

# Science

- Scientific Skills and Methods
- Scientific Knowledge



Young children are natural scientists. They easily become fascinated by everyday happenings. Through varied and repeated opportunities to observe, manipulate, listen, reflect, and respond to open-ended questions, preschoolers make decisions and become higher-level thinkers.

In quality early childhood programs, science activities require a balance of content and process, using multi-sensory experiences. In addition to science inquiry skills, preschoolers can begin to acquire a foundation of scientific concepts and knowledge on which they can build a clear understanding of their world.

Early childhood teachers and caregivers should look for opportunities to explore scientific concepts in all content areas.

## Strategies to support inclusive learning environments:

- ❖ Use special or adaptive devices to increase a child's level of participation
- ❖ Encourage hands-on and sensory experiences such as touching, holding, exploring, tasting, smelling and manipulating
- ❖ Provide physical guidance/support in using science tools when needed

Some general accommodations to support children with special learning or developmental needs can be found on page 9 and in Rule 51.

# Scientific Skills and Methods

## Widely Held Expectations

- Child develops scientific skills and methods
  - Makes observations, and describes objects and processes in the environment
  - Begins to make comparisons between objects that have been observed
  - Begins to find answers to questions through active investigation
- Child uses sentences that include two or more ideas with descriptive details
- Child uses senses, materials, events in nature, and the environment to investigate and expand knowledge

## Learning in Action: Examples

### The Child

- Explores various materials to learn about weight, shape, size, color and temperature
- Uses a variety of tools and objects to explore the world and how things work in the world (uses magnets to pick up metal, observes through a microscope, etc.)
- Makes observations, tries things out to see what will happen, etc.

### The Adult

- Encourages children to ask questions and find answers through active exploration and reflection on what they learn
- Observes nature and discusses the life cycles of animals (butterflies, frogs, etc.)
- Includes science materials to encourage exploration (magnets, magnifying glasses, and mirrors, etc.)

### THE ENVIRONMENT INCLUDES

- Materials that are available throughout the day for hands-on exploration and manipulation, which provide opportunities to explore natural objects and events
- Magnets, magnifying glasses, balance scales, gears, pulleys, mirrors, measuring devices, etc.

### Related Standards

#### Nebraska K-12 State Standards

- Reading/Writing
  - 1.1.4
  - 1.1.7
- Science
  - 1.1.1
  - 1.1.3
  - 1.2.1
  - 1.3.1
  - 1.4.2
  - 1.5.1
  - 1.6.1
  - 1.6.2
  - 1.8.1
- Mathematics
  - 1.4.2

#### Nebraska Rule 11 Regulations

- 004.05A3
- 004.05A6
- 004.06C
- 004.06D
- 004.06E

#### Head Start Outcomes Framework

- 4.1.1
- 4.1.2
- 4.1.3
- 4.1.4
- 4.1.5

# Scientific Knowledge

## Widely Held Expectations

### Related Standards

#### Nebraska K-12 State Standards

##### Reading/Writing

1.1.4

##### Science

1.1.1

1.1.3

1.2.1

1.3.1

1.4.1

1.4.2

1.5.1

1.5.2

1.8.1

##### Social Studies/

##### History

1.2

1.4

##### Mathematics

1.1.2

1.3.1

1.3.2

1.3.3

1.3.4

1.3.5

#### Nebraska Rule 11

##### Regulations

004.05A3

004.05A6

004.06C

004.06D

004.06E

##### Head Start Outcomes

##### Framework

4.2.1

4.2.2

4.2.3

4.2.4

- Child develops knowledge of the scientific process
  - Shows interest in active investigation
  - Begins to make comparisons among objects that have been observed
  - Describes or represents a series of events in the correct sequence
- Child demonstrates understanding of simple cause and effect relationships
- Child shows interest in measurement of time, length, distance, and weight
- Child develops increased ability to observe and discuss things that are common and things that are different

## Learning in Action: Examples

### The Child

- Compares the properties of objects that float in water with objects that sink
- Uses an eye dropper to drop color in glasses of water
- Compares handprint to those of classmates
- Joins in discussions about what we do during the day and what we do at night

### The Adult

- Encourages children to discuss objects and events that have been observed
- Provides opportunities to observe nature and make predictions about natural events
- Adds living things such as plants and pets to the environment
- Provides opportunities for class observation and comparison

## THE ENVIRONMENT INCLUDES

- A variety of materials from the natural world (plants, animals, rocks, etc.)
- Scheduled walks in the neighborhood or community to observe natural objects and events
- Materials to encourage sand and water play

# Resources

*202 Science Investigations*--Marjorie Frank

*Dialogue on Early Childhood, Science, Mathematics and Technology Education*--American Association for the Advancement of Science

*Everybody Has a Body: Science from Head to Toe/Activities Book for Teachers of Children Ages 3-6*--Robert E. Rockwell, Robert A. Williams and Elizabeth A. Sherwood

*Everyday Discoveries: Amazingly Easy Science and Math Using Stuff You Already Have*--Sharon MacDonald

*Exploring Science in Early Childhood: A Developmental Approach*--Karen K. Lind

*Math and Science for Young Children 4E*--Rosalind Charlesworth and Karen K. Lind

*Science Experiences for the Early Childhood Years: An Integrated Approach*--Jean D. Harlan and Mary S. Rivkin

*Worms, Shadows and Whirlpools: Science in the Early Childhood Classroom*--Karen Worth and Susan Grollman

*Young Children and Technology: A World of Discovery*--Susan W. Haugland and June L. Wright

These books and many other resources may be borrowed by Nebraska residents from the Early Childhood Training Center. A web-based search of these media materials is offered at [www.esu3.org/ectc](http://www.esu3.org/ectc) or telephone contact may be made by calling 1-402-597-4826 or 1-800-89CHILD.

## Books for Children

*The Carrot Seed*--Ruth Krauss

*From Seed to Plant*--Gail Gibbons

*Listen to the desert: Oye al desierto*--Pat Mora

*The Mitten*--Jan Brett

*More, Fewer, Less*--Tana Hoban

*Rocks, Rocks, Big and Small*--Joanne Barkan

*The Surprise Garden*--Zoe Hall

*The Very Hungry Caterpillar*--Eric Carle

*When Autumn Comes*--Robert Maass