

## ACTON PUBLIC SCHOOLS

### KINDERGARTEN SCIENCE PROGRAM\*

#### Description

The Kindergarten Science program is intended to be a discovery program, with some emphasis on each of the Domains of Science over the course of the year. The objectives as written assume an active, inquiry-oriented science program which builds on children's natural sense of curiosity about the world.

#### Teaching Strategies

Teachers may choose to use science kits or to develop their own lessons in the following areas, using the out-of-doors and hands-on activities whenever possible, and integrating the study of science into their Language Arts, Mathematics and Social Studies programs. Observation and discovery are the key to Kindergarten science, giving students a rich variety of experiences on which they may build their language skills and content knowledge about the world in which they live. Our Kindergarten Science Program is taught differently in each elementary school, but it is based on the following objectives:

#### Selected Massachusetts PreK–2 Frameworks Objectives for Kindergarten

##### Earth and Space Science

- E.1 Recognize that water, rocks, soil, and living organisms are found on the earth's surface.
- E.3. Describe the weather changes from day to day and through the seasons.
- E.4. Recognize that the sun supplies heat and light to the earth and is necessary for life.
- E.5. Identify some events around us that have repeating patterns, including the seasons of the year, day and night.

##### Life Science

- L.1 Recognize that animals (including humans) and plants are living things that grow, reproduce, and need food, air and water.
- L.2 Differentiate between living and non-living things. Group both living and non-living things according to the characteristics that share.
- L.3. Recognize that plants and animals have life cycles and that life cycles vary for different living things.
- L.7 Recognize changes in appearance that animals and plants go through as the seasons change.
- L.8 Identify ways in which an organism's habitat provides for its basic needs (plants require air, water, nutrients, and light; animals require food, water, air and shelter).

### Physical Science

- P.1 Sort objects by observable properties such as shape, color, weight and texture.
- P.5 Recognize that under some conditions objects can be balanced.

### Technology/Engineering

- T.1.1 Materials/Tools: Identify and describe characteristics of natural materials (e.g., wood, cotton, fur, wool) and human-made materials (e.g., plastic, Styrofoam).
- T.1.3 Materials/Tools: Identify and describe the safe and proper use of tools and materials (e.g., glue, scissors, tape, ruler, paper, toothpicks, straws, spools) to construct simple structures.
- T.2.1 Engineering Design: Identify tools and simple machines used for a specific purpose; e.g., ramp, wheel pulley, lever. (APS editing)

## The Changing Seasons (Earth and Space Science)

### Organizing Question

- What can we observe about the changing seasons?
- What is the predictable pattern?

### APS Goals, Concepts, and Skills

1. Children recognize that the Earth goes through changes with each season. (MA E.5)
2. Children recognize and describe physical changes that occur in the schoolyard during each season. (MA E.5/L.3)
  - ~ trees and plants
  - ~ animals and animal behavior
  - ~ temperature and weather
3. Children predict and discuss animal behaviors during different seasons. Using literature and other learning tools, children learn how different animals react to changes in weather and environment. (L.1/L.3)
4. Children observe, discuss, predict and graph schoolyard weather during each season. (MA E.3)

### Vocabulary

- change
- seasons (winter, spring, summer, fall/autumn)
- temperature
- weather
- precipitation

## Schoolyard Science (Life Science)

### Organizing Question

- What can we observe about the plants, animals and non-living things in our schoolyard?
- How do the animals and plants in the schoolyard respond to seasonal changes?

### Goals, Concepts and Skills

1. Children explore and understand that plants and animals are living things and have characteristics that differentiate them from non-living things. (MA L.1/L.2)
2. Children are able to provide examples of differences and similarities among individuals of the same species. They understand that, although it may be difficult to see, this is true of all kinds of organisms. (MA L.2)
3. Children observe and discuss different species of an animal (i.e., insects; birds) and recognize the similarities and differences between these species. (MA L.2)
4. Children observe and discuss different species of trees, recognizing their similarities and differences. (MA L.2)

### Vocabulary

- living/non-living
- property
- specific names of animals and plants studied (e.g. Insects: ladybugs, ants; trees: pine, oak, maple, etc.)

### Recommended kit/materials

Optional (not available in all buildings): *Trees* (FOSS kit), Full Option Science System, Lawrence Hall of Science, UC Berkeley.

## Balls and Ramps (Physical Science)

### Organizing Questions

- What can we learn by playing with balls and ramps?
- What can we learn by connecting ramps to one another?
- What materials make good balls?
- Does the weight of a ball influence how fast it rolls?
- What materials make good ramps? good balls?

### **Goals, Concepts and Skills**

1. Children explore, observe, discover, and describe characteristics and properties of balls and their motion. (MA T.1.1)
2. Children explore relationships between the physical properties of balls (size, weight, material, etc.) and their movement on ramps of different degrees of steepness and surface texture. (MA T.1.3)
3. Children are introduced to and use appropriate vocabulary to describe their explorations.

### **Vocabulary**

- gravity
- friction
- speed
- cause/effect
- ramp/ball
- energy

### **Recommended kit/materials:**

*Balls and Ramps*, Insights Kit, Educational Development Center, Newton, MA 1991.

## **Floating/Sinking** **(Physical Science)**

### **Key Questions**

- Can we make predictions and test them?
- Can we change something from a sinker to a floater?

### **Goals, Concepts and Skills**

1. Children recognize that some objects float and some objects sink. (MA P.1)
2. Children make predictions as to whether or not an object will float or sink. (Inquiry)
3. Children have the opportunity to experiment and explore with different types of objects and will graph in some form the results of their experimentation. (Inquiry/Math)
4. Building upon their exploration, children will observe and discuss similarities and differences in the material characteristics of objects that affect whether they float or sink (i.e., objects made of wood will usually float; objects made of metal will usually sink).(MA T.1.1)

5. In further explorations, children may investigate what would happen if materials are combined (e.g., a wooden clothes pin with a metal spring) or altered in shape (e.g., a ball of clay shaped into a boat). (MA T.1.1)

**Vocabulary**

- float/sink
- weight
- size
- property
- material names (e.g. wood, plastic, metal, glass)

**Recommended kit/materials**

There should be a water table in each classroom.

Optional: *Wood* (FOSS kit), Full Option Science System, Lawrence Hall of Science, UC Berkeley.

Optional: *Matter* (FOSS kit), Full Option Science System, Lawrence Hall of Science, UC Berkeley.