



## **Science Curriculum – Early Childhood**

**May 2007**

# Introduction

## *Science Curriculum*

Early Childhood teachers at Baker Demonstration School subscribe to the philosophy of the National Science Education Standards.

From the earliest grades, students should experience science in a form that engages them in the active construction of ideas and explanations that enhance their opportunities to develop the abilities of doing science. Teaching science as inquiry provides teachers with the opportunity to enrich student understanding of science. Students work with science in ways that are within their developmental capabilities.

In the early years of school, students can investigate earth materials, organisms, and properties of common objects. Although children develop concepts and vocabulary from such experiences, they also should develop inquiry skills. As students focus on the processes of doing investigations, they develop the ability to ask scientific questions, investigate aspects of the world around them, and use their observations to construct reasonable explanations for the questions posed. Guided by teachers, students continually develop their science knowledge. Students also learn how to communicate their own and their peers' explanations about their investigations.

### **Skills and Processes:**

- Formulates questions
- Generates hypotheses
- Observes in detail
- Draws conclusions based on observations
- Communicates investigations and explanations
- Compares observations of individual and group results
- Makes connections about issues affecting people and environment
- Uses scientific equipment

### Concepts

#### **Life Science**

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|------------------------------|--|
| Characteristics of Organisms | • All living organisms breathe, reproduce, excrete waste, require nutrients, require a particular range of temperatures, need shelter, and die |
| Life Cycles of Organisms     | • All living organisms have sensory properties for protection, to gain information, and for survival   |
| Environment of Organisms     | • Organisms and their environments are interconnected  |
|                              | • All living things change and go through life cycles  |
|                              | • Life cycles are different for different organisms  |
|                              | • Plants and animals closely resemble their parents  |
|                              | • Plants and animals have features that help them adapt and thrive in different kinds of environments  |
|                              | • Some kinds of organisms that once lived on earth have completely disappeared, although they resemble others that are alive today             |
|                              | • All animals depend on plants. All animals are part of one or more food chains  |

## Concepts

### **Earth and Space Science**

Properties of Earth Materials

- Earth materials are solid rocks and soils, water, and the gases of the atmosphere

Objects in the Sky

- Soil is a mixture of living, non-living and decomposing materials that is ever changing
- Soils have properties of color and texture, capacity to retain water, and the ability to support the growth of many kinds of plants, including those in our food supply
- The earth's surface changes over time due to the effects of water, wind and ice
- Fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at that time
- The water cycle causes and affects climate and weather
- The sun warms the air, land and water
- Some events in nature have repeating patterns
- The sun provides the light and heat necessary to maintain the temperature of the earth
- Objects in the sky have regular patterns of movement

### **Physical Science**

Properties of objects and materials

- Objects have observable properties, including size, weight, shape, temperature, color, location, and the ability to react to other substances. These properties can be measured using tools

Energy

- All matter has distinct properties and different purposes because of those properties

Position and motion of objects

- Materials can exist in different states: solid, liquid and gas.
- Light, heat, electricity, sound, magnetism and calories are common forms of energy
- Gaining and losing any form of energy can change things
- Some forms of energy cannot disappear; they only change (renewable and non-renewable) resources
- The position of an object can be described by locating it relative to another object or to the background
- An object's motion can be described by tracing and measuring its position over time
- Pushing or pulling can change the position and motion of objects. The size of the change is related to the strength of the push or pull
- Vibrating objects produces sound. Changing the rate of vibration can vary the pitch of the sound
- Space travel

## Concepts

### Science in Personal and Social Perspectives

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| Personal health characteristics            | • Safety and security are basic needs of humans  |
| Characteristics and changes in populations | • Individuals have some responsibility for their own health.   |
| Types of resources                         | • Germs cause some diseases  |
| Changes in Environments                    | • People can learn from each other by telling and listening, showing and watching, and imitating what others do  |
| Science and Technology in Local Challenges | • Human beings can use the memory of their past experiences to make judgments about new situations   |
|  | • Good nutrition, exercise, and rest are essential to good health.   |
|  | • Human populations include groups of individuals living in a particular location  |
|  | • People tend to live in families and communities in which individuals have different roles  |
|  | • People are alike and different in many ways  |
|  | • The groups to which they belong often influence the way people act   |
|  | • Money can buy things that people need or want. People earn money by working at a job making or growing things, selling things, or doing things to help other people  |
|  | • All humans want to be treated fairly, and some rules/laws make this possible   |
|  | • Disagreements are common, even between family members and friends. Some ways of dealing with them work better than others. People who are not involved in an argument may be helpful in solving it   |
|  | • Rules/regulations at home, at school, and in the community allow individuals to know what to expect and can assist in reducing the number of disputes  |
|  | • Resources are things we get from the living and non-living environment to meet the needs and wants of a population   |
|  | • Some resources are basic materials, such as air, water, and soil; some are produced from basic resources, such as food, fuel, and building materials; and some resources are non-material, such as quiet places, beauty, security and safety |
|  | • The supply of many resources is limited. If used, resources can be extended through recycling and decreased use  |
|  | • Environments are the space, conditions, and factors that affect an individual's and a population's ability to survive and their quality of life  |
|  | • Changes in environments can be natural or influenced by humans. Pollution is a change in the environment that can influence the health, survival, or activities of organisms, including humans   |
|  | • People continue inventing new ways of doing things, solving problems, and getting work done  |
|  | • Science and technology have greatly improved food quality and quantity, transportation, health, sanitation, and communication. These benefits of science and technology are not available to all of the people in the world                  |
|  | • Human beings have made tools and machines to sense and do things that they could not otherwise sense or do at all, or as quickly, or as well   |