tables, and words.

M-PFA10 The student will recognize and demonstrate the meaning of equality, using symbols representing numbers, operations, and relations [e.g., 3 + 5 = 5 + 3 and 15 + (35 + 16) = (15 + 35) + 16].

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Describe geometric and numerical patterns, using tables, symbols, or words.
- Create geometric and numerical patterns, using concrete materials, number lines, tables, and words.
- Extend geometric and numerical patterns, using concrete materials, number lines, tables, and words.
- Recognize that the equals sign (=) relates equivalent quantities.
- Write number sentences to represent equivalent mathematical relationships (e.g., $4 \times 3 = 2 \times 6$).
- Identify number sentences that show appropriate use of the equals sign.

Sample resources

Patterns, Functions, and Algebra Staff Development Module – Available at the VDOE Web site.

http://standards.nctm.org/document/chapter5/alg.htm#bp1 – NCTM Principles and Standards information related to the Algebra strand in Grades 3–5.

http://www.pbs.org/teachersource/mathline/lessonplans/atmp/snake/snake_procedure.shtm – Students describe, use and extend several stages of an imaginary snake's growth pattern.

http://www.illuminations.nctm.org/lessonplans/3-5/variablemach/index.html – A lesson plan that provides an introduction to the use of variables.

SKILL GROUP 6

SKILL GROUP 6
Organizing Topic→ Whole Numbers: Operations and Estimation – Addition, Subtraction, Multiplication, Division

Aligned Standard(s) of Learning

M-CE20 The student will create and solve problems involving addition, subtraction, multiplication, and division of whole numbers, using paper and pencil, estimation, mental computation, and calculators.

M-CE22 The student, given a dividend of four digits or fewer and a divisor of two digits or fewer, will find the quotient and remainder.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Create problems involving the operations of addition, subtraction, multiplication, and/or division of whole numbers, using real-life situations.
- Estimate the sum, difference, product, and quotient of whole-number computations.
- Solve problems involving addition, subtraction, multiplication, and division of whole numbers, using paper and pencil, mental computation, and calculators, in which
  - sums, differences, and products will not exceed five digits;
  - multipliers will not exceed two digits;
  - divisors will not exceed two digits; or
  - dividends will not exceed four digits.
- Estimate the quotient of two whole numbers when given a dividend of four digits or fewer and a divisor of two digits or fewer.
- Determine the quotient with no remainder of two whole numbers when given a dividend of four digits or fewer and a divisor of two digits or fewer.
- Determine the quotient and remainder of two whole numbers when given a dividend of four digits or fewer and a divisor of two digits or fewer.
- Use estimation to check the reasonableness of a quotient.

Sample resources

http://standards.nctm.org/document/chapter5/numb.htm#bp1 – NCTM Principles and Standards for School Mathematics, chapter on the Number and Operations Standard for Grades 3–5.

http://www.linkslearning.org/Teachers/1_Math/6_Learning_Resources/1_Illustrated_Lessons/3_Place_Value/index.html – Students work with place value using whole numbers as well as decimals. This interactive, computer-based lesson includes activities and assessments.

http://www.arcytech.org/java/b10blocks/description.html – Visual representations of base-10 place value and multi-digit operations, a valuable tool for teachers to use in class or for students to use on their own.

http://edweb.sdsu.edu/courses/edtec670/Cardboard/Card/N/NumberClub.html – Instructions for a card game that reinforces place value concepts.

http://www.naturalmath.com/mult/ – A tutorial to help students learn the multiplication facts.

SKILL GROUP 6
Organizing Topic→ Decimals: Representations, Relationships, Operations, Estimation – Addition, Subtraction, Multiplication and Division

Aligned Standard(s) of Learning

M-NS28 The student will

a) read, write, and identify the place values of decimals through thousandths;

b) round decimal numbers to the nearest tenth or hundredth; and

c) compare the values of two decimals through thousandths, using the symbols >, <, or =.

M-NS29 The student will

a) recognize and name commonly used fractions (halves, fourths, fifths, eighths, and tenths) in their equivalent decimal form and vice versa.

b) order a given set of fractions and decimals from least to greatest. Fractions will include like and unlike denominators limited to 12 or less, and mixed numbers.

M-CE21 The student will find the sum, difference, and product of two numbers expressed as decimals through thousandths, using an appropriate method of calculation, including paper and pencil, estimation, mental computation, and calculators.

M-CE23 The student, given a dividend expressed as a decimal through thousandths and a single-digit divisor, will find the quotient.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Identify the place values for each digit in decimals through thousandths.
- Read decimal numbers through thousandths from written words or place-value format.
- Write decimal numbers through thousandths from written words or from decimal numbers presented orally.
- Round decimal numbers to the nearest tenth or hundredth.
- Identify the symbols for the terms *greater than*, *less than*, and *equal to*.
- Compare the value of two decimal numbers through thousandths, using the symbols >, <, or =.
- Represent fractions (halves, fourths, fifths, eighths, and tenths) in their equivalent decimal form.
- Represent decimals in their equivalent fraction form (halves, fourths, fifths, eighths, and tenths).
- Determine equivalent relationships between decimals and fractions with denominators up to 12.
- Order from least to greatest a given set of no more than five numbers written as decimals and as fractions and mixed numbers with denominators of 12 or less.

Sample resources

http://standards.nctm.org/document/chapter5/numb.htm#bp3 . NCTM Principals and Standards for School Mathematics chapter on the Number and Operations Standard for Grades 3–5.

http://askeric.org/cgi-bin/printlessons.cgi/Virtual/Lessons/Mathematics/Number_Sense/NUS0200.html – an activity in which students arrange themselves into decimal numbers.

www.funbrain.com – "Power Football" Students score field goals with decimal numbers. Addition, subtraction, multiplication, and division are covered as well as algebra concepts.

www.aaamath.com/B/grade5.htm – This Web site contains reference information and activities for all fifth grade math topics.

www.matti.usu.edu – This Web site contains a library of virtual manipulatives.

SKILL GROUP 6
Organizing Topic→ Fractions: Representations, Relationships, Operations, Estimation – Addition and Subtraction

Aligned Standard(s) of Learning

M-NS29 The student will

a) recognize and name commonly used fractions (halves, fourths, fifths, eighths, and tenths) in their equivalent decimal form and vice versa; and

b) order a given set of fractions and decimal numbers from least to greatest. Fractions will include like and unlike denominators limited to 12 or less, and mixed numbers.

M-CE24 The student will add and subtract with fractions and mixed numbers, with and without regrouping, and express answers in simplest form. Problems will include like and unlike denominators limited to 12 or less.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Represent fractions (halves, fourths, fifths, eighths, and tenths) in their equivalent decimal form.
- Represent decimals in their equivalent fraction form (halves, fourths, fifths, eighths, and tenths).
- Determine equivalent relationships between decimals and fractions with denominators up to 12.
- Order from least to greatest a given set of no more than five numbers written as decimals and as fractions and mixed numbers with denominators of 12 or less.
- Add and subtract fractions having like and unlike denominators. Denominators should be limited to 12 or less, and answers should be expressed in simplest form.
- Add and subtract with mixed numbers having like and unlike denominators, with and without regrouping. Denominators should be limited to 12 or less, and answers should be expressed in simplest form.
- Use estimation to check the reasonableness of a sum or difference.

Sample resources

Thinking Rationally about Fractions, Decimals, and Percent: Instructional Activities for Grades 4 through 8 – Lesson plans available from VDOE at http://www.pen.k12.va.us/VDOE/Instruction/Math/FractionsDecimalsPercent.pdf.

http://math.rice.edu/~lanius/Patterns/ – Students use pattern blocks to investigate and build relations among fractions.

http://mathforum.org/paths/fractions/e.fraclessons.html – Extensive list of lesson plans and software related to fraction concepts.

http://www.col-ed.org/cur/math/math19.txt – Students construct words based on the fractional parts of other words in order to create a clue for a hidden candy bar.

http://mathcentral.uregina.ca/RR/database/RR.09.95/hanson4.html –This lesson plan uses pattern blocks to help students understand fractions and operations on fractions.

http://www.teachnet.com/lesson/math/fractioncity.html – This lesson provides instructions for an in-class activity in which students compare fractional parts

www.funbrain.com "Fresh Baked Fractions" and "Soccer Shootout" are games to practice fraction concepts.

http://matti.usu.edu – Library of Virtual manipulatives.

Other Web sites with interactive quizzes and games –

http://education.jlab.org/solquiz/indes.html

www.aaamath.com/B/grade5.html

www.brainpop.com/math/seeall.weml

http://www.learningbox.com/i_index.htm.

SKILL GROUP 6

Organizing Topic→ Measurement: Length, Weight/Mass, Volume, Temperature, Time, Perimeter, Area, Circumference, Angles

Aligned Standard(s) of Learning

M-M28 The student will describe and determine the perimeter of a polygon and the area of a square, rectangle, and right triangle, given the appropriate measures.

M-M29 The student will identify and describe the diameter, radius, chord, and circumference of a circle.

M-M30 The student will differentiate between perimeter, area, and volume and identify whether the application of the concept of perimeter, area, or volume is appropriate for a given situation.

M-M31 The student will choose an appropriate measuring device and unit of measure to solve problems involving measurement of

a)length — part of an inch (1/2, 1/4, and 1/8), inches, feet, yards, miles, millimeters, centimeters, meters, and kilometers;

b)weight/mass — ounces, pounds, tons, grams, and kilograms;

c)liquid volume — cups, pints, quarts, gallons, milliliters, and liters;

d)area — square units; and

e)temperature — Celsius and Fahrenheit units.

Problems also will include estimating the conversion of Celsius and Fahrenheit units relative to familiar situations (water freezes at 0°C and 32°F, water boils at 100°C and 212°F, normal body temperature is about 37°C and 98.6°F).

M-M32 The student will determine an amount of elapsed time in hours and minutes within a 24-hour period.

M-M33 The student will measure and draw right, acute, and obtuse angles and triangles, using appropriate tools.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Determine the perimeter of a polygon, with or without diagrams, when
  - the lengths of all sides of a polygon that is not a rectangle or a square are given;
  - the length and width of a rectangle are given; or
  - the length of a side of a square is given.
- Determine the area of a square, with or without diagrams, when the length of a side is given.
- Determine the area of a rectangle, with or without diagrams, when the length and width are given.
- Determine the area of a right triangle, with or without diagrams, when the base and the height are given.
- Determine the perimeter of a polygon and area of a square, rectangle, and triangle, following the parameters listed above, using only whole number measurements given in metric or U.S. Customary units, and record the solution with the appropriate unit of measure (e.g., 24 square inches).

- Describe the relationship between diameter and radius; and radius and circumference.
- Identify the diameter, radius, chord, and circumference of a given circle.
- Differentiate between the concepts of area, perimeter, and volume.
- Describe real-life situations where area, perimeter, and volume are appropriate measures to use, and justify their choices orally or in writing.
- Identify whether the application of the concept of perimeter, area, or volume is appropriate for a given situation.
- Solve problems involving measurement by selecting an appropriate measuring device and a U.S. Customary or metric unit of measure for the following:
  - length: part of an inch ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$), inches, feet, yards, miles, millimeters, centimeters, meters, and kilometers;
  - weight: ounces, pounds, and tons;
  - mass: grams and kilograms;
  - liquid volume: cups, pints, quarts, gallons, milliliters, and liters;
  - area: square units; and
  - temperature: Celsius and Fahrenheit units.
- Estimate the conversion of Celsius and Fahrenheit units relative to familiar situations:
  - Water freezes at 0°C and 32°F.
  - Water boils at 100°C and 212°F.

  Normal body temperature is about 37°C and 98.6°F.
- Determine elapsed time in hours and minutes within a 24-hour period.
- Identify the appropriate tools (e.g., protractor and straightedge or angle ruler as well as available software) used to measure and draw angles and triangles.
- Draw right, acute, and obtuse angles, using appropriate tools.
- Measure right, acute, and obtuse angles, using appropriate tools, and identify their measures in degrees.
- Measure the angles of right, acute, and obtuse triangles, using appropriate tools, and identify their measures in degrees.

Sample resources

Learning and Teaching Measurement: 2003 Yearbook with Classroom Activities Companion Booklet, NCTM, 2003 Information related to measurement and activities that go beyond the content.

http://standards.nctm.org/document/chapter5/meas.htm – Information on measurement from Principles and Standards for School Mathematics.

http://mathforum.org/paths/measurement/inchbyinch.html – A lesson from the Math Forum that uses literature to explore the concept of length.

http://mathforum.org/paths/measurement/e.measlessons.html – Ideas and resources for teaching measurement that includes lesson plans, materials, common questions, and software.

http://www.aimsedu.org/Activities/minimetrics/mini-metrics.pdf – A Mini-Metric Olympics activity from the AIMS organization.

http://marg.mhost.com/MathGr5/elapsedtime.htm – Interactive quiz on elapsed time.

www.mathcats.com – Metric and U.S. conversions, weather from around the world in Celsius and Fahrenheit.

www.quia.com/mc/66516.html – Matching game with elapsed time.

www.edhelper.com/TimeMath24.htm – Printable worksheet on elapsed time.

www.funbrain.com/poly/ – Activities for students with area and perimeter.

www.shodor.org/interactivate/lessons/lpa.html – This lesson is designed to examine the mathematical concepts of length, perimeter, and area. These activities and discussions may be used to develop students' understanding of these mathematical concepts.

www.mste.uiuc.edu/users/carvell/rectperim/RectPerim2.html – Interactive site that examines the relationship between area and perimeter.

www.mathgoodies.com/lessons/vol1/area_rectangle.html – Lessons and problems for students involving area and perimeter.

http://its.guilford.k12.nc.us/webquest/areaperim/areaperim.htn – A Webquest using area and perimeter to design a "Fun House."

www.aaamath.com/B/grade5.htm – Interactive site for students involving all fifth grade concepts.

www.teachnet.com/lesson/math/geometry/circlesingeo.html – Activities to introduce the concept of circumference.

www.aimsedu.org – Provides a database of all AIMS activities.

SKILL GROUP 6
Organizing Topic→ Geometry: Two-Dimensional (Plane), Three-Dimensional (Solid), Transformations

Aligned Standard(s) of Learning

M-G18 The student will classify angles and triangles as right, acute, or obtuse.

M-G19 The student, using two-dimensional (plane) figures (square, rectangle, triangle, parallelogram, rhombus, kite, and trapezoid) will

a) recognize, identify, describe, and analyze their properties in order to develop definitions of these figures;

b) identify and explore congruent, noncongruent, and similar figures;

c) investigate and describe the results of combining and subdividing shapes;

d) identify and describe a line of symmetry; and

e) recognize the images of figures resulting from geometric transformations such as translation (slide), reflection (flip), or rotation (turn).

M-G20 The student will identify, compare, and analyze properties of three-dimensional (solid) geometric shapes (cylinder, cone, cube, square pyramid, and rectangular prism).

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Classify angles as right, acute, and obtuse.
- Classify triangles as right, acute, and obtuse.
- Recognize and identify the properties of squares, rectangles, triangles, parallelograms, rhombi, kites and trapezoids.
- Describe the properties of squares, rectangles, triangles, parallelograms, rhombi, kites and trapezoids.
- Analyze the properties of squares, rectangles, triangles, parallelograms, rhombi, kites and trapezoids.
- Identify congruent, non-congruent, and similar figures.
- Describe the results of combining and subdividing shapes.
- Identify and describe a line of symmetry.
- Recognize the images of figures resulting from geometric transformations such as translation, reflection, or rotation.
- Identify properties of three-dimensional (solid) geometric shapes (cylinder, cone, cube, square pyramid, and rectangular prism).
- Analyze and compare properties of three-dimensional (solid) geometric shapes (cylinder, cone, cube, square pyramid, and rectangular prism).

Sample resources

http://standards.nctm.org/document/chapter5/geom.htm – - NCTM Principles and Standards information related to geometry in Grades 3-5.

http://illuminations.nctm.org/imath/3-5/GeometricSolids/index.html – An I-math investigation of geometric solids.

http://standards.nctm.org/document/eexamples/chap5/5.3/index.htm – An interactive exploration of the properties of rectangles and parallelograms.

http://www.learnnc.org/LearnNC/lessonp.nsf/docunid/E59C22A90A8A43F485256831007443D4?opendocument – A lesson plan on congruent figures.

http://ericir.syr.edu/cgi-bin/printlessons.cgi/Virtual/Lessons/Mathematics//Geometry/GEO0200.html – A lesson plan on points, rays, lines, line segments, parallel, perpendicular and intersecting lines.

http://www.learnnc.org/LearnNC/lessonp.nsf/docunid/272DFA – A lesson plan on constructing three-dimensional figures.

http://artsedge.kennedy-center.org/teaching_materials/curricula/curriculum.cfm?curriculum_id=213&mode=full – Using the context of lighthouses, this lesson plan focuses on the geometric figures required to construct structures.

http://www.learner.org/teacherslab/math/geometry/space/ – Lessons plans that focus on visualization of three-dimensional objects.

VDOE Geometry Instructional Module – Professional development training module that contains activities that can be adapted for student use.

Navigating through Geometry in Grade 3 through Grade 5 – Available from NCTM. Contains additional lessons for geometric activities.

Van Hiele Levels of Geometric Thought CD – Available through the Virginia Department of Education. Contains assessments to determine children's level of geometric thinking.

www.matti.usu.edu – A library of virtual manipulatives.

www.mathcats.com – Creative, interactive site for students with geometry activities.

www.standards.nctm.org/document/eexamples/chap4/4.2/ – An interactive geoboard.

SKILL GROUP 6

Organizing Topic→Statistics: Collect, Organize, Display, Analyze and Interpret Data

Aligned Standard(s) of Learning

M-PS14 The student will, given a problem situation, collect, organize, and display a set of numerical data in a variety of forms, using bar graphs, stem-and-leaf plots, and line graphs, to draw conclusions and make predictions.

M-PS15 The student will find the mean, median, mode, and range of a set of data.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Collect data, using observations (e.g., weather), measurement (e.g., shoe sizes), surveys (e.g., favorite television shows), or experiments (e.g., plant growth).
- Organize the data into a chart or table.
- Construct bar graphs, labeling one axis with equal whole-number or decimal increments and the other axis with attributes of the topic (categorical data) (e.g., skiing, basketball, ice hockey, skating, and sledding as the categories of "Favorite Winter Sports"). Bar graphs will have no more than six categories.
- Display data in line graphs, bar graphs, and stem-and-leaf plots.
- Construct line graphs, labeling the vertical axis with equal whole-number, decimal, or fractional increments and the horizontal axis with continuous data commonly related to time (e.g., hours, days, months, years, and age). Line graphs will have no more than six identified points along a continuum for continuous data (e.g., the decades: 1950s, 1960s, 1970s, 1980s, 1990s, and 2000s).
- Construct a stem-and-leaf plot to organize and display data, where the stem is listed in ascending order and the leaves are in ascending order, with or without commas between leaves.
- Title the given graph, or identify the title.
- Interpret the data to compare the answer to the prediction.
- Write a few sentences to describe the interpretation of the data.
- Calculate the mean of a group of numbers representing data from a given context.
- Determine the median of a group of numbers representing data from a given context.
- Determine the mode of a group of numbers representing data from a given context.
- Determine the range of a group of numbers representing data from a given context.

Sample resources

www.nces.ed.gov/nceskids/Graphing/ -– An interactive Web site for students that allows them to create several types of graphs

www.aaamath.com/B/sta.htm – An interactive Web site for students with activities to practice finding mean, median, and mode.

http://illuminations.nctm.org/lessonplans/3-5/airplanes/ – In this lesson, students make paper airplanes and explore attributes related to increasing flight distances. Each student collects data from three flights of the airplane and finds the median distance. Students then collect, organize, display, and interpret the median distances for the class in a stem-and-leaf plot.

http://score.kings.k12.ca.us/lessons/mandm.html – A lesson plan that uses small individual bags of "M&M's"™ candies to review students' understanding of estimating, sorting, graphing, mean, median, mode, fractions, percentage, and averaging.

www.manatee.k12.fl.us/sites/elementary/palmasola/mathlabtutstat1.htm – A tutorial for students involving mean, median, and mode.

http://www.brainpop.com/math/dataprobability/meanmodemedianrange/index.weml – An interactive Web site for students using probability concepts.

SKILL GROUP 6

Organizing Topic→Probability

Aligned Standard(s) of Learning

M-PS13 The student will

a) solve problems involving the probability of a single event by using tree diagrams or by constructing a sample space representing all possible results;

b) predict the probability of outcomes of simple experiments, representing it with fractions or decimal numbers from 0 to 1, and test the prediction; and

c) create a problem statement involving probability and based on information from a given problem situation. Students will not be required to solve the created problem statement.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Construct a sample space, using a tree diagram to identify all possible outcomes of a single event.
- Construct a sample space, using a list or chart to represent all possible outcomes of a single event.
- Determine the probability of a single event when the total number of possible outcomes is 12 or less.
- Determine the outcome of an event that is least likely to occur (0) or most likely to occur (1) when the number of possible outcomes is 12 or less.
- Create a problem statement involving probability based on information from a given problem situation. Students will not be expected to solve the problem.

Sample resources

http://rec-puzzles.org/probability.html – A Web site containing many word problems involving probability and their solutions.

http://nces.ed.gov/nceskids/probability – National Center for Education Statistics Web site with probability activities for students and many other resources.

http://mathforum.org/dr.math/faq/faq.boy.girl.html – Probability activities and information from the Math Forum.

http://standards.nctm.org/document/chapter5/data.htm#bp4 – NCTM's Principles and Standards information about probability at the 3-5 grade levels.

http://www.pbs.org/teachersource/mathline/lessonplans/esmp/chances/chances_procedure.shtm – PBS lesson plan on probability.

http://mathforum.org/probstat/probstat.lessons.html – lesson plans from the Math Forum on probability.

Probability and Statistics Professional Development Module – Available from VDOE Web site. Contains activities related to this strand that can be modified for student use.

Navigating through Data Analysis and Probability in Prekindergarten through Grade 2 – Available from NCTM. Contains additional lessons for data analysis activities.

SKILL GROUP 6

Organizing Topic→ Patterns and Functions; Representations and Relationships, Algebra Representations and Relationships

Aligned Standard(s) of Learning

M-PFA11 The student will analyze the structure of numerical and geometric patterns (how they change or grow) and express the relationship, using words, tables, graphs, or a mathematical sentence. Concrete materials and calculators will be used.

M-PFA12 The student will

a) investigate and describe the concept of variable;

b) use a variable expression to represent a given verbal quantitative expression involving one operation; and

c) write an open sentence to represent a given mathematical relationship, using a variable.

M-PFA13 The student will create a problem situation based on a given open sentence using a single variable.

Essential understandings, knowledge, and skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Describe numerical and geometric patterns formed by using concrete materials and calculators.
- Express the relationship found in numerical and geometric patterns, using words, tables, graphs, or a mathematical sentence.
- Describe the concept of a variable (presented as boxes, letters, or other symbols) as a representation of an unknown quantity.
- Use a variable expression to represent a given verbal expression involving one operation (e.g., "5 more than a number" can be represented by $x + 5$).
- Write an open sentence with addition, subtraction, multiplication, or division, using a variable to represent a missing number.
- Create and write a word problem to match a given open sentence with a single variable and one operation.

Sample resources

http://www.pen.k12.va.us/VDOE/Instruction/Elem_M/mathtrain.html

Session 4: **Functional Machines, Functional Relationships, Graphing Functions.**
Session 5: **Equivalence**: "Seesaw Balances" Activity 3, **Solving Equations**: "Can You Make This Balance?" Activity 4, "Weighty Problems Balance Those Blocks" Activity 5, "Mobilettes" Activity 7, "Coat Hanger Balances" Activity 8.

www.brainpop.com/math/algebra/equationswvar/index.weml – Interactive Web site for students using algebraic concepts.

www.mathgoodies.com/lessons/vol7/equations.html – Lessons on writing algebraic equations.

http://math.rice.edu/~lanius/Lessons/calen.html – An algebraic activity that uses the calendar.

www.matti.usu.edu - A library of virtual manipulatives and lesson plans.

Aligned Standards of Learning
Math Strategies

GENERAL MATH STRATEGIES:

- Use adapted writing tools for any paper/pencil work (e.g. pencil grips, pencils on splints, wrist supporters, arm stabilizers)
- Use word walls containing important and current math curricula vocabulary (including picture clues for word meaning)
- Enlarge the text of any written materials or instructions
- Break down all instructions into simple 2-5 word steps
- Model all activities and directions
- Provide prepared sheets for any written assignments (include organized places for responses, visual cues, etc.)
- Provide graphic organizers whenever helpful
- Adjust allotted time for assignments
- Elicit student's prior knowledge of content
- Provide framed sentences and/or paragraphs for any written responses
- Present any new vocabulary and review any related or needed vocabulary for current assignment
- Use partner pairs and or think/pair/share groupings to work through assigned activity
- Utilize topics of student interest for any data collection or data organization and representation (e.g., favorite animals, colors, ice cream flavors, music groups, etc.)

MANIPULATIVES:

(Using manipulatives builds understanding in a concrete way and helps students focus on conceptual understanding and skill blending)

- Base Ten Blocks
- Pattern Blocks
- Tangrams
- Cuisenaire Rods
- Fraction Bars
- Fraction Circles
- Unifex Cubes
- Centimeter Cubes
- Geoboards
- Attribute Pieces
- Patio Tiles

NO TECH IDEAS:

- Have students verbally or visually explain how to solve a math problem.
- Provide students with a strategy to use for solving word problems
- Model strategy used to solve a problem
- Teach and use think-aloud, self-dialogue, non-verbal sequence strategies
- Use enlarged math sheets
- Use Math smart charts (counting, adding, multiplication tables)
- Embed counting and number use into daily routines
- Integrate object/symbol graphs into daily routines
- Integrate time and money and measurement into daily routine
- Use color coding for maintaining columns in math computations
- Use lined paper turned sideways to maintain column for computation

LOW TECH IDEAS:

- Provide learning aids such as calculators, manipulatives, and models to help students focus on conceptual understanding and skill building
- Demonstrate all concepts with manipulatives
- Use large size calculators
- Use calculators with print out
- Use calculators with big number buttons and large keypads
- Use abacus/math line

MID TECH IDEAS:

- Use software programs with on screen calculator pads
- Use on-screen /scanning calculator
- Use alternative keyboard programmed for math tasks
- Use software with cueing for math computation
- Use talking watches /clocks/calculators
- Use electronic number processors
- Use money calculator and coinulator
- Use tactile/voice output measuring devices
- Use voice recognition software for math computation

RESOURCES ON THE INTERNET:

http://www.illuminations/nctm.org/index.aspx

http://www.ablenetinc.com

http://www.widgit.com (math games for free download)

http://www.donjohnston.com (Blocks in motion is a building and creativity program that lets students practice problem-solving and critical thinking skills)

HISTORY & SOCIAL SCIENCE ALIGNED STANDARDS OF LEARNING

History

HS-H1 The student will recognize that history describes events and people of other times and places by
- a) identifying examples of past events in legends, stories, and historical accounts of Pocahontas, George Washington, Betsy Ross, and Abraham Lincoln;
- b) identifying the people and events honored by the holidays of Thanksgiving Day, Martin Luther King, Jr. Day, Presidents' Day, and Independence Day (Fourth of July).

HS-H2 The student will describe everyday life in the present and in the past and begin to recognize that things change over time.

HS-H3 The student will interpret information presented in picture time lines to show sequence of events and will distinguish between past and present.

HS-H4 The student will describe the stories of American leaders and their contributions to our country, with emphasis on George Washington, Benjamin Franklin, Abraham Lincoln, and George Washington Carver.

HS-H5 The student will discuss the lives of people associated with Presidents' Day, Columbus Day, and the events of Independence Day (Fourth of July).

HS-H6 The student will explain how the contributions of ancient China and Egypt have influenced the present world in terms of architecture, inventions, the calendar, and written language.

HS-H7 The student will compare the lives and contributions of American Indians (First Americans), with emphasis on the Powhatan of the Eastern Woodlands, the Sioux of the Plains, and the Pueblo people of the Southwest.

HS-H8 The student will identify and compare changes in community life over time in terms of buildings, jobs, transportation, and population.

HS-H9 The student will explain how the contributions of ancient Greece and Rome have influenced the present world in terms of architecture, government (direct and representative democracy), and sports.

HS-H10 The student will study the early West African empire of Mali by describing its oral tradition (storytelling), government (kings), and economic development (trade).

HS-H11 The student will study the exploration of the Americas by
- a) describing the accomplishments of Christopher Columbus, Juan Ponce de Léon, Jacques Cartier, and Christopher Newport;
- b) identifying reasons for exploring, the information gained, and the results from the travels.

HS-H12 The student will demonstrate knowledge of the first permanent English settlement in America by explaining the reasons for English colonization

HS-H13 The student will demonstrate knowledge of the first permanent English settlement in America by identifying the importance of the arrival of Africans and women to the Jamestown settlement

HS-H14 The student will demonstrate knowledge of the first permanent English settlement in America by describing the hardships faced by settlers at Jamestown and the changes that took place to ensure survival;

HS-H15 The student will demonstrate knowledge of the first permanent English settlement in America by describing the interactions between the English settlers and the Powhatan people, including the contributions of the Powhatans to the survival of the settlers.

HS-H16 The student will demonstrate knowledge of life in the Virginia colony by describing how European (English, Scotch-Irish, German) immigrants, Africans, and American Indians (First Americans) influenced the cultural landscape and changed the relationship between the Virginia colony and England.

HS-H17 The student will demonstrate knowledge of the role of Virginia in the American Revolution by identifying the various roles played by Virginians in the Revolutionary War era, with emphasis on George Washington, Thomas Jefferson, and Patrick Henry.

HS-H18 The student will demonstrate knowledge of the role of Virginia in the American Revolution by identifying the importance of the American victory at Yorktown.

HS-H19 The student will demonstrate knowledge of the role of Virginia in the establishment of the new American nation by identifying the ideas of George Mason and Thomas Jefferson as expressed in the Virginia Declaration of Rights and the Virginia Statute for Religious Freedom.

HS-H20 The student will demonstrate knowledge of the issues that divided our nation and led to the Civil War by identifying the events and differences between northern and southern states that divided Virginians and led to secession, war, and the creation of West Virginia.

HS-H21 The student will demonstrate knowledge of the issues that divided our nation and led to the Civil War by describing Virginia's role in the war, including identifying major battles that took place in Virginia.

HS-H22 The student will demonstrate knowledge of twentieth century Virginia by the political, social, and/or economic contributions made by Maggie L. Walker, Harry F. Byrd, Sr., Arthur R. Ashe, Jr., and L. Douglas Wilder.

HS-H23 The student will demonstrate knowledge of European exploration in North America and West Africa by describing cultural interactions between Europeans and American Indians (First Americans) that led to cooperation and conflict.

HS-H24 The student will demonstrate knowledge of the factors that shaped colonial America by describing the religious and economic events and conditions that led to the colonization of America.

HS-H25 The student will demonstrate knowledge of the factors that shaped colonial America by describing colonial life in America from the perspectives of large landowners, farmers, artisans, women, indentured servants, and slaves.

HS-H26 The student will demonstrate knowledge of the factors that shaped colonial America by identifying the political and economic relationships between the colonies and England.

HS-H27 The student will demonstrate knowledge of the causes and results of the American Revolution by identifying the issues of dissatisfaction that led to the American Revolution.

HS-H28 The student will demonstrate knowledge of the causes and results of the American Revolution by describing key events and the roles of key individuals in the American Revolution, with emphasis on George Washington, Benjamin Franklin, Thomas Jefferson, Patrick Henry, and Thomas Paine.

HS-H29 The student will demonstrate knowledge of the causes and results of the American Revolution by explaining reasons why the colonies were able to defeat Britain.

HS-H30 The student will demonstrate knowledge of the challenges faced by the new nation by describing the major accomplishments of the first five presidents of the United States.

HS-H31 The student will demonstrate knowledge of westward expansion and reform in America from 1801 to 1861 by describing territorial expansion and how it affected the political map of the United States, with emphasis on the Louisiana Purchase, the Lewis and Clark expedition, and the acquisitions of Florida, Texas, Oregon, and California.

HS-H32 The student will demonstrate knowledge of westward expansion and reform in America from 1801 to 1861 by identifying the main ideas of the abolitionist and suffrage movements.

HS-H33 The student will demonstrate knowledge of the causes, major events, and effects of the Civil War by explaining how the issues of states' rights and slavery increased sectional tensions.

HS-H34 The student will demonstrate knowledge of the causes, major events, and effects of the Civil War by describing the roles of Abraham Lincoln, Jefferson Davis, Ulysses S. Grant, Robert E. Lee, Thomas "Stonewall" Jackson, and Frederick Douglass in events leading to and during the war.

HS-H35 The student will demonstrate knowledge of the causes, major events, and effects of the Civil War by describing the effects of war from the perspectives of Union and Confederate soldiers (including black soldiers), women, and slaves.

HS-H36 The student will demonstrate knowledge of the causes, major events, and effects of the Civil War by describing the impact of Reconstruction policies on the South.

HS-H37 The student will demonstrate knowledge of how life changed after the Civil War by identifying the reasons for westward expansion.

HS-H38 The student will demonstrate knowledge of how life changed after the Civil War by explaining the reasons for the increase in immigration, growth of cities, new inventions, and challenges arising from this expansion.

HS-H39 The student will demonstrate knowledge of how life changed after the Civil War by describing racial segregation, the rise of "Jim Crow," and other constraints faced by African Americans in the post-Reconstruction South.

HS-H40 The student will demonstrate knowledge of the changing role of the United States from the late nineteenth century through World War I by explaining the reasons for and results of the Spanish American War.

HS-H41 The student will demonstrate knowledge of the changing role of the United States from the late nineteenth century through World War I by explaining the reasons for the United States' involvement in World War I and its leadership role at the conclusion of the war.

HS-H42 The student will demonstrate knowledge of the social, economic, and technological changes of the early twentieth century by describing the social changes that took place, including Prohibition, and the Great Migration north.

HS-H43 The student will demonstrate knowledge of the social, economic, and technological changes of the early twentieth century by examining art, literature, and music from the 1920s and 1930s, emphasizing Langston Hughes, Duke Ellington, and Georgia O'Keeffe and including the Harlem Renaissance.

HS-H44 The student will demonstrate knowledge of the major causes and effects of American involvement in World War II by describing the impact of World War II on the homefront.

HS-H45 The student will demonstrate knowledge of the key domestic issues during the second half of the twentieth century by describing the development of new technologies and their impact on American life.

HS-H46 The student will demonstrate knowledge of early development of humankind from the Paleolithic Era to the agricultural revolution by listing characteristics of hunter-gatherer societies, including their use of tools and fire.

HS-H47 The student will demonstrate knowledge of early development of humankind from the Paleolithic Era to the agricultural revolution describing technological and social advancements that gave rise to stable communities.

HS-H48 The student will demonstrate knowledge of ancient river civilizations, including Egypt, Mesopotamia, the Indus River Valley, and China and the civilizations of the Hebrews, Phoenicians, and Kush, by explaining the development of religious traditions.

HS-H49 The student will demonstrate knowledge of ancient river civilizations, including Egypt, Mesopotamia, the Indus River Valley, and China and the civilizations of the Hebrews, Phoenicians, and Kush, by describing the origins, beliefs, traditions, customs, and spread of Judaism.

HS-H50 The student will demonstrate knowledge of ancient river civilizations, including Egypt, Mesopotamia, the Indus River Valley, and China and the civilizations of the Hebrews, Phoenicians, and Kush, by the development of language and writing.

HS-H51 The student will demonstrate an understanding of the political, cultural, and economic conditions in the world about 1500 A.D. by describing artistic, literary, and intellectual ideas of the Renaissance.

HS-H52 The student will demonstrate an understanding of the political, cultural, and economic conditions in the world about 1500 A.D. by major technological and scientific exchanges in the Eastern Hemisphere.

HS-H53 The student will demonstrate knowledge of the impact of the European Age of Discovery and expansion into the Americas, Africa, and Asia by explaining the roles of explorers and conquistadors.

HS-H54 The student will demonstrate knowledge of the impact of the European Age of Discovery and expansion into the Americas, Africa, and Asia by describing the influence of religion.

HS-H55 The student will demonstrate knowledge of scientific, political, economic, and religious changes during the sixteenth, seventeenth, and eighteenth centuries by describing the Scientific Revolution and its effects.

HS-H56 The student will demonstrate knowledge of scientific, political, economic, and religious changes during the sixteenth, seventeenth, and eighteenth centuries by describing the expansion of the arts, philosophy, literature, and new technology.

HS-H57 The student will demonstrate knowledge of the worldwide impact of World War II by examining the Holocaust and other examples of genocide in the twentieth century.

HS-H58 The student will demonstrate knowledge of the influence of Judaism, Christianity, Islam, Buddhism, and Hinduism in the contemporary world by describing their beliefs, sacred writings, traditions, and customs.

Geography

HS-G1 The student will describe the relative location of people, places, and things by using positional words, with emphasis on near/far, above/below, left/right, and behind/in front.

HS-G2 The student will use simple maps and globes to
a) develop an awareness that a map is a drawing of a place to show where things are located and that a globe is a round model of the Earth;
b) describe places referenced in stories and real-life situations;
c) locate land and water features.

HS-G3 The student will develop an awareness that maps and globes
a) show a view from above;
b) show things in smaller size;
c) show the position of objects.

HS-G4 The student will develop map skills by
a) recognizing basic map symbols, including references to land, water, cities, and roads;
b) using cardinal directions on maps;
c) identifying the physical shape of the United States and Virginia on maps and globes;
d) locating Washington, D.C., the capital of the United States, and Richmond, the capital of Virginia, on a United States map.

HS-G5 The student will construct a simple map of a familiar area, using basic map symbols in the map legend.

HS-G6 The student will describe how location, climate, and physical surroundings affect the way people live, including their food, clothing, shelter, transportation, and recreation.

HS-G7 The student will develop map skills by
a) locating China and Egypt on world maps;
b) locating the regions of the Powhatan, Sioux, and Pueblo Indians on United States maps;
c) comparing the climate, land, and plant life of these regions;
d) describing how people in these regions adapt to their environment.

HS-G8 The student will develop map skills by
a) locating the equator, the seven continents, and the four oceans on maps and globes;
b) locating selected rivers (James River, Mississippi River, Rio Grande), mountain ranges (Appalachian Mountains and Rocky Mountains), and lakes (Great Lakes) in the United States.

HS-G9 The student will demonstrate map skills by constructing simple maps, using title, map legend, and compass rose.

HS-G10 The student will develop map skills by

a) positioning and labeling the seven continents and four oceans to create a world map;
b) using the equator and prime meridian to identify the four hemispheres;
c) locating the countries of Spain, England, and France;
d) locating the regions in the Americas explored by Christopher Columbus (San Salvador in the Bahamas), Juan Ponce de Léon (near St. Augustine, Florida), Jacques Cartier (near Quebec, Canada), and Christopher Newport (Jamestown, Virginia);
e) locating specific places on a simple letter-number grid system.

HS-G11 The student will interpret geographic information from maps, tables, graphs, and charts.

HS-G12 The student will demonstrate knowledge of the geography and early inhabitants of Virginia by locating Virginia and its bordering states on maps of the United States.

HS-G13 The student will demonstrate knowledge of the geography and early inhabitants of Virginia by locating and describing Virginia's Coastal Plain (Tidewater), Piedmont, Blue Ridge Mountains, Valley and Ridge, and Appalachian Plateau.

HS-G14 The student will demonstrate knowledge of the geography and early inhabitants of Virginia by locating and identifying water features important to the early history of Virginia (Atlantic Ocean, Chesapeake Bay, James River, York River, Potomac River, and Rappahannock River).

HS-G15 The student will demonstrate knowledge of the geography and early inhabitants of Virginia by how American Indians (First Americans) adapted to the climate and their environment to secure food, clothing, and shelter.

HS-G16 The student will use maps, globes, photographs, pictures, and tables to locate the seven continents.

HS-G17 The student will use maps, globes, photographs, pictures, and tables to locate and identify the water features important to the early history of the United States: Great Lakes, Mississippi River, Missouri River, Ohio River, Columbia River, Colorado River, Rio Grande, Atlantic Ocean, Pacific Ocean, and Gulf of Mexico.

HS-G18 The student will demonstrate knowledge of how early cultures developed in North America by where the American Indians (First Americans) settled, with emphasis on Arctic (Inuit), Northwest (Kwakiutl), Plains (Sioux), Southwest (Pueblo), and Eastern Woodland (Iroquois).

HS-G19 The student will demonstrate knowledge of how early cultures developed in North America by describing how the American Indians (First Americans) used their environment to obtain food, clothing, and shelter.

HS-G20 The student will demonstrate knowledge of the causes, major events, and effects of the Civil War by identifying on a map the states that seceded from the Union and those that remained in the Union.

HS-G21 The student will use maps, globes, photographs, pictures, and tables for locating the 50 states and the cities most significant to the historical development of the United States.

HS-G22 The student will use maps, globes, photographs, and pictures in order to obtain geographical information and apply the concepts of location, scale, and orientation.

HS-G23 The student will use maps, globes, photographs, and pictures in order to develop and refine his or her mental maps of world regions.

HS-G24 The student will analyze how selected physical and ecological processes shape the Earth's surface by describing how humans influence the environment and are influenced by it.

HS-G25 The student will analyze how selected physical and ecological process shape the Earth's surface by explaining how technology affects one's ability to modify the environment and adapt to it.

HS-G26 The student will apply geography to interpret the past, understand the present, and plan for the future by relating current events to the physical and human characteristics of places and regions.

HS-G27 The student will demonstrate knowledge of the influence of Judaism, Christianity, Islam, Buddhism, and Hinduism in the contemporary world by locating the geographic distribution of religions in the contemporary world.

Economics

HS-E1 The student will match simple descriptions of work that people do with the names of those jobs.

HS-E2 The student will
a) identify the difference between basic needs (food, clothing, and shelter) and wants (things people would like to have);
b) recognize that people use money to purchase goods.

HS-E3 The student will explain the difference between goods and services and will describe how people are both buyers and sellers of goods and services.

HS-E4 The student will explain that people make choices because they cannot have everything they want.

HS-E5 The student will recognize that people save money for the future to purchase goods and services.

HS-E6 The student will describe the differences between natural resources (water, soil, wood, and coal), human resources (people at work), and capital resources (machines, tools, and buildings).

HS-E7 The student will distinguish between the use of barter and money in the exchange for goods and services.

HS-E8 The student will explain that scarcity (limited resources) requires people to make choices about producing and consuming goods and services.

HS-E9 The student will explain how producers use natural resources (water, soil, wood, and coal), human resources (people at work), and capital resources (machines, tools, and buildings) to produce goods and services for consumers.

HS-E10 The student will recognize the concepts of specialization (being an expert in one job, product, or service) and interdependence (depending on others) in the production of goods and services (in ancient Greece, Rome, the West African empire of Mali, and in the present).

HS-E11 The student will identify examples of making an economic choice and will explain the idea of opportunity cost (what is given up when making a choice).

HS-E12 The student will demonstrate knowledge of life in the Virginia colony by explaining the importance of agriculture and its influence on the institution of slavery.

HS-E13 The student will demonstrate knowledge of life in the Virginia colony by how money, barter, and credit were used.

HS-E14 The student will demonstrate knowledge of the reconstruction of Virginia following the Civil War by identifying the effects of Reconstruction on life in Virginia.

HS-E15 The student will demonstrate knowledge of the reconstruction of Virginia following the Civil War by describing the importance of railroads, new industries, and the growth of cities to Virginia's economic development.

HS-E16 The student will demonstrate knowledge of twentieth century Virginia by describing the economic and social transition from a rural, agricultural society to a more urban, industrialized society, including the reasons people came to Virginia from other states and countries.

HS-E17 The student will demonstrate knowledge of government, geography, and economics by describing the major products and industries of Virginia's five geographic regions.

HS-E18 The student will demonstrate knowledge of government, geography, and economics by explaining how advances in transportation, communications, and technology have contributed to Virginia's prosperity and role in the global economy.

HS-E19 The student will demonstrate knowledge of European exploration in North America and West Africa by identifying the location and describing the characteristics of West African societies (Ghana, Mali, and Songhai) and their interactions with traders.

HS-E20 The student will demonstrate knowledge of westward expansion and reform in America from 1801 to 1861 by identifying the geographic and economic factors that influenced the westward movement of settlers.

HS-E21 The student will demonstrate knowledge of westward expansion and reform in America from 1801 to 1861 by describing the impact of inventions, including the cotton gin, the reaper, the steamboat, and the steam locomotive, on life in America.

HS-E22 The student will demonstrate knowledge of the effects of Reconstruction on American life by identifying the provisions of the 13th, 14th, and 15th Amendments to the Constitution of the United States of America and their impact on the expansion of freedom in America.

HS-E23 The student will demonstrate knowledge of how life changed after the Civil War by explaining the rise of big business, the growth of industry, and life on American farms.

HS-E24 The student will demonstrate knowledge of the social, economic, and technological changes of the early twentieth century by explaining how developments in transportation (including the use of the automobile), communication, and electrification changed American life.

HS-E25 The student will demonstrate knowledge of the social, economic, and technological changes of the early twentieth century by identifying the causes of the Great Depression, its impact on Americans, and the major features of Franklin D. Roosevelt's New Deal.

HS-E26 The student will demonstrate knowledge of the economic, social, and political transformation of the United States and the world between the end of World War II and the present by describing the conversion from a wartime to a peacetime economy.

HS-E27 The student will identify natural, human, and capital resources and explain their significance by showing patterns of economic activity and land use.

HS-E28 The student will distinguish between developed and developing countries and relate the level of economic development to the standard of living and quality of life.

HS-E29 The student will demonstrate knowledge of ancient Greece in terms of its impact on Western civilization by identifying the social structure and role of slavery, explaining the significance of citizenship and the development of democracy, and comparing the city-states of Athens and Sparta.

HS-E30 The student will demonstrate knowledge of ancient Rome from about 700 B.C. to 500 A.D. in terms of its impact on Western civilization by explaining the social structure and role of slavery, significance of citizenship, and the development of democratic features in the government of the Roman Republic.

HS-E31 The student will demonstrate knowledge of civilizations and empires of the Eastern Hemisphere and their interactions through regional trade patterns by identifying technological advances and transfers, networks of economic interdependence, and cultural interactions.

HS-E32 The student will demonstrate knowledge of the impact of the European Age of Discovery and expansion into the Americas, Africa, and Asia by describing the impact of precious metal exports from the Americas.

HS-E33 The student will demonstrate knowledge of the status and impact of global trade on regional civilizations of the world after 1500 A.D. by describing Africa and its increasing involvement in global trade.

HS-E34 The student will demonstrate knowledge of the effects of the Industrial Revolution during the nineteenth century by the evolution of the nature of work and the labor force, including its effects on families, the status of women and children, the slave trade, and the labor union movement.

HS-E35 The student will demonstrate knowledge of cultural, economic, and social conditions in developed and developing nations of the contemporary world by assessing the impact of economic development and global population growth on the environment and society, including an understanding of the links between economic and political freedom.

HS-E36 The student will demonstrate knowledge of how the nation grew and changed from the end of Reconstruction through the early twentieth century by describing the transformation of the American economy from a primarily agrarian to a modern industrial economy and identifying major inventions that improved life in the United States.

Civics

HS-C1 The student will demonstrate that being a good citizen involves
- a) taking turns and sharing;
- b) taking responsibility for certain classroom chores;
- c) taking care of personal belongings and respecting what belongs to others;
- d) following rules and understanding the consequence of breaking rules;
- e) practicing honesty, self-control, and kindness to others.

HS-C2 The student will recognize the American flag, the Pledge of Allegiance, and that the President is the leader of the United States.

HS-C3 The student will apply the traits of a good citizen by
- a) focusing on fair play, exhibiting good sportsmanship, helping others, and treating others with respect;
- b) recognizing the purpose of rules and practicing self-control;
- c) working hard in school;
- d) taking responsibility for one's own actions;
- e) valuing honesty and truthfulness in oneself and others.

HS-C4 The student will recognize the symbols and traditional practices that honor and foster patriotism in the United States by
- a) identifying the American flag, bald eagle, Washington Monument, and Statue of Liberty;
- b) demonstrating respect for the American flag by learning the Pledge of Allegiance.

HS-C5 The student will recognize that communities in Virginia include people who have diverse ethnic origins, customs, and traditions, who make contributions to their communities, and who are united as Americans by common principles.

HS-C6 The student will explain the responsibilities of a good citizen, with emphasis on
- a) respecting and protecting the rights and property of others;
- b) taking part in the voting process when making classroom decisions;
- c) describing actions that can improve the school and community;
- d) demonstrating self-discipline and self-reliance;
- e) practicing honesty and trustworthiness.

HS-C7 The student will identify George Washington, Abraham Lincoln, Susan B. Anthony, Helen Keller, Jackie Robinson, and Martin Luther King, Jr. as Americans whose contributions improved the lives of other Americans.

HS-C8 The student will understand that the United States is a land of people who have diverse ethnic origins, customs, and traditions, who make contributions to their communities, and who are united as Americans by common principles.

HS-C9 The student will recognize why government is necessary in the classroom, school, and community by

a) explaining the purpose of rules and laws;
b) explaining that the basic purposes of government are to make laws, carry out laws, and decide if laws have been broken;
c) explaining that government protects the rights and property of individuals.

HS-C10 The student will explain the importance of the basic principles that form the foundation of a republican form of government by

a) describing the individual rights to life, liberty, and the pursuit of happiness; and equality under the law;
b) identifying the contributions of George Washington, Thomas Jefferson, Abraham Lincoln, Rosa Parks, Thurgood Marshall, and Martin Luther King, Jr.;
c) recognizing that Veterans Day and Memorial Day honor people who have served to protect the country's freedoms.

HS-C11 The student will recognize that Americans are a people of diverse ethnic origins, customs, and traditions, who are united by the basic principles of a republican form of government and respect for individual rights and freedoms.

HS-C12 The student will demonstrate knowledge of the first permanent English settlement in America by identifying the importance of the charters of the Virginia Company of London in establishing the Jamestown settlement.

HS-C13 The student will demonstrate knowledge of the first permanent English settlement in America by identifying the importance of the Virginia Assembly (1619) as the first representative legislative body in English America.

HS-C14 The student will demonstrate knowledge of the role of Virginia in the American Revolution by identifying the reasons why the colonies went to war with England as expressed in the Declaration of Independence.

HS-C15 The student will demonstrate knowledge of the role of Virginia in the establishment of the new American nation by identifying the ideas of George Mason and Thomas Jefferson as expressed in the Virginia Declaration of Rights and the Virginia Statute for Religious Freedom.

HS-C16 The student will demonstrate knowledge of the reconstruction of Virginia following the Civil War by identifying the effects of segregation and "Jim Crow" on life in Virginia.

HS-C17 The student will demonstrate knowledge of twentieth century Virginia by identifying the social and political events in Virginia linked to desegregation and Massive Resistance and their relationship to national history.

HS-C18 The student will demonstrate knowledge of government, geography, and economics by identifying the three branches of Virginia government and the function of each.

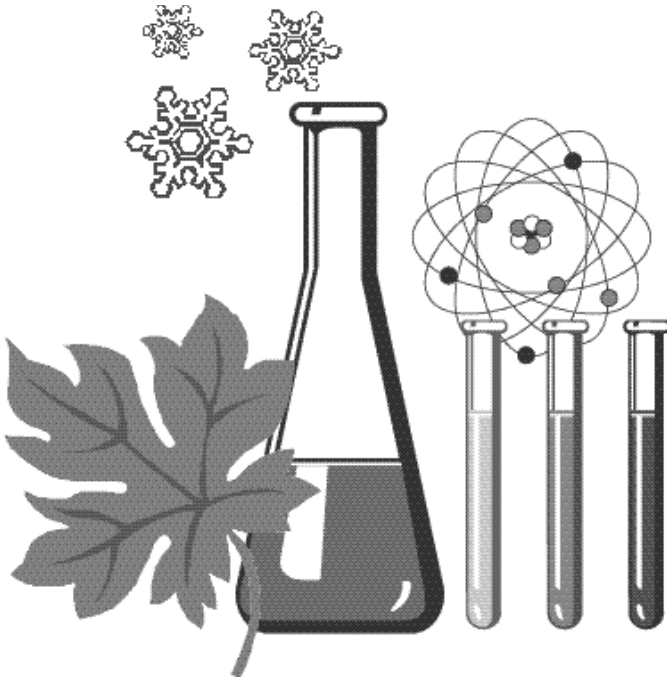
HS-C19 The student will demonstrate knowledge of the causes and results of the American Revolution by identifying how political ideas shaped the revolutionary movement in America and led to the Declaration of Independence, with emphasis on the ideas of John Locke.

HS-C20 The student will demonstrate knowledge of the challenges faced by the new nation by identifying the basic principles of the new government established by the Constitution of the United States of America and the Bill of Rights.

HS-C21 The student will demonstrate knowledge of the challenges faced by the new nation by identifying the conflicts that resulted in the emergence of two political parties.

HS-C22 The student will demonstrate knowledge of the key domestic issues during the second half of the twentieth century by examining the Civil Rights Movement and the changing role of women.

SCIENCE
ALIGNED STANDARDS OF LEARNING



SCIENCE ALIGNED STANDARDS OF LEARNING

Scientific Investigation, Reasoning, and Logic

S-SI 1 The student will conduct investigations in which
- a) basic properties of objects are identified by direct observation;
- b) observations are made from multiple positions to achieve different perspectives;
- c) objects are described both pictorially and verbally;
- d) a set of objects is sequenced according to size;
- e) a set of objects is separated into two groups based on a single physical attribute;
- f) nonstandard units are used to measure common objects;
- g) a question is developed from one or more observations;
- h) picture graphs are constructed using 10 or fewer units;
- i) an unseen member in a sequence of objects is predicted; and
- j) unusual or unexpected results in an activity are recognized.

S-SI 2 Students will investigate and understand that humans have senses that allow one to seek, find, take in, and react or respond to information in order to learn about one's surroundings. Key concepts include
- a) five senses and corresponding sensing organs (taste – tongue, touch – skin, smell – nose, hearing – ears, and sight – eyes); and
- b) sensory descriptors (sweet, sour, bitter, salty, rough/smooth, hard/soft, cold, warm, hot, loud/soft, high/low, bright/dull).

S-SI 3 The student will conduct investigations in which
- a) differences in physical properties are observed using the senses;
- b) simple tools are used to enhance observations;
- c) objects or events are classified and arranged according to attributes or properties;
- d) observations and data are communicated orally and with simple graphs, pictures, written statements, and numbers;
- e) length, mass, and volume are measured using standard and nonstandard units;
- f) predictions are based on patterns of observation rather than random guesses;
- g) simple experiments are conducted to answer questions; and
- h) inferences are made and conclusions are drawn about familiar objects and events.

S-SI 4 The student will conduct investigations in which
- a) observation is differentiated from personal interpretation, and conclusions are drawn based on observations;
- b) observations are repeated to ensure accuracy;
- c) two or more attributes are used to classify items;
- d) conditions that influence a change are defined;
- e) length, volume, mass, and temperature measurements are made in metric units (centimeters, meters, liters, degrees Celsius, grams, kilograms) and standard English units (inches, feet, yards, cups, pints, quarts, gallons, degrees Fahrenheit, ounces, pounds);
- f) pictures and bar graphs are constructed using numbered axes;
- g) unexpected or unusual quantitative data are recognized; and
- h) simple physical models are constructed.

S-SI 5 The student will plan and conduct investigations in which

a) predictions and observations are made;
b) objects with similar characteristics are classified into at least two sets and two subsets;
c) questions are developed to formulate hypotheses;
d) volume is measured to the nearest milliliter and liter;
e) length is measured to the nearest centimeter;
f) mass is measured to the nearest gram;
g) data are gathered, charted, and graphed (line plot, picture graph, and bar graph);
h) temperature is measured to the nearest degree Celsius;
i) time is measured to the nearest minute;
j) inferences are made and conclusions are drawn; and
k) natural events are sequenced chronologically.

S-SI 6 The student will plan and conduct investigations in which

a) distinctions are made among observations, conclusions, inferences, and predictions;
b) hypotheses are formulated based on cause-and-effect relationships;
c) variables that must be held constant in an experimental situation are defined;
d) appropriate instruments are selected to measure linear distance, volume, mass, and temperature;
e) appropriate metric measures are used to collect, record, and report data;
f) data are displayed using bar and basic line graphs;
g) numerical data that are contradictory or unusual in experimental results are recognized; and
h) predictions are made based on data from picture graphs, bar graphs, and basic line graphs.

S-SI 7 The student will plan and conduct investigations in which

a) rocks, minerals, and organisms are identified using a classification key;
b) estimations of length, mass, and volume are made;
c) appropriate instruments are selected and used for making quantitative observations of length, mass, volume, and elapsed time;
d) accurate measurements are made using basic tools (thermometer, meter stick, balance, graduated cylinder);
e) data are collected, recorded, and reported using the appropriate graphical representation (graphs, charts, diagrams);
f) predictions are made using patterns, and simple graphical data are extrapolated;
g) manipulated and responding variables are identified; and
h) an understanding of the nature of science is developed and reinforced.

Force, Motion, and Energy

S-FME 1 The student will investigate and understand that magnets have an effect on some materials, make some things move without touching them, and have useful applications. Key concepts include

a) attraction/nonattraction, push/pull, attract/repel, and metal/nonmetal; and
b) useful applications (refrigerator magnet, can opener, magnetized screwdriver, and magnetic games).

S-FME 2 The student will investigate and understand that moving objects exhibit different kinds of motion. Key concepts include

a) objects may have straight, circular, and back-and-forth motions;
b) objects may vibrate and produce sound;
c) pushes or pulls can change the movement of an object; and
d) the motion of objects may be observed in toys and in playground activities.

S-FME 3 The student will investigate and understand that natural and artificial magnets have certain characteristics and attract specific types of metals. Key concepts include

a) magnetism, iron, magnetic/nonmagnetic, poles, attract/repel; and
b) important applications of magnetism including the magnetic compass.

S-FME 4 The student will investigate and understand simple machines and their uses. Key concepts include

a) types of simple machines (lever, screw, pulley, wheel and axle, inclined plane, and wedge);
b) how simple machines function;
c) compound machines (scissors, wheelbarrow, and bicycle); and
d) examples of simple and compound machines found in the school, home, and work environment.

S-FME 5 The student will investigate and understand characteristics and interaction of moving objects. Key concepts include

a) motion is described by an object's direction and speed;
b) forces cause changes in motion;
c) friction is a force that opposes motion; and
d) moving objects have kinetic energy.

S-FME 6 The student will investigate and understand the characteristics of electricity. Key concepts include

a) conductors and insulators;
b) basic circuits (open/closed, parallel/series);
c) static electricity;
d) the ability of electrical energy to be transformed into heat, light, and mechanical energy;
e) simple electromagnets and magnetism; and
f) historical contributions in understanding electricity.

S-FME 7 The student will investigate and understand how sound is transmitted and is used as a means of communication. Key concepts include

a) frequency, waves, wavelength, vibration;
b) the ability of different media (solids, liquids, and gases) to transmit sound; and
c) uses and applications (voice, sonar, animal sounds, and musical instruments).

S-FME 8 The student will investigate and understand basic characteristics of visible light and how it behaves. Key concepts include

a) the visible spectrum and light waves;
b) refraction of light through water and prisms;
c) reflection of light from reflective surfaces (mirrors);
d) opaque, transparent, and translucent; and
e) historical contributions in understanding light.

Matter

S-M 1 The student will investigate and understand that the position, motion, and physical properties of an object can be described. Key concepts include
- a) colors (red, orange, yellow, green, blue, purple), white, and black;
- b) shapes (circle, triangle, square, and rectangle) and forms (flexible/stiff, straight/curved);
- c) textures (rough/smooth) and feel (hard/soft);
- d) relative size and weight (big/little, large/small, heavy/light, wide/thin, long/short);
- e) position (over/under, in/out, above/below, left/right) and speed (fast/slow).

S-M 2 The student will investigate and understand that water flows and has properties that can be observed and tested. Key concepts include
- a) water occurs in different states (solid, liquid, gas);
- b) the natural flow of water is downhill; and
- c) some materials float in water, while others sink.

S-M 3 The student will investigate and understand how different common materials interact with water. Key concepts include
- a) some liquids will separate when mixed with water, but others will not;
- b) some common solids will dissolve in water, but others will not; and
- c) some substances will dissolve more readily in hot water than in cold water.

S-M 4 The student will investigate and understand basic properties of solids, liquids, and gases. Key concepts include
- a) mass and volume; and
- b) processes involved with changes in matter from one state to another (condensation, evaporation, melting, and freezing).

S-M 5 The student will investigate and understand that objects are made of materials that can be described by their physical properties. Key concepts include
- a) objects are made of one or more materials;
- b) materials are composed of parts that are too small to be seen without magnification; and
- c) physical properties remain the same as the material is reduced in size.

S-M 6 The student will investigate and understand that matter is anything that has mass, takes up space, and occurs as a solid, liquid, or gas. Key concepts include
- a) atoms, elements, molecules, and compounds;
- b) mixtures including solutions; and
- c) the effect of heat on the states of matter.

Life Processes

S-LP 1 The student will investigate and understand basic needs and life processes of plants and animals. Key concepts include

a) living things change as they grow, and they need food, water, and air to survive;
b) plants and animals live and die (go through a life cycle); and
c) offspring of plants and animals are similar but not identical to their parents and to one another.

S-LP 2 The student will investigate and understand that plants have life needs and functional parts and can be classified according to certain characteristics. Key concepts include

a) needs (food, air, water, light, and a place to grow);
b) parts (seeds, roots, stems, leaves, blossoms, fruits); and
c) characteristics (edible/nonedible, flowering/nonflowering, evergreen/deciduous).

S-LP 3 The student will investigate and understand that animals, including people, have life needs and specific physical characteristics and can be classified according to certain characteristics. Key concepts include

a) life needs (air, food, water, and a suitable place to live);
b) physical characteristics (body coverings, body shape, appendages, and methods of movement); and
c) other characteristics (wild/tame, water homes/land homes).

S-LP 4 The student will investigate and understand that plants and animals undergo a series of orderly changes in their life cycles. Key concepts include

a) some animals (frogs and butterflies) undergo distinct stages during their lives, while others generally resemble their parents; and
b) flowering plants undergo many changes, from the formation of the flower to the development of the fruit.

S-LP 5 The student will investigate and understand that behavioral and physical adaptations allow animals to respond to life needs. Key concepts include

a) methods of gathering and storing food, finding shelter, defending themselves, and rearing young; and
b) hibernation, migration, camouflage, mimicry, instinct, and learned behavior.

S-LP 6 The student will investigate and understand basic plant anatomy and life processes. Key concepts include

a) the structures of typical plants (leaves, stems, roots, and flowers);
b) processes and structures involved with reproduction (pollination, stamen, pistil, sepal, embryo, spore, and seed);
c) photosynthesis (sunlight, chlorophyll, water, carbon dioxide, oxygen, and sugar); and
d) dormancy.

Living Systems

S-LS 1 The student will investigate and understand that living things are part of a system. Key concepts include

a) living organisms are interdependent with their living and nonliving surroundings; and
b) habitats change over time due to many influences.

S-LS 2 The student will investigate and understand relationships among organisms in aquatic and terrestrial food chains. Key concepts include

a) producer, consumer, decomposer;
b) herbivore, carnivore, omnivore; and
c) predator and prey.

S-LS 3 The student will investigate and understand that environments support a diversity of plants and animals that share limited resources. Key concepts include

a) water-related environments (pond, marshland, swamp, stream, river, and ocean environments);
b) dry-land environments (desert, grassland, rain forest, and forest environments); and
c) population and community.

S-LS 4 The student will investigate and understand how plants and animals in an ecosystem interact with one another and the nonliving environment. Key concepts include

a) behavioral and structural adaptations;
b) organization of communities;
c) flow of energy through food webs;
d) habitats and niches;
e) life cycles; and
f) influence of human activity on ecosystems.

S-LS 5 The student will investigate and understand that organisms are made of cells and have distinguishing characteristics. Key concepts include

a) basic cell structures and functions;
b) kingdoms of living things;
c) vascular and nonvascular plants; and
d) vertebrates and invertebrates.

Interrelationships in Earth/Space Systems

S-IE 1 The student will investigate and understand that shadows occur when light is blocked by an object. Key concepts include
- a) shadows occur in nature when sunlight is blocked by an object; and
- b) shadows can be produced by blocking artificial light sources.

S-IE 2 The student will investigate and understand the basic relationships between the sun and the Earth. Key concepts include
- a) the sun is the source of heat and light that warms the land, air, and water; and
- b) night and day are caused by the rotation of the Earth.

S-IE 3 The student will investigate and understand basic types, changes, and patterns of weather. Key concepts include
- a) temperature, wind, precipitation, drought, flood, and storms; and
- b) the uses and importance of measuring and recording weather data.

S-IE 4 The student will investigate and understand the major components of soil, its origin, and importance to plants and animals including humans. Key concepts include
- a) soil provides the support and nutrients necessary for plant growth;
- b) topsoil is a natural product of subsoil and bedrock;
- c) rock, clay, silt, sand, and humus are components of soils; and
- d) soil is a natural resource and should be conserved.

S-IE 5 The student will investigate and understand how weather conditions and phenomena occur and can be predicted. Key concepts include
- a) weather measurements and meteorological tools (air pressure – barometer, wind speed – anemometer, rainfall – rain gauge, and temperature – thermometer); and
- b) weather phenomena (fronts, clouds, and storms).

S-IE 6 The student will investigate and understand characteristics of the ocean environment. Key concepts include
- a) geological characteristics (continental shelf, slope, rise);
- b) physical characteristics (depth, salinity, major currents); and
- c) biological characteristics (ecosystems).

S-IE 7 The student will investigate and understand the organization of the solar system and the relationships among the various bodies that comprise it. Key concepts include
- a) the sun, moon, Earth, other planets and their moons, meteors, asteroids, and comets;
- b) relative size of and distance between planets;
- c) the role of gravity;
- d) revolution and rotation;
- e) the mechanics of day and night and the phases of the moon;
- f) the unique properties of Earth as a planet;
- g) the relationship of the Earth's tilt and the seasons;
- h) the cause of tides; and
- i) the history and technology of space exploration.

Earth Patterns, Cycles, and Change

S-EP 1 The student will investigate and understand simple patterns in his/her daily life. Key concepts include
- a) weather observations;
- b) the shapes and forms of many common natural objects including seeds, cones, and leaves;
- c) animal and plant growth; and
- d) home and school routines.

S-EP 2 The student will investigate and understand that change occurs over time and rates may be fast or slow. Key concepts include
- a) natural and human-made things may change over time; and
- b) changes can be noted and measured.

S-EP 3 The student will investigate and understand the relationship of seasonal change and weather to the activities and life processes of plants and animals. Key concepts include how temperature, light, and precipitation bring about changes in
- a) plants (growth, budding, falling leaves, and wilting);
- b) animals (behaviors, hibernation, migration, body covering, and habitat); and
- c) people (dress, recreation, and work).

S-EP 4 The student will investigate and understand that weather and seasonal changes affect plants, animals, and their surroundings. Key concepts include
- a) effects on growth and behavior of living things (migration, hibernation, camouflage, adaptation, dormancy); and
- b) weathering and erosion of the land surface.

S-EP 5 The student will investigate and understand basic patterns and cycles occurring in nature. Key concepts include
- a) patterns of natural events (day and night, seasonal changes, phases of the moon, and tides); and
- b) animal and plant life cycles.

S-EP 6 The student will investigate and understand the water cycle and its relationship to life on Earth. Key concepts include
- a) the energy from the sun drives the water cycle;
- b) processes involved in the water cycle (evaporation, condensation, precipitation);
- c) water is essential for living things; and
- d) water supply and water conservation.

S-EP 7 The student will investigate and understand the relationships among the Earth, moon, and sun. Key concepts include

a) the motions of the Earth, moon, and sun (revolution and rotation);
b) the causes for the Earth's seasons and phases of the moon;
c) the relative size, position, age, and makeup of the Earth, moon, and sun; and
d) historical contributions in understanding the Earth-moon-sun system.

S-EP 8 The student will investigate and understand how the Earth's surface is constantly changing. Key concepts include

a) the rock cycle including identification of rock types;
b) Earth history and fossil evidence;
c) the basic structure of the Earth's interior;
d) plate tectonics (earthquakes and volcanoes);
e) weathering and erosion; and
f) human impact.

Resources

S-R 1 The student will investigate and understand that materials can be reused, recycled, and conserved. Key concepts include
- a) materials and objects can be used over and over again;
- b) everyday materials can be recycled; and
- c) water and energy conservation at home and in school helps preserve resources for future use.

S-R 2 The student will investigate and understand that natural resources are limited. Key concepts include
- a) identification of natural resources (plants and animals, water, air, land, minerals, forests, and soil);
- b) factors that affect air and water quality; and
- c) recycling, reusing, and reducing consumption of natural resources.

S-R 3 The student will investigate and understand that plants produce oxygen and food, are a source of useful products, and provide benefits in nature. Key concepts include
- a) important plant products (fiber, cotton, oil, spices, lumber, rubber, medicines, and paper);
- b) the availability of plant products affects the development of a geographic area; and
- c) plants provide homes and food for many animals and prevent soil from washing away.

S-R 4 The student will investigate and understand that natural events and human influences can affect the survival of species. Key concepts include
- a) the interdependency of plants and animals;
- b) the effects of human activity on the quality of air, water, and habitat;
- c) the effects of fire, flood, disease, and erosion on organisms; and
- d) conservation and resource renewal.

S-R 5 The student will investigate and understand different sources of energy. Key concepts include
- a) the sun's ability to produce light and heat energy;
- b) sources of energy (sunlight, water, wind);
- c) fossil fuels (coal, oil, natural gas) and wood; and
- d) renewable and nonrenewable energy resources.

S-R 6 The student will investigate and understand important Virginia natural resources. Key concepts include
- a) watershed and water resources;
- b) animals and plants;
- c) minerals, rocks, ores, and energy sources; and
- d) forests, soil, and land.

Life Science

S-LFS1 The student will plan and conduct investigations in which

a) data are organized into tables showing repeated trials and means;
b) variables are defined;
c) metric units (SI—International System of Units) are used;
d) models are constructed to illustrate and explain phenomena;
e) sources of experimental error are identified;
f) dependent variables, independent variables, and constants are identified;
g) variables are controlled to test hypotheses, and trials are repeated;
h) continuous line graphs are constructed, interpreted, and used to make predictions;
i) interpretations from a set of data are evaluated and defended; and
j) an understanding of the nature of science is developed and reinforced.

S-LFS2 The student will investigate and understand that all living things are composed of cells. Key concepts include

a) cell structure and organelles (cell membrane, cell wall, cytoplasm, vacuole, mitochondrion, endoplasmic reticulum, nucleus, and chloroplast);
b) similarities and differences between plant and animal cells;
c) development of cell theory; and
d) cell division (mitosis and meiosis).

S-LFS3 The student will investigate and understand that living things show patterns of cellular organization. Key concepts include

a) cells, tissues, organs, and systems; and
b) life functions and processes of cells, tissues, organs, and systems (respiration, removal of wastes, growth, reproduction, digestion, and cellular transport).

S-LFS4 The student will investigate and understand that the basic needs of organisms must be met in order to carry out life processes. Key concepts include

a) plant needs (light, water, gases, and nutrients);
b) animal needs (food, water, gases, shelter, space); and
c) factors that influence life processes.

S-LFS5 The student will investigate and understand how organisms can be classified. Key concepts include

a) the distinguishing characteristics of kingdoms of organisms;
b) the distinguishing characteristics of major animal and plant phyla; and
c) the characteristics of the species.

S-LFS6 The student will investigate and understand the basic physical and chemical processes of photosynthesis and its importance to plant and animal life. Key concepts include

a) energy transfer between sunlight and chlorophyll;
b) transformation of water and carbon dioxide into sugar and oxygen; and
c) photosynthesis as the foundation of virtually all food webs.

S-LFS7 The student will investigate and understand that organisms within an ecosystem are dependent on one another and on nonliving components of the environment. Key concepts include

a) the carbon, water, and nitrogen cycles;
b) interactions resulting in a flow of energy and matter throughout the system;
c) complex relationships within terrestrial, freshwater, and marine ecosystems; and
d) energy flow in food webs and energy pyramids.

S-LFS8 The student will investigate and understand that interactions exist among members of a population. Key concepts include

a) competition, cooperation, social hierarchy, territorial imperative; and
b) influence of behavior on a population.

S-LFS9 The student will investigate and understand interactions among populations in a biological community. Key concepts include

a) the relationships among producers, consumers, and decomposers in food webs;
b) the relationship between predators and prey;
c) competition and cooperation;
d) symbiotic relationships; and
e) niches.

S-LFS10 The student will investigate and understand how organisms adapt to biotic and abiotic factors in an ecosystem. Key concepts include

a) differences between ecosystems and biomes;
b) characteristics of land, marine, and freshwater ecosystems; and adaptations that enable organisms to survive within a specific ecosystem.

S-LFS11 The student will investigate and understand that organisms reproduce and transmit genetic information to new generations. Key concepts include

a) the role of DNA;
b) the function of genes and chromosomes;
c) genotypes and phenotypes;
d) factors affecting the expression of traits;
e) characteristics that can and cannot be inherited;
f) genetic engineering and its applications; and
g) historical contributions and significance of discoveries related to genetics.

Earth Science

S-ES1 The student will plan and conduct investigations in which

a) volume, area, mass, elapsed time, direction, temperature, pressure, distance, density, and changes in elevation/depth are calculated utilizing the most appropriate tools;
b) technologies including computers, probeware, and global positioning systems (GPS), are used to collect, analyze, and report data and to demonstrate concepts and simulate experimental conditions;
c) scales, diagrams, maps, charts, graphs, tables, and profiles are constructed and interpreted;
d) variables are manipulated with repeated trials; and
e) a scientific viewpoint is constructed and defended (the nature of science).

S-ES 2 The student will demonstrate scientific reasoning and logic by

a) analyzing how science explains and predicts the interactions and dynamics of complex Earth systems;
b) recognizing that evidence is required to evaluate hypotheses and explanations;
c) comparing different scientific explanations for a set of observations about the Earth;
d) explaining that observation and logic are essential for reaching a conclusion; and
e) evaluating evidence for scientific theories.

S-ES 3 The student will investigate and understand how to read and interpret maps, globes, models, charts, and imagery. Key concepts include

a) maps (bathymetric, geologic, topographic, and weather) and star charts;
b) imagery (aerial photography and satellite images);
c) direction and measurements of distance on any map or globe; and
d) location by latitude and longitude and topographic profiles.

S-ES 4 The student will investigate and understand the characteristics of the Earth and the solar system. Key concepts include

a) position of the Earth in the solar system;
b) sun-Earth-moon relationships (seasons, tides, and eclipses);
c) characteristics of the sun, planets and their moons, comets, meteors, and asteroids; and
d) the history and contributions of the space program.

S-ES 5 The student will investigate and understand how to identify major rock-forming and ore minerals based on physical and chemical properties. Key concepts include

a) hardness, color and streak, luster, cleavage, fracture, and unique properties; and
b) uses of minerals.

S-ES 6 The student will investigate and understand the differences between renewable and nonrenewable resources. Key concepts include

a) fossil fuels, minerals, rocks, water, and vegetation;
b) advantages and disadvantages of various energy sources;
c) resources found in Virginia;
d) making informed judgments related to resource use and its effects on Earth systems; and
e) environmental costs and benefits.

S-ES 7 The student will investigate and understand that many aspects of the history and evolution of the Earth and life can be inferred by studying rocks and fossils. Key concepts include

a) traces and remains of ancient, often extinct, life are preserved by various means in many sedimentary rocks;
b) superposition, cross-cutting relationships, index fossils, and radioactive decay are methods of dating bodies of rock;
c) absolute and relative dating have different applications but can be used together to determine the age of rocks and structures; and
d) rocks and fossils from many different geologic periods and epochs are found in Virginia.

S-ES 8 The student will investigate and understand that oceans are complex, interactive physical, chemical, and biological systems and are subject to long- and short-term variations. Key concepts include

a) physical and chemical changes (tides, waves, currents, sea level and ice cap variations, upwelling, and salinity variations);
b) importance of environmental and geologic implications;
c) systems interactions (density differences, energy transfer, weather, and climate);
d) features of the sea floor (continental margins, trenches, mid-ocean ridges, and abyssal plains) as reflections of tectonic processes; and
e) economic and public policy issues concerning the oceans and the coastal zone including the Chesapeake Bay.

S-ES 9 The student will investigate and understand that energy transfer between the sun and the Earth and its atmosphere drives weather and climate on Earth. Key concepts include

a) observation and collection of weather data;
b) prediction of weather patterns;
c) severe weather occurrences, such as tornadoes, hurricanes, and major storms; and
d) weather phenomena and the factors that affect climate including radiation and convection.

Aligned Standards of Learning Resources
Instructional Strategies for Students

INSTRUCTIONAL AND ENVIRONMENTAL STRATEGIES:

- Use manipulatives to support active learning
- Use hands-on learning experiences that incorporate a multisensory approach and rely on information available through touch, smell, and movement, and provide extra time for exploration and play with manipulatives before requiring student to complete tasks
- Teach the meaning of key vocabulary words with object and picture models
- Provide an example of a correctly solved problem at the beginning of the lesson
- Increase the amount of wait time for a student to process information and respond (e.g. ask a question then wait for a response for 10-30 seconds without rephrasing the question)
- Arrange the classroom so that mobility is encouraged and ensure that the child knows where materials, centers, and peers are located
- Optimize use of additional support staff to assist the child in accessing classroom information and concept development
- Consult with specialists to determine what type of assistive technology might be useful in maximizing a student's residual hearing and vision (e.g., hearing aids, amplification systems, glasses, magnification devices, etc.)
- Adjust allotted time for assignments
- Provide students with a visual or written schedule of classroom routines and timelines
- Use songs, rhymes, or rhythms to help students remember information
- Re-teach items (content, skills, lessons) as often as possible, varying the approach a little each time, until the skill is mastered

- Introduce only one new concept at a time
- Scaffold instruction to support new learning
- Provide many practice opportunities and include problem solving, reasoning and real-life application to help with transfer of information
- Vary reinforcement styles to provide positive recognition for completing the correct steps regardless of the outcome
- Look for the same or similar content in another medium to reinforce instruction (e.g., movie, filmstrip, audio tape, video tape, sticker book, photo album, field trip, etc.)
- Use digital visual timer to help pace student while working
- Use adaptive equipment for posture and positioning (e.g., booster seats, arm rests, etc)
- Use computers with touch screen capabilities
- Vary group sizes for instruction
- Utilize computer speech-enhanced text and lessons
- Provide voice output communication aids (VOCA) for students with little or no verbal communication system
- Provide an alternate keyboard and/or mouse for computers (e.g., switch-adapted mouse, one-hand keyboard)
- Use supplemental overlays using “go to” features or linking (e.g., Dynamyte) or levels (e.g., Voice-in-a-Box)
- Create overlays with phrases and/or words to answer comprehension questions, ask questions, or for peer test review sessions
- Be certain lighting is adequate

VISUAL SUPPORTS:

- Use many visual aids (e.g., drawings, symbols, lunch counts, class lists, posters, models, videos, slides, pictures, bulletin boards, notebooks, etc.)
- Provide optimal lighting conditions to capitalize on the student's residual vision. Adjust lighting as needed—consider natural and incandescent as opposed to fluorescent lighting
- Minimize distracting and/or overwhelming visual stimuli (e.g., close curtains or partially close blinds, remove all non-related materials from desk, create room dividers, etc.)
- Position student and materials based on type of vision impairment. For example, a child who has a field loss on the left side will need materials presented on the right side
- Arrange seating according to the requirements of the assignment and students needs (e.g., close proximity to the teacher and activity/materials may be desirable)
- Adapt materials to match learner's needs: large print, Braille
- Reduce visual clutter on worksheets and all printed materials
- Use a line or a place-marker
- Use colored highlighters, removable highlighting tape, or colored sticky notes to direct attention to key information or to clarify important information
- Have students work each step of a problem in different colors
- Improve visual contrast of materials and print (e.g., white print on black background)
- Determine if student would benefit from a Closed Circuit Television (CCTV), light box, or other devices to magnify print
- Utilize tactile cues (e.g., vinyl, sandpaper)

AUDITORY SUPPORTS:

- Minimize distracting/overwhelming auditory stimuli by positioning student away from noises, closing the classroom door, using rubber bottoms or cutting tennis balls on chair/desk legs, etc.)
- Ensure that students can communicate with signs in the learning environment who can effectively provide vocabulary to label objects but also to provide a language model for expressing concepts and ideas
- Use overhead projectors or *Powerpoint* lessons, as the teacher does not need to turn their back to the students. This is important for students who are relying on speechreading, signing, cuing, and/or use of residual hearing
- When using visuals, allow time for students to view the board, overhead, or objects, then to watch instruction given by the teacher or interpreter
- Ensure that all involved are consistent in the sign language used. Use conceptually based signs and avoid inventing new signs for new vocabulary
- Explore amplification devices such as an FM system to determine be appropriateness in boosting the students' residual hearing
- Make sure student's hearing aids or other amplification devices are turned on and functioning properly

BALANCE AND MOVEMENT SUPPORTS:

- Provide naturally available active resistance activities (e.g., carrying heavy books, moving chairs/furniture, cleaning chalkboard, dusting, sweeping, push ups, sit ups**,** jumping jacks**,** wheelbarrow walk, tug of war, chin up bar)
- Provide active resistance activities prior to structured instructional activity (e.g., chair push ups, Theraband stretches, hand gripper exercises, rolling up into a blanket to make a hot dog or burrito, rolling a large ball over a child to make a pizza, etc.)
- Provide a weighted vest or lap pad
- Provide finger fidgets (e.g., rubber band stretches, fidget balls, thera-putty, etc.)
- Provide seating options that incorporate movement, and allow frequent changes (e.g., T-stools, ball chairs/therapy balls, inflatable cushions, beaded seat, and rocking chairs, etc.)

FINE MOTOR SUPPORTS:

- Provide adapted and alternative writing tools (e.g., grippers, markers, pens, chalk, vibratory pens, etc.)
- Provide adapted paper (e.g. bold line, raised line, enlarged spacing, etc.)
- Use grids and graph paper for writing
- Provide alternative writing surfaces (e.g., textured paper, slant boards, etc.)
- Provide a paper stabilizer (e.g., clipboard, Dycem, rubber matting, non-slip shelf paper, etc.)
- Have stable pencil rest to keep pencils from falling and readily available
- Create a masking tape outline for paper placement/orientation
- Allow additional time or a peer with carbon paper for note taking, or provide copies of notes
- Administer tests orally rather than requiring written answers

- Provide page-fluffers, page-turners
- Teach the student to use word processors, word prediction software, and tape recorders for written work production
- Use stamps or stickers for labeling
- Prompt right/left discrimination with colors, stickers, stamps, etc

SENSORY SUPPORTS:

- Minimize and eliminate (if possible) aromas in the classroom (e.g., perfume, food smells, cleaning solutions, etc.)
- Provide deep pressure prior to tactile activities (e.g., weighted vest, backpack, lap pad, etc.)
- Provide active resistance activities prior to tactile activities (see list above)
- Provide finger fidgets and/or resistive hand activities (e.g., cutting, erasing, hand grippers)
- Establish a routine that provides these activities before classes and throughout the day
- Approach this student from the front and warn him/her before touching
- Avoid touching sensitive areas, i.e., face, hair, neck, and abdomen
- Use firm touch when touch is necessary
- Experiment with and expose children to a variety of tactile media, but NEVER force child to do more than they are willing to do (e.g., glue stick, white glue or paste, paintbrush paints, finger paints, sandpaper, shaving cream, jello, etc.)

Aligned Standards of Learning
Assistive Technology Ideas

NO TECH/LIGHT TECH

- Use page fluffers, page turners and page extenders to assist with turning of pages
- Enlarge the text of any written materials
- Use post-its and/or highlighters in written materials to emphasize important words, concepts, vocabulary, and paragraphs
- Use plastic page protectors for easier turning of pages in books
- Use slant boards, wedges, or easels for easier viewing of materials
- Laminate pages of books or any paper materials for easier turning
- Use a 3 ring binder for page turning – also provides a hard surface for slanting
- Use visual aides (ex. pictures) to help stimulate ideas for discussion or for project
- Secure books and other reading materials to student's desk with clamps, bungee cords, tape, or Velcro
- Use adapted writing tools for any writing assignments (i.e. slant boards, pencil grips, wrist supporters, arm stabilizers)
- Use word magnets to develop sentences, phrases, or titles
- Use banks of communication symbols or words to assist with sentence development, answering questions, asking questions, discussion with peers
- Use corresponding stickers on squares of the overlay or augmentative communication device with pre-recorded reading of the paragraph
- Use colored strips of plastic (such as colored overhead sheets) and cut into strips to assist with tracking
- Use adaptive papers, such as Quick Draw paper
- Use letter/word/number stamps
- Word prediction/choice software

MID TECH/HIGH TECH

- Provide voice output communication aids (VOCA) for students with little or no verbal communication system
- Provide a computer for writing
- Provide an alternate keyboard access for computers
- Use storybook software
- Allow student to use slide projectors for oral reports
- Have materials available on filmstrips for students who have difficulty reading
- Have reading materials available on CD Rom for students with difficulty reading
- Reproduce reading materials and reduce the size to fit on augmentative communication device or alternate keyboard
- Use multimedia software such as Hyperstudio, IntelliPics, or Imagination Express to author own ballads, poems, or stories – these can be read on screen with and without voice output
- Download other stories, ballads, poems from the Internet, then upload them into a talking word processor
- Use a screen reader to help with reading
- Use supplemental overlays using "go to" features or linking (Dynamyte) or levels (Voice-in-a-box)
- Create overlays with phrases and/or words for to answer comprehension questions, ask questions, or for peer test review sessions
- Use mouse adaptor, such as one with the ball removed
- Place the mouse pointer on page turning arrow on the computer screen
- Secure the mouse where the student can click to turn the pages
- Create overlays that included the phrases and words needed for story frames, frame sentences, and other types of modeled writing

Resource Documents on CD

I. Curriculum Frameworks

- English
  - Reading
- Mathematics
  - Computation and Estimation
  - Number and Number Sense
  - Patterns, Functions and Algebra
  - Measurement
  - Geometry
  - Probability and Statistics
- Science
  - Scientific Investigation and Reasoning
  - Force, Motion and Energy
  - Matter
  - Life Process
  - Interrelationships in Earth/Space Systems
  - Earth Patterns, Cycles and Change
  - Resources
  - Living Systems
  - Earth Science
  - Life Science
- History and Social Science
  - Civics
  - Economics
  - Geography
  - History

II. Sample Activities

- Reading
- Math

III. Standards Driven IEP Resources

- Standards Driven IEP Powerpoint from VDOE
- Sample PLOP – Kelsea
- Student Profile sample form
- Instructional Priorities sample form
- IEP Agenda

IV. SOL Instructional and Training Materials Compilation

- VDOE document with list of resources for SOL