

SOS!
Strategies on Standards
 Access to science for Everyone!

CTG
 2006

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National Science Content Standards (K to Grade 8)

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

<http://www.usgs.gov/globalwarming/kidspage.html>

<http://www.nature.org>

Science in Inquiry

Abilities necessary to do scientific inquiry

Understanding about scientific inquiry

www.amsbio.com

www.amsbio.com

<http://www.calnet.net/mc/news/2003/128/chart.html>

Physical Science

— K-4 —

Properties of objects & materials

Light, heat, electricity & magnetism

Position & motion of objects

<http://hsportal.com/category.asp?O=C-E-56492>

<http://catalog.beacon-edup.com>

<http://www.mcs.eapsyca.com/edu/transport/force.html>

Physical Science

— 5-8 —

Properties and changes of properties in matter

Motion & forces

Transfer of energy

<http://www.sciencenet.com>


<http://www.inventtopper.com>

<http://www.sciencenet.com>

Life Science


— K-4 —

The characteristics of organisms




<http://www.discountschoolsupply.com>

Life cycles of organisms



Organisms & environments




<http://www.discountschoolsupply.com>

Life Science

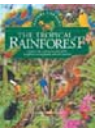
— 5-8 —

Structure & function in living systems



<http://www.discountschoolsupply.com>


Reproduction & heredity



<http://www.ck12.org>

Regulation & behavior

Population & ecosystems



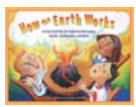
<http://www.discountschoolsupply.com>

Diversity & adaptations of organisms

Earth and Space Science


— K-4 —

Properties of earth materials




<http://www.nature-science.com>

Changes in earth & sky



<http://www.nature-science.com>


Objects in the sky



Earth and Space Science


— 5-8 —

Structure of the earth systems




<http://www.nature-science.com>

Earth in the solar system



<http://www.nature-science.com>

Earth's history




<http://science81.com/product.asp?D=1-E-552936-A-on-E-4794300>

Science and Technology


— K-8 —

Abilities of technological design



<http://science81.com/product.asp?D=1-E-492073>

Abilities to distinguish between natural objects & objects made by humans



<http://store.projectwet.com>

Understanding about science & technology

Science in Personal and Social Perspectives

— K-4 —

Personal health




<http://learningladder.org>

Changes in environments

Science & technology in local challenges

Characteristics & changes in populations



<http://www.learningladder.org>

Types of resources

Science in Personal and Social Perspectives — 5-8 —

Personal health
 Natural hazards
 Populations, resources & environments
 Science & technology in society
 Risks & benefits



<http://www.alibuy.com>



<http://www.sciencelink.com>



<http://www.target.com>

History and Nature of Science — K-4 —

Science as a human endeavor.....

Short stories



<http://www.projectatool.com>



<http://www.sciencelink.com>

Films/videos



<http://www.teachmeanatomy.com>



<http://www.amazon.com>

History and Nature of Science — 5-8 —

Science as a human endeavor

History of science



<http://www.amazon.com>

Nature of science



<http://www.amazon.com>



<http://teacherstore.discovery.com>



<http://www.projectatool.com>



Position Statement

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>

National Science Content Standards

(K to 8)

Questions?

National Science Teachers Association (NSTA)

General Education Software

- Tutorial
- Drill & Practice
- Simulation
- Problem Solving
- Educational Games (any of the above)
- Ready-made / Teacher-made

General Ed Software

- Digital Frog International
- Tom Snyder
- Tool Factory

QuickTime™ and a TIFF (uncompressed) decompressor are needed to see this pic.

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



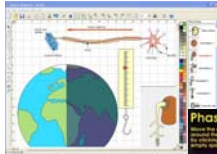
Science Court Explorations
Grades: 2-6




Science Seekers
Grades: 5-8

Tool Factory


<http://www.toolfactory.com>



Science Diagram
Grades: 5-12



BBC Science Simulations
Grades: K-2



Science Explorer
Grades: 4-9

Teaching Adaptations: A Model

Provides a process...

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

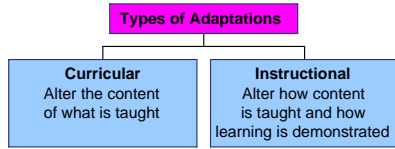
Janney, R. & Snell, M.E. (2004)
http://www.utaheducationjobs.com/Adapting_Schoolwork.pdf

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.

Janney & Snell, 2004

Teaching Adaptations: A Model



Janney & Snell, 2004

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

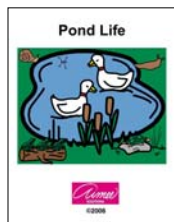
Booth(s): 203, 204, 205, Great Hall

▪ IntelliTools

Plaza 1



Aimee Solutions



Book Cover

Animal Habitat



Icon Examples



Data Sheet

Booth: 327

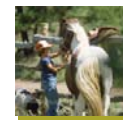
Slater Software



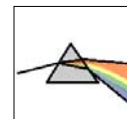
<http://slatersoftware.com>



Animals: Volume 1



Animals: Volume 2



Energy: Volume 1

Booth(s): 220 & 221 Great Hall

Activities

Easy Readers

Write & Retell

Sentence Strips

Matching

Hands-on Activities

Worksheets

Quizzes

SoftTouch

<http://www.softtouch.com>

hot

Short Phrases

Most of the animals that live in the rainforest have small bodies because it makes it easier for them to move in the undergrowth. Many of the animals hibernate or migrate during the long, cold winter months.

It is very wet and warm in the rainforest.

Short Sentences

Long Sentences

Booth(s): 203, 204, 205, Great Hall

red-eyed tree frog

gorilla

blue morpho butterfly

next

© 2004 by SoftTouch&TECH, Inc. - Switching on Science: Habitat

Use of Manipulatives

RESEARCH SHOWS
Improves achievement
Increases ability to retain understanding

REMEMBER...

Manipulatives don't always carry meaning

Should introduce within REAL-WORLD context

7 Musts for Using Manipulatives

By Marilyn Burns

- Talk with students about why manipulatives help them learn math.
- Set ground rules for using materials.
- Set up a system for storing materials and familiarize students with it.
- Allot at least one period for free exploration.
- Post class charts about manipulative materials.
- Manipulatives are a natural for writing assignments.
- Let parents get their hands on manipulatives, too.

<http://teacher.scholastic.com/products/instructor/musts.htm>

Virtual Manipulatives

Benefits

CONCERNS...

- 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

http://www.seed.slb.com/en/scictr/lab/index_virtual.htm

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



Alternate Teaching Tools

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
- Sandtimer – one minute
- Student thermometers
- Test tube stoppers, clamps, and brushes
- Funnels
- Eyedroppers
- Single and double pulleys
- PH paper, blue and red litmus paper
- Blue forceps
- Dual lens magnifiers



Booth: 123, Great Hall

Alternate Teaching Tools

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

ComputerRelated Tools

- Virtual Labs
- Virtual Field Trips (<http://www.sfn.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, store, 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



EXPERIMENT -- HOT AIR BALLOON

Materials:

- 2 liter empty soda bottle with the cap off
- 1 rubber balloon
- Blubber or wax
- Hot water

Do experiment following directions!

Then write a report on it in PixWriter!



State Standards

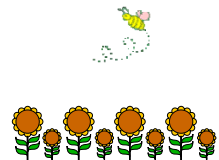
- Look at your state - models for teaching content
- On-line Lesson Plans
 - <http://www2.nsta.org/sciencesites/default.asp?category=14>
 - <http://dev.nsta.org/ssc>
 - <http://science.education.nih.gov/>

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/tlc-butterflies/>

STUDENT ACTIVITIES

- Imagine & reflect
- Make selections
- Research & draw

(select one)

Pollination Parties!

1. Imagine that a bee-keeping 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.

<input type="checkbox"/> apples	<input type="checkbox"/> blueberries	<input type="checkbox"/> cantaloupes	<input type="checkbox"/> cotton
<input type="checkbox"/> cucumbers	<input type="checkbox"/> grapes	<input type="checkbox"/> lima beans	<input type="checkbox"/> peaches
<input type="checkbox"/> pears	<input type="checkbox"/> plums	<input type="checkbox"/> pumpkins	<input type="checkbox"/> soybeans
<input type="checkbox"/> strawberries	<input type="checkbox"/> squash	<input type="checkbox"/> tomatoes	<input type="checkbox"/> watermelon

Many of the farmers that raise these crops use bee pollination. Bee pollination often makes for stronger, healthier crops. For example, some pears grown with bee pollination are lots bigger than pears grown without the help of bees. Of course, these are only some of the crops that use bee pollination - there are many, many more!

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. Can it pollinate itself, or does it require the help of bees? After you have learned more about the plant, draw a sequence below in which the plant produces seeds and attracts a bee. Show how the bee "catches" some of the pollen in its pollen basket and flies to another plane to feed. Make sure that you show how the bee brings the pollen to the new plant - and thus how pollination occurs.

5. Based on what you have learned from this activity, explain how bees are helpful to us. Think back to the imaginary bee-keeping business in your community. If your neighbors were worried about so many bees, how could you explain their usefulness? Could you tell them what life might be like without the help of bees?

STUDENT ACTIVITIES

- Imagine
- Reflect
- Select
- Would you?
- Research
- Draw
- Discuss
- Explain

Pollination Parties!

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Alter Worksheet

Select feelings

← BACK

STUDENT ACTIVITIES

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Pollination Parties!

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Alter Worksheet

Select foods

- Device
- Low tech

← BACK

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Alter Worksheet

Select sequence

Roll playing

STUDENT ACTIVITIES

- Imagine
- Reflect
- Select
- Would you?
- Research
- Draw
- Discuss
- Explain

Pollination Parties!

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Supplementary Activities

- songs
- games
- websites

References

- <http://teacher.scholastic.com/products/instructor/musts.htm>
- <http://nsta.org/standards>
- <http://www.kiddiddles.com/lyrics/b002.html>
- BoardMaker: Mayer-Johnson Company (Booths #115 -118)
- <http://www.augmentativeresources.com>
- <http://www.orcca.com>
- <http://enablingdevices.com>
- <http://www.ablenetinc.com>

Janney, R. & Snell, M.E. (2004)

Reys, Lindquist, Lambdin, Smith, & Suydam (2004)

