ACTON PUBLIC SCHOOLS

GRADE TWO SCIENCE PROGRAM

Plant Growth and Development

(Life Science)

Key Questions

- Where do seeds come from?
- How do different plant parts help the plant to grow?
- How can we learn about plants from nature?

Concepts

Students will recognize that

1. plants follow a *life cycle* often defined from *seed* to seed;
2. plants have parts, i. e. *root, stem, leaf, flower, and fruit*;
3. each part has a purpose and is necessary for the plant to grow;
4. one seed produces one plant; one plant can produce many seeds;
5. plants need water, light, and nutrients to grow;
6. each plant thrives in a specific habitat and may have particular *adaptations* for that habitat, i. e. cactus.

Outcomes

Students will have experiences

1. planting a variety of seeds;
2. observing a complete plant life cycle – seed to seed;
3. measuring and graphing growth;
4. predicting changes in the plant's growth;
5. drawing the life cycle of a plant or ordering plant growth pictures to show the life cycle.

Recommended kit/materials:

Plant Growth and Development, Science and Technology For Children (STC) kit, National Science Resources Center, Smithsonian Institution, 1992. (Carolina Biological Supply Company)

Life Cycles

Key Questions for Amphibians

- Why are amphibians important?
- What are some special features of amphibians?
- How can we learn about amphibians from nature?

Life Cycles (cont'd.)

Concepts

Students will

1. describe the *life cycle* of a frog, toad or salamander (salamander eggs should not be collected, since they are a threatened species) and use the term *metamorphosis;*
2. describe each stage of an amphibian's life; tell some of the *adaptations* of each stage which help it survive; and compare this *life cycle* with that of different *organisms;*
3. understand that all amphibians (and mammals in the Africa study) share common characteristics with others animals in the same group.
4. describe the *habitat* of the amphibian studied and list several characteristics of that habitat, i. e. vernal pools for wood frogs and salamanders;
5. illustrate a food chain which shows the amphibian's relationship to its habitat;
6. appreciate some of the environmental threats to the survival of amphibians;
7. explain why the survival of amphibians is important to the earth.

Recommended kit/materials

Frogs and Toads by Seddon Kelly Beaty and Irene Fountas, Addison-Wesley Publishing Company, 1996.

Key Questions for Butterflies

- Why are butterflies important?
- What are some special features about butterflies?

Outcomes

Through the study and use of live butterflies, students will

1. describe the unique *characteristics* of insects;
2. describe the *life cycle* of an insect and use the term *metamorphosis;*
3. compare its *life cycle* with that of different organisms;
4. describe some of the survival *adaptations* in different stages;
5. recognize that butterflies have a wide range of *habitats;*
6. understand that butterflies are part of a *food chain*.

Recommended kit/materials

Life Cycle of Butterflies, Science and Technology For Children (STC) kit, National Science Resources Center, Smithsonian Institution, 1992. (Carolina Biological Supply Company)

Butterflies Abound! by Seddon Kelly Beaty and Irene Fountas, Addison-Wesley Publishing Company, 1994.

Balance
(Physical Science)

Concepts

1. Balance is affected by the amount of weight, the position of weight, and the position of the fulcrum.
2. The weight of an object is not determined by its size.
3. Number sentences are an abstract representation of balance in action.
4. Objects can move in a variety of ways.
5. Movement of an object can be changed by applying a force.

Massachusetts Science, Math, and Technology Frameworks Standards

Physical Science (PK-2)

#3: Describe the various ways that objects can move, such as in a straight line, zigzag, back-and-forth, round-and-round, fast, and slow.

#4: Demonstrate that the way to change the motion of an object is to apply a force (give it a push or a pull). The greater the force, the greater the change in the motion of the object.

#5: Under some conditions, objects can be balanced.

Technology/Engineering (PK-2)

#2.1: Identify tools and simple machines used for a specific purpose (ramp and wheel).

Additional Technology/Engineering from Grades 3-5 Standards

#2.4: Compare natural systems with mechanical systems that are designed to serve similar purposes, e.g., an equal-arm balance compared to a tightrope walker.

Number Sense and Operations

#2.N.4: Compare whole numbers using terms and symbols, e.g., less-than, equal-to, greater-than (<, =, >).

#2.N.7: Demonstrate and understanding of various meanings of addition and subtraction, e.g., addition as combination, (plus, combined-with, more); subtraction as comparison (how much less, how much more); equalizing (how many more are needed to make these equal); and separation (how much remaining).

Patterns, Relations, and Algebra

#2.P.5: Construct and solve open sentences that have variables, e.g., * + 7 = 10.

#2.P.6: Write number sentences using +, -, <, =, and/or > to represent mathematical relationships in everyday situations.

Balance: Standards (cont'd.)

Data Analysis, Statistics, and Probability

#2.D.2: Organize, classify, represent, and interpret data using tallies, charts, tables, bar graphs, pictographs, and Venn diagrams; interpret the representations.

#2.D.3: Formulate inferences (draw conclusions) and make educated guesses (conjectures) about a situation based on information gained from data.

#2.D.4: Decide which outcomes of experiments are most likely.

Skills

Students will

1. observe and describe balance in everyday experiences;
2. develop skill in using a balance scale and other tools of science;
3. build and balance a mobile;
4. communicate ideas, observations, and experiences through writing, drawing, discussing, and presenting;
5. predict, observe, classify, and record results in a journal and on record sheets and class charts.

Attitudes

Students will

1. become curious about the balance occurs in the world around us;
2. develop an interest in investigating balance and balancing objects;
3. develop an appreciation for the importance of recording and organizing information on record sheets, science journals, and class charts.

Recommended kit/materials:

Full Option Science System (FOSS) *Balance and Motion* kit, Lawrence Hall of Science (Delta Education)

Some activities taken from Science and Technology for Children (STC) kit, *Balance and Weighing*, National Science Resources Center, Smithsonian Institution, 1997. (Carolina Biological Supply Company)

Sounds

Key Questions

- What can we learn about sound?
- Can we make an instrument which makes more than one note?

Skills

Students will

1. demonstrate that *sound* is produced by *vibrating* objects;

Sounds: Skills (cont'd.)

2. investigate ways of altering properties of sound, such as pitch and loudness, by changing the characteristics of its source;
3. invent an object that can produce sounds that can be varied (i. e. an instrument which can produce more than one note).

Recommended kit/materials

Acton Public Schools kit, *Sounds*, 1998

A World of Sound big book/teaching guide, Ranger Rick Science, Newbridge Publications, 1997.

Rocks and Minerals (Earth Science)

Key Questions:

- Where do rocks come from?
- What are some ways we can categorize rocks?
- What is the difference between rocks and minerals?

Concepts

Students will understand that

1. the earth is made of *layers of rocks*;
2. different kinds of rocks appear in different places;
3. minerals can be categorized by *properties* such as *hardness, color, texture*;
4. different rocks form in different ways;
5. earthquakes, volcanoes, and mountains are caused by forces within the earth's interior;
6. fossils provide evidence of the earth's history.

Recommended kit/materials

Scholastic Science Place Kit, *Rocks and Soils*, 1997. (Rocks section only)