National Science Content Standards
(K to Grade 8)

Access to science for Everyone!

CTG
Strategies on Standards

H2O

National Science Teachers Association (NSTA)

http://nsta.org/standards

Unifying Concepts & Processes

- Systems, order & organization
- Evidence, models & explanation
- Constancy, change & measurement
- Evolution & equilibrium
- Form & function

Science in Inquiry

Abilities necessary to do scientific inquiry
Understanding about scientific inquiry

Physical Science

Properties of objects & materials
Light, heat, electricity & magnetism
Position & motion of objects

Physical Science

Properties and changes of properties in matter
Motion & forces
Transfer of energy
Life Science
--- K-4 ---
- The characteristics of organisms
- Life cycles of organisms
- Organisms & environments

http://www.discountschoolsupply.com

Life Science
--- 5-8 ---
- Structure & function in living systems
- Reproduction & heredity
- Regulation & behavior
- Population & ecosystems
- Diversity & adaptations of organisms

http://www.discountschoolsupply.com

Earth and Space Science
--- K-4 ---
- Properties of earth materials
- Changes in earth & sky
- Objects in the sky

http://www.nature-watch.com/cgi-bin/naturewatch/646e.html
http://www.nature-watch.com/cgi-bin/naturewatch/610h.htm

Earth and Space Science
--- 5-8 ---
- Structure of the earth systems
- Earth in the solar system
- Earth’s history

http://www.nature-watch.com

Science and Technology
--- K-8 ---
- Abilities of technological design
- Abilities to distinguish between natural objects & objects made by humans
- Understanding about science & technology

http://sciencekit.com/category.asp?c=E_427673
http://store.projectwet.org

Science in Personal and Social Perspectives
--- K-4 ---
- Personal health
- Changes in environments
- Science & technology in local challenges
- Characteristics & changes in populations
- Types of resources

http://www.learningwelled.com
http://learningladder.org
Students with Disabilities

Introduction

Since the passage of the Individuals with Disabilities Education Act (IDEA) in 1997, schools have been committed to working toward inclusion of students with physical, mental, sensory, and emotional challenges in the classroom. Yet even with the best of intentions, barriers to learning science have emerged. These barriers include inadequate equipment, communication difficulties, insufficient numbers of instructional assistants and tools in the classroom, and lack of overall administrative support. In accordance with the National Science Education Standards, NSTA is strongly committed to developing strategies to overcome these barriers to ensure that all students have the benefit of a good science education and can achieve scientific literacy. While NSTA is aware of the importance of these issues for practicing educators with disabilities, the declarations focus on the preK-12 classroom.

http://nsta.org/disabilities
General Ed Software

- Digital Frog International
- Tom Snyder
- Tool Factory

Digital Frog International

http://www.digitalfrog.com

The Digital Frog 2.5

Digital Fieldtrip to the Rainforest: AT

Tom Snyder Productions

- Magnets
- Flight
- Endangered Species
- Hidden in Rocks

Science Court Explorations
Grades: 2-6

Science Seekers
Grades: 5-8

Tool Factory

http://www.toolfactory.com

Science Diagram
Grades: 5-12

Science Explorer
Grades: 4-9

Teaching Adaptations: A Model

Provides a process...

- Guidelines for all students
- Consistent with IEP process
- Need for collaboration / Teams

Accommodations vs. Adaptations

- Accommodations enable students to gain access to the classroom or the curriculum for FAPE and LRE.

- Adaptations are changes to the learning task requirements, teaching methods and materials, or the physical environment when the IEP is already in place.


http://www.utaheducationjobs.com/Adapting_Schoolwork.pdf

Janney & Snell, 2004
Teaching Adaptations: A Model

Types of Adaptations

Curricular
Alter the content of what is taught

Instructional
Alter how content is taught and how learning is demonstrated

Curricular Adaptations

- Supplementary add social-behavioral, communication, study and/or self management skills to the general curriculum (LD)
- Simplified change the level of difficulty or include fewer goals
- Alternative teach functional skills plus embedded social, communication, and motor skills through participation in age-appropriate activities

Janney & Snell, 2004

Instructional Adaptations

- Adapt the instructional stimulus
- Adapt student response
- Include adapting difficulty, amount, modality, format or materials
- Examples used in your classrooms?

Janney & Snell, 2004

Software Supporting Varied Learning Needs

- Aimee Solutions
  Booth: 327
- Slater Software
  Booth(s): 220 & 221 Great Hall
- SoftTouch
  Booth(s): 203, 204, 205, Great Hall
- IntelliTools
  Plaza 1

Aimee Solutions

- Animal Habitat
  Book Cover
  Icon Examples
  Booth: 327

Slater Software

- Animals: Volume 1
- Animals: Volume 2
- Energy: Volume 1

http://slatersoftware.com

Booth(s): 220 & 221 Great Hall
RESEARCH SHOWS
Improves achievement
Increases ability to retain understanding

REMEMBER...
Manipulatives don’t always carry meaning
Should introduce within REAL-WORLD context

Virtual Manipulatives

**Benefits**

- Computer Access
- Higher disconnect than manipulatives
- Greater incidence for ‘play’
- Relying on fewer learning modalities
Virtual manipulatives

http://www.uen.org/3-6interactives/science.shtml

Utah Education Network

Virtual manipulatives


SEED

Typical Teaching Tools

- Microscopes
- Binoculars
- Weights, rulers, beakers
- Magnets & mirrors
- Animal models
- Plants & gardens
- Skeletons
- Compass & telescopes
- Globe
- Legos
- Food pyramid
- Puzzles, flashcards & charts

Alternate Teaching Tools

Booth: 123, Great Hall

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

Basic Kits:
- Elementary Science Classroom Starter Kit
  - Precision school balance and tube spring scale
  - Graduated cylinder set, plastic test tube racks
  - Measuring cups and spoons metric
  - Guide and cart
  - Compass
  - Metric English tapes
  - Rain gauge
  - Sand timer – one minute
  - Student thermometers
  - Test tube stoppers, clamps, and brushers
  - Funnel
  - Cylindricals
  - Single and double pulleys
  - PP paper, blue and red litmus paper
  - Blue foams
  - Dual lens magnifiers

Content Specific Kits
- Power of Science: Electricity Kit
  - Teaching guide
  - Activity guide
  - Wire
  - Volt bulbs
  - Brass switch plates
  - Felt cloth
  - Magnet
  - Sockets
  - Nichrome wire filament
  - Nuts and bolts
  - Balloons
  - Nails
  - Aluminum foil

Booth: 123, Great Hall
Alternate Teaching Tools

Computer Related Tools

- Virtual Labs
- Virtual Field Trips (http://www.sln.org)
- WebQuests (http://www.williston.k12.vt.us/Services/Science/ScienceWebQuests/sciencewebquests.html)
- PowerPoint Interactive Games (http://www.csun.edu/science/ref/games)
  - Who wants to be a millionaire?
  - Bingo
- Play
- Role Play & Drama

Report Writing

Science as inquiry:
Use appropriate tools and techniques to gather, analyze, and interpret data (students should be able to access, gather, sort, retrieve, and organize data, using hardware and software designed for these purposes).

Science K-4:

Science and technology:
Communicated a problem, design, and solution: Student abilities should include oral, written, and pictorial communication of the design process and product. The communication might be show and tell, group discussions, short written reports, or pictures, depending on the students’ abilities and the design project.

Science 5-8

In middle schools, students produce oral or written reports that present the results of their inquiries. Such reports and discussions should be a frequent occurrence in science programs.

Report Writing

Technology...

- Word templates (graphic, outlines, fill-in-the-blanks, etc.)
- PowerPoint
- Taking pictures with adaptive camera (ORCCA Technology)
- Kidspiration Inspiration
- Overlays for IntelliKeys
- IntelliTools Classroom Suite (Writing in Science template in IntelliTalk 3)
- Slater Company Science Software
- PixWriter, Writing with Symbols templates, BoardMaker, Mayer Johnson symbols, etc.
- Topic related overlays for students’ communication devices

Do experiment following directions!

Then write a report on it in PixWriter!

State Standards

- Look at your state - models for teaching content
- On-line Lesson Plans
  - http://www2.nsta.org/sciencesites/default.asp?category=14
  - http://dev.nsta.org/ssc
  - http://science.education.nih.gov/

Pollination Party!

- Life Science - Grades K-5

OBJECTIVES:

- Students will:
  1. understand the concept of pollination and show examples of bee pollination on specific plants
  2. understand the interdependence between insects, plants, and humans
  3. understand that insects can have a negative impact on their ecosystem.

http://school.discovery.com/lessonplans/programs/life-butterflies/
1. Imagine that a beekeeping business was started in your community. Beekeepers handle thousands of bees. How might your community react to this new business? What fears might people have?

2. Take a look at this list of crops that farmers grow. Place a check mark next to any of these crops that you enjoy eating or using or that can be found in your home.

   - apples __
   - blueberries __
   - cantaloupes __
   - cotton __
   - pears __
   - plums __
   - pumpkins __
   - soybeans __
   - strawberries __
   - squash __
   - tomatoes __
   - watermelon __
   - cucumbers __
   - grapes __
   - lima beans __
   - peaches __

   Many of the farmers that grow these crops use bee pollination. Bee pollination can make stronger, healthier crops. For example, some pear varieties with bee pollination are this bigger than pear varieties without the help of bees. Of course, there are only one of the many reasons that farmers like bee pollination.

3. If you were a farmer, would you think about using bee pollination? Why or why not?

4. Pick one of the plants from the list above. Use the library and/or the Internet to find out more about it. Cut out photocopied sheets of the plant you had selected from the list above and assemble a book. Show how the "worker" bee stings the pollen in its pollen basket and brings it to another place to feed. Make sure that the bee shows how the flower is in the new plant and the bee pollination occurs.

5. Based on what you have learned from this activity, explain how bees are helpful to us. Give examples of useful bees. Could you tell them what life might be like without the help of bees?

References

- Alter Worksheet
- Select sequence
- Roll playing
- Supplementary Activities
- Songs
- Games
- Websites

- http://www.orcca.com
- http://www.augmentativeresources.com
- BoardMaker: Mayer-Johnson Company (Booths #115 -118)
- http://www.altenetrcm.com