**Science Content Standards:** National Science Teachers Association (NSTA) [http://nsta.org/standards](http://nsta.org/standards)

**Standard for all K-12**

1. **Unifying concepts and processes:** As a result of activities in grades K-12, all students should develop understanding and abilities aligned with the following concepts and processes:
   a. Systems, order, and organization
   b. Evidence, models, and explanation
   c. Constancy, change, and measurement
d. Evolution and equilibrium
e. Form and function

**Standards for all K-4**

As a result of activities in grades K-4, all students should...

2. **Science as inquiry:** develop:
   a) Abilities necessary to do scientific inquiry
   b) Understanding about scientific inquiry

3. **Physical science:** develop and understanding of:
   a) Properties of objects and materials,
   b) Position and motion of objects
   c) Light, heat, electricity, and magnetism

4. **Life science:** develop understanding of:
   a) The characteristics of organisms,
   b) Life cycles of organisms
   c) Organisms and environments

5. **Earth and Space Science:** develop understanding of:
   a) Properties of earth materials,
   b) Objects in the sky
   c) Changes in earth and sky

6. **Science and Technology:** develop:
   a) Abilities of technological design,
   b) Understanding about science and technology
   c) Abilities to distinguish between natural objects and objects made by humans

7. **Science in Personal and Social Perspectives:** develop understanding of:
   a) Personal health,
   b) Characteristics and changes in populations,
   c) Types of resources,
   d) Changes in environments and e) Science and technology in local challenges

8. **History and Nature of Science:** develop understanding of:
   a) Science as a human endeavor (through the use of short stories, films, videos, and other examples)

**Standards for all 5-8**

As a result of activities in grades 5-8, all students should...

2. **Science as inquiry:** develop:
   a) Abilities necessary to do scientific inquiry
   b) Understanding about scientific inquiry

3. **Physical science:** develop and understanding of:
   a) Properties and changes of properties in matter,
   b) Motion and forces
   c) Transfer of energy

4. **Life science:** develop understanding of:
   a) Structure and function in living systems,
   b) Reproduction and heredity,
   c) Regulation and behavior,
   d) Population and ecosystems
e) Diversity and adaptations of organisms

5. **Earth and Space Science:** develop understanding of:
   a) Structure of the earth system,
   b) Earth’s history
c) Earth in the solar system

6. **Science and Technology:** develop:
   a) Abilities of technological design
   b) Understanding about science and technology

7. **Science in Personal and Social Perspectives:** develop understanding of:
   a) Personal health,
   b) Populations, resources, and environments,
   c) Natural hazards,
   d) Risks and benefits
   e) Science and technology in society

8. **History and Nature of Science:** develop understanding of:
   a) Science as a human endeavor,
   b) Nature of science
c) History of science

**Science Resources**

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*Thank you for providing materials for this presentation*
CLASSROOM SCIENCE MANIPULATIVES

Inquiry
- Microscopes (magnifying, talking, digital)
- Slide strips
- Magnifiers
- Binoculars
- Test tubes (with clamps), flasks, plates
- Gyroscope
- Dissecting kit

Measurements
- Centimeter cubes
- Rulers
- Tape measures
- Thermometers
- Scales (various [platform, spring, simple] including electronic)
- Weights
- Graduated cylinders (with enlarged numbers), beakers
- Measuring cups, containers
- Balances
- Timers
- Funnels

Physical Science
- Magnets, magnetic wands
- Iron fillings
- Atom, crystal, and molecular model
- Density cubes
- Force Pulleys
- Wimshurst Generator
- Wave apparatus
- Listening discrimination blocks
- Tuning fork
- Color peddles/color wheels
- Prisms, lenses
- Litmus paper
- Mirrors

Life Science
  Animal Studies
  - Animals/insects
  - Inflatable insects, frogs, butterflies
  Natural Science

Earth and Space Science
- Compass
- Rocks, minerals, fossils sets
- Globe (landforms; astronomy)
- Anemometer (measure wind)
- Barometer
- Fault model
- Erupting volcano model
- Tornado tube
- Telescope
- Sling Psychrometer/Humidity Detector
- Cloud forming apparatus
- Rain gauge
- Water cycle model
- Solar system model/simulator
- Rocket system
- Sun/earth models
- Solar system maps

Machines and Technology
- Lego
- Rollercoasters
- Gear sets
- K?NEX
• Cell, DNA models
• Pulleys

Science in Personal and Social Perspectives

Health
• Food pyramid
• Stethoscopes
• Blood pressure kit
• Blood typing kit
• Oral Hygiene kit

General
• Mixtures, indicators, and chemicals
• Pocket charts
• Diagrams
• Stamps
• Science flashcards
• Puzzles

Virtual Manipulatives/Activities for Science Teachers

http://www.wonderville.ca/support/index.htm - science activities (3-7)
http://www.uen.org/3-6interactives/science.shtml - interactive science activities (3-6)
http://www.medropolis.com/VBody.asp - interactive, 3-D presentations of human body
http://www.ibiblio.org/virtualcell/index.htm - virtual cell tours
http://faculty.washington.edu/chudler/chgames.html - Neuroscience for kids, interactive presentations/simulations of how brain works
http://frog.edschool.virginia.edu/ - virtual frog dissection
http://www.scholastic.com/kids/weather/ - interactive weather maker
http://classroom.jc-schools.net/sci-units/matter.htm - virtual interactive manipulatives/activities
http://www.ga.k12.pa.us/curtech/interactive/interactive.htm - interactive classroom
http://www.accessexcellence.org/RC/virtual.html - list of virtual dissections, labs, and field trips
http://www.virlab.virginia.edu/FS/home.htm - University of Virginia Virtual lab
http://www.iknowthat.com/com/L3?Area=L2_Science - experiments and activities for elementary and middle school

Websites that include a collection of links for virtual labs and activities:
• http://www.nist.gov/public_affairs/kids/kidsmain.htm
• http://www.ofsd.k12.wi.us/science/frogdiss.htm
• http://www.hazelwood.k12.mo.us/~gritchert/sciweb/misc.htm
• http://sciencepage.org/lessons.htm
• http://www.niehs.nih.gov/kids/links.htm
• http://scorescience.humboldt.k12.ca.us/fast/kids.htm
• http://www.iknowthat.com/com/L3?Area=L2_Science&COOK
• http://www.kidsolr.com/science/page2.html

Science Lesson Plans

http://www2.nsta.org/sciencesites/default.asp?category=14
• http://dev.nsta.org/ssc/
• http://science.education.nih.gov/
Adaptations to Pollination Parties! Lesson (Grade 4-6, Life Science Standards)
Lesson available on the Web at:
http://school.discovery.com/lessonplans/programs/tlc-butterflies

Learning Disabilities
- Students may have difficulty with the Pollination Parties! worksheet. There are several ways you can adapt the worksheet:
  - Highlight every other row on the plant list so students can better track the rows and boxes.
  - Use a reading guide to help students reach across each row.
  - Adapt the worksheet by enlarging #2. This would provide more space for tracking what is read and for writing and checking the boxes.
  - Separate the individual questions within each numbered part of the worksheet so students can better know what is being asked without getting one question confused with another.
  - Provide websites and/or book resources on the sheet for students to use as references in #4.
  - Lengthen the worksheet with each question on a page so students have room to complete answers.

- Using a software program such as Microsoft Word or PowerPoint can serve as an adaptation
  - Teacher/Student can adjust font style, size, and color to meet student’s needs along with adjusting the background color and screen magnification.
  - Use highlighting tool to draw attention to certain items, or help with visual tracking as discussed above.
  - Record/insert audio directions and/or insert comments throughout the worksheet to provide additional directions or hints.
  - Have direct hotlinks to websites as references.

Visual Impairments
- Many of the adaptation described for students with learning disabilities work well for students with visual impairments.
- Additionally students with visual impairments may need the worksheet in large-print, printed in Braille, or to complete the worksheet online with text/screen reading software.

Cognitive Disabilities/Autism
- Students with cognitive disabilities may benefit from the adaptations described above, but also may require additional modifications to help support their learning needs and academic level.
  - Provide students with a checklist with step-by-step directions of the individual tasks. Include picture symbols for students as needed.
  - Have students answer the questions using a communication board, communication device, expanded keyboard
  - Adapt the content/complexity by providing pictures of the plants, audio recordings of the lesson and/or resource information, and/or have pictures already available, having students sequence them correctly
  - Adapt the content/complexity by asking students to select between only a few number of plants and/or those most familiar to the student
  - For students who need a more simplified worksheet, reduce the number of questions. Limit #1 and #5 to one question. Let the student select which question they want to answer. Provide possible answers to questions for students to select. Provide the possible answers in picture form.
  - Instead of drawing the pollination process, have students use puzzles or puppets to show understanding.

All Disabilities
- The ability for students to work with a partner or in groups not only provides the support for completing tasks, but encourages social interactions that may be of benefit to all students involved!

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To dos for presentation:

Alter worksheet
Make PowerPoint for worksheet
Augcom for sequencing
Overlay for plant selection – automatic to resource info
Puzzle
Puppets