Nashoba Regional School District

SCIENCE AND TECHNOLOGY/ ENGINEERING

Standards and Benchmarks
Grade K

Nashoba Regional School District Science and Technology/Engineering Standards and Benchmarks, 2006.

Work in this document is based upon the standards outlined in the Massachusetts Science and Technology/Engineering Curriculum Framework (2001), updated (2006).

SCIENCE AND TECHNOLOGY/ENGINEERING

Acknowledgements

The Science and Technology/Engineering Standards and Benchmarks documents are the result of the work of a cross-section of elementary teachers from within the Nashoba Regional School District. These dedicated teachers spent over a year researching, writing, and editing curriculum that mapped to state mandated standards. The district recognizes the ongoing support of building and district administrators, the excellent work of the Science Task Force, district grade-level teachers, and especially the following people:

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Overview

The Massachusetts Science and Technology/Engineering Curriculum Framework was used as the guide for developing the NRSD Standards and Benchmarks document. "Mastery" expectations have been identified for each grade level in accordance with these documents. Mastery expectations should be based on grade-appropriate developmental performance levels.

Each grade includes curriculum for the four strands: Earth and Space Science, Life Science, Physical Science, and Technology and Engineering. Each strand includes the appropriate Learning Standards, Big Ideas, and Essential Questions. Additionally, further ideas and resources are included to help guide the teaching of the given unit topic/theme. These resources include: Learning Experiences and Investigations, suggested Coverage Timeline, Assessments, and Resources. It is our expectation that this "resource" section will continue to improve and develop over time.

Science and Technology/Engineering by Grade Level
Grade: K
Standards and Benchmarks

Massachusetts Science and Technology/Engineering Curriculum Frameworks (2001), updated (2006)

EARTH AND SPACE SCIENCE STRAND

UNIT/TOPIC THEME: Earth's Materials, Living and Non-Living Things

Kindergarten students will be **EXPOSED** to the following**:**

Learning Standard ES 1

Recognize that water, rocks, soil and living organisms are found on the earth's surface.

Learning Standard ES 2

Understand that air is a mixture of gases that is all around us and that wind is moving air.

Big Ideas

Water, rocks, soil, and air have different properties and are found all around us.
Living organisms are found in the natural environment.
Air takes up space.

Essential Questions

What are the living things in our environment?
What are the properties of water, rocks, soil, and air?
What do the non-living things do, look like, and feel like?
What happens when non-living things are combined?

Coverage Timeline

- Timeline is flexible, depending on student interest and corresponding opportunities.
- Children will be exposed to experiences in their natural environment throughout the year.

Possible Investigations and Learning Experiences

- Combine sand and water to make mud.
- Play in the water table to explore properties of water; pouring, filling, and emptying containers of different sizes and shapes.
- Examine rocks and soil.
- Inflate a ball with a hand pump.

Evidence of Learning

- Use scientific vocabulary to describe and classify water, rocks, soil, and living organisms.

EARTH AND SPACE SCIENCE STRAND - continued…

UNIT/TOPIC THEME: WEATHER

Kindergarten students will be **EXPOSED** to the following**:**

Learning Standard ES 3

Describe the weather changes from day to day and over the seasons.

Big Ideas

Weather changes from day to day and week to week.
Features of weather include cloud cover, sun, rain, and snow.

Essential Questions

What weather changes occur daily and yearly?
Are there any patterns?
How can we record weather from day to day?
How does weather affect our lives?

Coverage Timeline

- Timeline is flexible, depending on student interest and corresponding opportunities.
- Children will be exposed to experiences in their natural environment throughout the year.

Possible Investigations and Learning Experiences

- Make weather charts and graphs.
- Use tools such as a thermometer, rain gauge, etc.

Evidence of Learning

- Interpret recorded data about the weather from a graph.

EARTH AND SPACE SCIENCE STRAND - continued…

UNIT/TOPIC THEME: Sun as a Source of Light and Heat

Kindergarten students will be **EXPOSED** to the following**:**

Learning Standard ES 4

Recognize that the sun supplies heat and light to the earth and is necessary for life.

Big Idea

The sun supplies heat and light to the earth and is necessary for life.

Essential Questions

Why do we need the sun?
How does the sun affect objects in our life and on the Earth?

Coverage Timeline

- Timeline is flexible, depending on student interest and corresponding opportunities.
- Children will be exposed to experiences in their natural environment throughout the year.

Possible Investigations and Learning Experiences

- Make predictions about objects left in the sun.
- Observe and describe changes in objects left in the sun.

Evidence of Learning

- Make reasonable predictions of the effects of the sun's light/heat on objects and living things.

EARTH AND SPACE SCIENCE STRAND - continued…

UNIT/TOPIC THEME: Periodic Phenomena

Kindergarten students will be **EXPOSED** to the following:

Learning Standard ES 5

Identify some events around us that have repeating patterns, including the seasons of the year, day, and night.

Big Idea

There are certain repeating events in our everyday life such as the seasons, and day and night.

Essential Questions

What changes do you notice as day turns to night?
What outside changes can be observed throughout the year?

Coverage Timeline

- Timeline is flexible, depending on student interest and corresponding opportunities.
- Children will be exposed to experiences in their natural environment throughout the year.

Possible Investigations and Learning Experiences

- Make a list of what you see outdoors and in the sky during the day. Make another list of things you see outdoors and in the sky at night. Discuss the differences between the day and night lists.
- Have students identify past experiences in relation to the seasons.
- For a week have students draw pictures each day to represent their schedule before school, during school, and before bedtime.
- Record changes that happen through the seasons (i.e., trees and plants).

Suggested Extensions to Learning in Technology/Engineering

- Use a thermometer to record the temperature from morning to noon over several weeks and discuss any patterns that emerge. (T/E 1.3, 2.1)

Evidence of Learning

- Observation/record keeping
- Participation in classroom discussion
- Ability to identify the repetition of events
- Journals

Resources

- Pictures
- Thermometer

LIFE SCIENCE STRAND

UNIT/TOPIC THEME: Heredity/Evolution and Biodiversity

Kindergarten students will demonstrate **MASTERY** of the following learning standards[1]:

Learning Standard LS 4

Describe ways in which many plants and animals closely resemble their parents in observed appearance.

Learning Standard LS 5

Recognize that fossils provide us with information about living things that inhabited the earth years ago.

Big Ideas

Plants and animals may resemble their parents.
We use fossils to learn about living things.

Essential Questions

How are plants and animals alike or different from their parents?
How are living things different today than long ago?

Coverage Timeline

- Timeline is flexible, depending on student interest and corresponding opportunities.
- Children will be exposed to experiences in their natural environment throughout the year.

Possible Investigations and Learning Experiences

- Look at and discuss pictures of animals from the same species. Observe and discuss how they are alike and how they are different.
- Look at a variety of fossils or pictures of fossils, including plants, fish, and extinct species. Guess to which living organisms they might be related.
- Record observations of living things as they grow (i.e., plants, frogs, butterflies).

Suggested Extensions to Learning in Technology/Engineering

- Make a fossil print of plant leaves using clay or putty. (T/E 1.1, 1.2)

Evidence of Learning

- Observation
- Participation in classroom discussion

[1] Expectations should be based on an appropriate developmental performance level.

LIFE SCIENCE STRAND - continued…

Resources

- Pictures
- Manipulatives
- Big books
- Videos/CD's
- Living examples of animals/plants
- Field trips
- Actual fossils

PHYSICAL SCIENCE STRAND

UNIT/TOPIC THEME: Observable Properties of Objects

Kindergarten students will be **EXPOSED** to the following:

Learning Standard PS 1

Sort objects by observable properties such as size, shape, color, weight, and texture.

Big Idea

All objects can be sorted by color, shape, size, weight, and texture.

Essential Question

How can we sort objects?

Coverage Timeline

- Timeline is flexible, depending on student interest and corresponding opportunities.
- Children will be exposed to experiences in their natural environment throughout the year.

Possible Investigations and Learning Experiences

- Manipulate, observe, compare, describe, and group objects found in the classroom, on the playground, and at home.

Suggested Extensions to Learning in Technology/Engineering

- Predict the use of a simple tool or object based on its shape and parts (e.g., pliers, letter opener, paperweight). (T/E 1.3, 2.1)

Evidence of Learning

- Observation
- Participation in classroom discussion
- Demonstrate the ability to sort objects by color, shape, size, weight, and texture.

Resources

- Pictures
- Manipulatives

TECHNOLOGY AND ENGINEERING STRAND

UNIT/TOPIC THEME: Materials and Tools

Kindergarten students will be **EXPOSED** to the following:

Learning Standard T/E 1.1
Identify and describe characteristics of natural materials and human-made materials.

Learning Standard T/E 1.2
Identify and explain some possible uses for natural materials (e.g., wood, cotton, fur, wool) and human-made materials (e.g., plastic, Styrofoam).

Learning Standard T/E 1.3
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.

Big Ideas

Some materials and tools we need/use are obtained from natural sources, while others are made by humans.
Tools should be used safely.
Tools are used to construct simple structures.

Essential Questions

What is the difference between wood and Styrofoam?
How can you use wood, cotton, fur, and wool?
How can you use plastic or Styrofoam?
How do we use tools safely?

Coverage Timeline:

- It is recommended that technology and engineering standards should permeate all other units in such a way that students are able to make connections to real-life applications of the material learned throughout the school year.

Possible Investigations and Learning Experiences:

- Discuss a sample of items and determine what they are made of and how they can be used safely.
- Construct simple structures using tools.

From Earth and Space Science Strand:

- Use a thermometer to record the temperature from morning to noon over several weeks and discuss any patterns that emerge. (T/E 1.3, 2.1)

From Life Science Strand:

- Make a fossil print of plant leaves using clay or putty. (T/E 1.1, 1.2)

From Physical Science Strand:

- Predict the use of a simple tool or object based on its shape and parts (e.g. pliers, letter opener, paperweight.). (T/E 1.3, 2.1)

TECHNOLOGY AND ENGINEERING STRAND - continued…

Evidence of Learning

- Observation
- Participation in classroom discussion
- Discussion

Resources

- Unusual and common objects naturally made and manufactured