

Grade 5 Expectations in Science and Technology/Engineering

Learning standards are taken from both the 1999 and May 2001 from the MA Science and Technology/Engineering Curriculum Framework. The numbers correspond to the numbers in the 2001 state document. All students are expected to master all grade level expectations.

INQUIRY AND EXPERIMENTATION

Scientific inquiry and experimentation should not be taught or tested as separate, stand-alone skills. Rather, opportunities for inquiry and experimentation should arise within a well-planned curriculum in the domains of science. They should be assessed through examples drawn from life, physical, and earth and space science standards so that it is clear to students that in science, *what* is known does not stand separate from *how* it is known.

In fifth grade, students can plan and carry out investigations as a class, in small groups, or independently, often over a period of several class lessons. The teacher should first model the process of selecting a question that can be answered, formulating a hypothesis, planning the steps of an experiment, and determining the most objective way to test the hypothesis. Students should begin to incorporate the mathematical skills of measuring and graphing to communicate their findings.

Skills of Inquiry	Resources
1. Ask questions and make predictions that can be tested.	
2. Select and use appropriate tools and technology (e.g., calculators, computers, balances, scales, meter sticks, graduated cylinders) in order to extend observations.	
3. Keep accurate records while conducting simple investigations or experiments.	
4. Conduct multiple trials to test a prediction. Compare the result of an investigation or experiment with the prediction.	
5. Recognize simple patterns in data and use data to create a reasonable explanation for the results of an investigation or experiment.	
6. Record data and communicate findings to others using graphs, charts, maps, models, oral and written reports.	

**Strand 1: DOMAINS OF SCIENCE
EARTH SCIENCE**

Curriculum Framework Learning Standard	Resources
Rocks and Their Properties	
2. Identify the physical properties of minerals (hardness, color, luster, cleavage, and streak), and explain how minerals can be tested for these different physical properties.	Earth Materials FOSS <ul style="list-style-type: none"> • Investigations 2, 3, 4
** This standard is review at this grade level.	
3. Identify the three categories of rocks (metamorphic, igneous, and sedimentary) based on how they are formed, and explain the natural and physical processes that create these rocks.	Reading the Environment Insights <ul style="list-style-type: none"> • Learning Experiences 10,11
Earth Materials	
4. Explain and give examples of the ways in which soil is formed (the weathering of rock by water and wind and from the decomposition of plant and animal remains).	Reading the Environment, Insights <ul style="list-style-type: none"> • Learning Experience 6
5. Recognize and discuss the different properties of soil, including color, texture(size of particles), the ability to retain water, and the ability to support the growth of plants.	Reading the Environment, Insights <ul style="list-style-type: none"> • Learning Experience 14
12. Give examples of how the surface of the earth changes due to slow processes such as erosion and weathering, and rapid processes such as landslides, volcanic eruptions, and earthquakes.	Reading the Environment: Insights <ul style="list-style-type: none"> • Learning Experiences 6,9,12

**Strand 2: DOMAINS OF SCIENCE
LIFE SCIENCE**

Curriculum Framework Learning Standard	Resources
Adaptations of Living Things	
6. Give examples of how inherited characteristics may change over time as adaptations to changes to the environment that enable organisms to survive, e.g., shape of feet or beak, placement of eyes on head, length of neck, shape of teeth, color.	The Food Chain: Birds of Prey District Developed
10. Give examples of how organisms can cause changes in their environment to ensure survival. Explain how some of these changes may affect the ecosystem.	The Food Chain: Birds of Prey District Developed
Energy and Living Things	
11. Describe how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within a food chain from producers (plants) to consumers and decomposers. Review: photosynthesis	The Food Chain: Birds of Prey District Developed

**Strand 3: DOMAINS OF SCIENCE
THE PHYSICAL SCIENCES**

Curriculum Framework Learning Standard	Resources
Observable Properties of Objects	
1. Differentiate between properties of objects (e.g., size, shape, weight) and properties of materials (e.g., color, texture, hardness).	Mixtures and Solutions FOSS <ul style="list-style-type: none"> • Investigation 1-Parts 1,2,3 • Investigation 2-Parts 1,2,3,4 • Investigation 3-Parts 1,2,3 • Investigation 4-Parts 1,2,3
States of Matter	
2. Compare and contrast solids, liquids, and gases based on the basic properties of each of these states of matter.	Mixtures and Solutions FOSS <ul style="list-style-type: none"> • Investigation 1-Parts 2,3,4 • Investigation 2-Parts 3,4 • Investigation 4-Part 2
3. Describe how water can be changed from one state to another by adding or taking away heat.	Mixtures and Solutions FOSS <ul style="list-style-type: none"> • Investigation 1-Parts 2,3,4

Strand 4: TECHNOLOGY /ENGINEERING

Curriculum Framework Learning Standard	Resources
Materials and Tools	
**Materials currently being developed for this standard-new May 2001	
1.3 Identify and explain the differences between simple and complex machines, e.g., hand can opener that includes multiple gears, wheel, wedge gear, and lever.	Models and Designs FOSS <ul style="list-style-type: none"> • Investigations 2,3,4

Curriculum Framework Learning Standard	Resources
Nature of Technology	
1. Analyze products by taking them apart and reassembling them.	Models and Design FOSS
2. Analyze a product’s components and their functions.	Models and Design FOSS
Engineering: Design, Produce and Use	
3. Recognize a design need or engineering problem.	Models and Design FOSS
4. Develop, sketch, and discuss possible solutions and select one.	Models and Design FOSS
5. Select appropriate materials for the proposed solution.	Models and Design FOSS
6. Construct the object or a working model using a variety of materials, hand tools, and measuring devices.	Models and Design FOSS
7. Use, evaluate, and suggest ways to improve the object.	Models and Design FOSS
8. Communicate the solution through drawing, speaking, and writing.	Models and Design FOSS