

Nashoba Regional School District

SCIENCE AND TECHNOLOGY/ ENGINEERING

**Standards and Benchmarks
Grade 2**



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: 2

Standards and Benchmarks

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

EARTH AND SPACE SCIENCE STRAND

UNIT/TOPIC THEME: Weather

Grade 2 students will demonstrate **MASTERY** of the following learning standards¹

Learning Standard ES 2

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

Learning Standard ES 3

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

Learning Standard ES 4

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

Learning Standard ES 5

Identify events with repeating patterns including day and night and seasonal patterns.

Big Ideas

The sun is central to Earth's weather and the basic water cycle.

Daily changes in weather affect our daily lives.

Weather moves from place to place, and wind moves the weather.

Essential Questions

How does the sun affect the water cycle?

How does the weather change from day-to-day and season-to-season?

Why does weather move from place to place?

Coverage Timeline

- It is recommended that you plan for 4 – 8 weeks of instruction, but allow for flexibility based upon resources, student interest, and corresponding opportunities.

Possible Investigations and Learning Experiences

- Create a daily weather log over the course of about a month. Students observe elements of weather such as precipitation, temperature, wind, and storm types. This daily log would allow students to comment on the effects that weather has on their lives each day.
- Explore the four basic stages of the water cycle: evaporation, condensation, precipitation, and collection.

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

EARTH AND SPACE SCIENCE STRAND – continued...

Possible Investigations and Learning Experiences

- Follow a weather system from the west coast of the United States to the east coast to observe the movement of weather.
- Identify the four main types of precipitation and their seasons: rain, hail, snow, and sleet/ice.
- Identify the seasons and describe the weather during each season.
- Identify and observe the main types of clouds: cumulous, stratus, cirrus, nimbus, and fog.
- Keep a class weather chart indicating daily temperature, how windy it is, which direction wind is blowing (use visual clues), and kind of precipitation, if any.
- Identify and research major storms such as hurricanes, tornadoes, thunder/lightning storms, and blizzards.
- 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

- Design a kite and identify which materials would be used for its construction. Classify them as natural or manmade materials. Build the kite and fly it outside. (T/E 1.1, 1.2)
- Design and build a tool that could be used to measure weather (wind sock, anemometer, wind vane, thermometer, rain gauge). (T/E 1.3)

Resources

- The Cloud Book by Tomie dePaola
- Foss Kit –Weather (Book only)
- Internet (Weather Channel www.weather.com) to observe weather movements

LIFE SCIENCE STRAND

UNIT/TOPIC THEME: Plants and Animals

Grade 2 students will demonstrate **MASTERY** of the following learning standard:

Learning Standard LS 3

Recognize that plants and animals have life cycles, and that life cycles vary for different living things.

Big Ideas

Plants and animals have life cycles.

Life cycles may be different for different living things.

Essential Questions

What are the stages of a life cycle (sequence)?

Compare the life cycles of two living things. How are they the same? How are they different?

Coverage Timeline

- It is recommended that you plan for 8 weeks of instruction, but allow for flexibility based upon resources, student interest, and corresponding opportunities.
- Observations of life cycles could be on-going throughout the year.

Possible Investigations and Learning Experiences

- Within the classroom, raise and observe the life cycles of a plant and animal. Examples: vegetable plants, flowering plants, butterflies, mealworms, brine shrimp, frogs.
- Observe the stages of a tree's life cycle in the forest: rotting log, seed, seedling, sapling, adult tree.
- Research the stages of a life cycle for any plant, animal, or fungi.
- Observe a variety of life cycles within one biome and how they are interdependent.

Suggested Extensions to Learning in Technology/Engineering

- Design and build a habitat for a living organism that can be modified to meet the changing needs of the organism during its life cycle. (T/E 1.1, 1.2)
- Design and construct a habitat for a living organism that meets its needs for food, air and water. (T/E 1.2, 1.2)

Resources

- FOSS Kit (butterfly & mealworms)
- Caroline Scientific: Butterfly Kit

PHYSICAL SCIENCE STRAND

UNIT/TOPIC THEME: Forces and Motion

Grade 2 students will demonstrate **MASTERY** of the following learning standards:

Learning Standard PS 3

Describe the various ways that objects can move, such as in a straight line, zigzag, back-and-forth, round-and-round, fast, and slow.

Learning Standard PS 4

Demonstrate that the way to change the motion of an object is to apply a force (give it a push or a pull). The greater the force, the greater the change in the motion of the object.

Learning Standard PS 5

Recognize that under some conditions, objects can be balanced.

Big Ideas

Objects move in a variety of ways.

The motion of an object is changed by applying a force.

Under some conditions, objects can be balanced.

Essential Questions

What causes matter to move?

When do objects balance?

How can you change an object's motion?

What are the different ways objects can move?

Coverage Timeline

- It is recommended that you plan for 4-6 weeks of instruction, but allow for flexibility based upon resources, student interest, and corresponding opportunities.

Possible Investigations and Learning Experiences

- Define, classify and/or sort the variety of movements, such as a straight line, zigzag, back-and-forth, round-and-round, fast, and slow.
- Experiment with or create a variety of balancing tools.
- Brainstorm and explore all the possible forces that a student could put upon an object to change its movement.

Suggested Extensions to Learning in Technology/Engineering

- Using construction paper and glue, design a three-dimensional object that will roll in a straight line and a three-dimensional object that will roll around in a circle. (T/E 1.3)
- Design a lever, putting unequal weights on the ends of the balance board. Observe. Now find ways to restore the balance by moving the fulcrum, keeping each weight in the same place. Discuss what happens. (T/E 2.1)

PHYSICAL SCIENCE STRAND – continued...

Suggested Extensions to Learning in Technology/Engineering

- Design and create a 3-D amusement park ride. The ride must show two types of motion and incorporate at least one simple machine. Identify the force(s) that create these motions. (T/E 1.2, 2.1)

Resource

- Balance and Motion FOSS Kit

TECHNOLOGY AND ENGINEERING STRAND

UNIT/TOPIC THEME: Materials and Tools/Engineering Design

Grade 2 students will demonstrate **MASTERY** of 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).

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 and Space Science Strand:

- Design a kite and identify which materials would be used for its construction. Classify them as natural or manmade materials. Build the kite and fly it outside. (T/E 1.1, 1.2)
- Design and build a tool that could be used to measure weather (wind sock, anemometer, wind vane, thermometer, rain gauge). (T/E 1.3)

From Life Science Strand:

- Design and build a habitat for a living organism that can be modified to meet the changing needs of the organism during its life cycle. (T/E 1.1, 1.2)
- Design and construct a habitat for a living organism that meets its needs for food, air and water. (T/E 1.2, 1.2)

From Physical Science Strand:

- Using construction paper and glue, design a three-dimensional object that will roll in a straight line and a three-dimensional object that will roll around in a circle. (T/E 1.3)
- Design a lever, putting unequal weights on the ends of the balance board. Observe. Now find ways to restore the balance by moving the fulcrum, keeping each weight in the same place. Discuss what happens. (T/E 2.1)
- Design and create a 3-D amusement park ride. It must show two types of motion and incorporate at least one simple machine. Identify the force(s) that create the motions. (T/E 1.2, 2.1)