

Nashoba Regional School District

SCIENCE AND TECHNOLOGY/ ENGINEERING

**Standards and Benchmarks
Grade 1**



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: 1

Standards and Benchmarks

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

EARTH AND SPACE SCIENCE STRAND

UNIT/TOPIC THEME: Earth as a Habitat

Grade 1 students will demonstrate **MASTERY** of the following learning standards¹:

Learning Standard ES 1

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

Big Idea

The Earth is made of living and non-living things.

Essential Question

What is on the Earth's surface?

Coverage Timeline

- Approximately 4 weeks of instruction, but allow for flexibility based upon resources, student interest, and corresponding opportunities.

Possible Investigations and Learning Experiences

Note: It is suggested that this standard would work well in conjunction with the unit topic living and non-living things.

- Observe a variety of locations and surfaces around the school to discover which area has rocks, soil, water, and/or living organisms (e.g., observe a field, a stream, a path, a forest, etc.)
- Brainstorm places that you might find rocks, soil, water, and living organisms.
- Observe maps to show locations of land and water on Earth.
- Compare several biomes to observe their land and water make-up.

Suggested Extensions to Learning in Technology/Engineering

- Identify characteristics shared by naturally occurring rocks and man-made concrete. (T/E 1.1)

Resources

- Trade books
- Videos/CD's

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

LIFE SCIENCE STRAND

UNIT/TOPIC THEME: Living and Non-Living Things

Grade 1 students will demonstrate **MASTERY** of the following learning standards:

Learning Standard LS 1

Recognize that animals (including humans) and plants are living things that grow, reproduce, and need food, air, and water.

Learning Standard LS 2

Differentiate between living and non-living things. Group both living and non-living things according to the characteristics that they share.

Learning Standard LS 6

Recognize that people and other animals interact with the environment through their senses of sight, hearing, touch, smell, and taste.

Learning Standard LS 7

Recognize changes in appearance that animals and plants go through as the seasons change.

Learning Standard LS 8

Identify the 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).

Big Ideas

All living things need food, air, and water.

All living things grow and reproduce.

Living and non-living things can be sorted by special characteristics.

All animals interact with their environment through their senses.

Plants and animals may show change in response to the seasons.

Every living organism has a habitat that provides the basic needs (plants require nutrients, air, water, light; animals require food, air, water, and shelter).

Essential Questions

How do plants and animals change as the seasons change?

What are the differences between living and non-living things?

What are the basic needs of living things?

Why is it important for living things to reproduce?

How do animals use their senses to interact with their-environment?

What does a habitat provide for a plant or animal?

Coverage Timeline

- Approximately 8 weeks of instruction, but allow for flexibility based upon resources, student interest, and corresponding opportunities.

LIFE SCIENCE STRAND - continued...

Possible Investigations and Learning Experiences

- Sort and classify objects or pictures into living and non-living groups.
- Adopt a tree to observe how it changes through the seasons.
- Observe a variety of plants and animals within one biome and how their habitats provide for their basic needs.
- Discuss the ideas of endangerment and extinction, and why it is important for organisms to successfully grow and reproduce.
- Explore how students use their own senses and research how other animals use their senses.
- Each child writes his/her own book about the seasons (see resources).

Suggested Extensions to Learning in Technology/Engineering

- Design and construct a habitat for a living organism that meets its needs for food, air and water. (T/E 1.2, 1.2, 2.3)
- Design and build an ant farm. Observe how ants use their senses and how they communicate to each other the location of a food source. (T/E 1.1, 1.2, 1.3)
- Visit a maple syrup manufacturing facility. Discuss the sap-to-maple syrup process and the seasonal life cycle of a tree. (T/E 1.1, 1.2)
- Visit an apple orchard. Discuss the flower-to-fruit process and the seasonal life cycle of a tree. (T/E 1.1, 1.2)
- Using simple tools and materials have students draw pictures of their houses and an animal's habitat. Discuss differences and similarities. (T/E 1.3)

PHYSICAL SCIENCE STRAND

UNIT/TOPIC THEME: Properties of Objects and States of Matter

Grade 1 students will demonstrate **MASTERY** of the following learning standards:

Learning Standard PS 1

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

Learning Standard PS 2

Identify objects and materials as solid, liquid, or gas. Recognize that solids have a definite shape and that liquids and gases take the shape of their container.

Big Ideas

There are three states of matter: solid, liquid, and gas.

Each state of matter has its own properties which can be observed.

The Earth is made of living and non-living things. (Note: Big Idea link to Unit/Topic “Living and Non-Living Things”)

Essential Questions

What is matter?

What are the states of matter?

What are the properties of solids, liquids, and gases?

Coverage Timeline

- Approximately 4-6 weeks of instruction, but allow for flexibility based upon resources, student interest, and corresponding opportunities.

Possible Investigations and Learning Experiences

- Learn the properties of solids by touching, observing, and manipulating a variety of different solids.
- Learn the properties of liquids by observing a variety of different liquids in enclosed bottles.
- Compare and contrast the properties of liquids and solids.
- Dramatize the movements of molecules in solids, liquids, and gases.

Suggested Extensions to Learning in Technology/Engineering

- Ask students to bring in different types of containers from home. Discuss and demonstrate whether the containers are appropriate to hold solids and liquids (e.g., an unwaxed cardboard box will absorb water and eventually disintegrate while a glass bottle will not.). (T/E 1.1, 1.2)

Resources

- FOSS Kit- Solids and Liquids

TECHNOLOGY AND ENGINEERING STRAND

UNIT/TOPIC THEME: Materials and Tools and Engineering Design

Grade 1 students will be **INTRODUCED** to the following learning standards:

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.

Learning Standard T/E 2.1

Identify tools and simple machines used for a specific purpose (e.g., ramp, wheel, pulley, lever.)

Grade 1 students will demonstrate **MASTERY** of the following learning standard:

Learning Standard T/E 2.2

Describe how human beings use parts of the body as tools (e.g., teeth for cutting, hands for grasping and catching), and compare their use with the ways in which animals use those parts of their bodies.

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

From Earth Science Strand:

- Identify characteristics shared by naturally occurring rocks and manmade concrete. (T/E1.1)

From Life Science Strand:

- Design and construct a habitat for a living organism that meets its needs for food, air and water. (T/E 1.1, 1.2, 2.1)
- Discuss the different ways animals and humans use their body as tools. (T/E 2.2)
- Design and build an ant farm. Observe how ants use their senses and how they communicate to each other the location of a food source. (T/E 1.1, 1.2, 1.3, 2.1)
- Visit a maple syrup manufacturing facility. Discuss the sap-to-maple syrup process and the seasonal life cycle of a tree. (T/E 2.1)
- Visit an apple orchard. Discuss the flower-to-fruit process and the seasonal life cycle of a tree. (T/E 1.1, 1.2)

TECHNOLOGY AND ENGINEERING STRAND - continued...

From Life Science Strand (continued):

- Using simple tools and materials have students draw pictures of their houses and an animal's habitat. Discuss differences and similarities. (T/E 1.3)

From Physical Science Strand:

- Ask students to bring in different types of containers from home. Discuss and demonstrate whether the containers are appropriate to hold solids and liquids (e.g., an unwaxed cardboard box will absorb water and eventually disintegrate while a glass bottle will not). (T/E 1.1, 1.2)