

## Grade 4 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 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 the 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 fourth grade, students can plan and carry out investigations as a class, in small groups, or independently, often over a period of several class lessons.**

Curriculum Framework Learning Standard	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 and oral and written reports.	

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

<b>Curriculum Framework Learning Standard</b>	<b>Resources</b>
<b>Weather</b>	
6. Explain how air temperature, moisture, wind speed and direction, and precipitation make up the weather in a particular place and time.	<b>Changes of State Insights</b> • Lesson 14
7. Distinguish among the various forms of precipitation (rain, snow, sleet, and hail), making connections to the weather in a particular place and time.	<b>Changes of State Insights</b> • Lesson 14
<b>The Water Cycle</b>	
10. Describe how water on earth cycles in different locations, including underground and in the atmosphere.	
<b>Materials for these standards are currently being developed-New May 2001</b>	
8. Describe how global patterns such as the jet stream and water currents influence local weather in measurable terms such as temperature, wind direction and speed, and precipitation.	
9. Differentiate between weather and climate.	
11. Give examples of how the cycling of water, both in and out of the atmosphere, has an effect on climate.	

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

<b>Curriculum Framework Learning Standard</b>	<b>Resources</b>
<b>Life Cycles and Heredity</b>	
1. Understand that offspring tend to resemble their parents and that individuals of the same species have variations. (from PreK-2)	<b>Heredity</b> District Developed
2. Recognize the individuals of the same species differ in their characteristics.	<b>Heredity</b> District Developed
5. Differentiate between observed characteristics of plants and animals that are fully inherited (e.g., color of flower, shape of leaves,) and characteristics that are affected by climate or environment (e.g., browning of leaves due to too much sun)	Heredity District Developed

**Strand 3: DOMAINS OF SCIENCE  
PHYSICAL SCIENCE (Chemistry and Physics)**

<b>Curriculum Framework Learning Standard</b>	<b>Resources</b>
<b>Electricity and Magnetism</b>	
6. Recognize that electricity in circuits requires a complete loop through which an electrical current can pass, and that electricity can produce light, heat, and sound.	<b>Magnetism and Electricity FOSS</b> <ul style="list-style-type: none"> <li>• Investigations 2,3</li> </ul>
7. Identify and classify objects and materials that conduct electricity and objects and materials that are insulators of electricity.	<b>Magnetism and Electricity FOSS</b> <ul style="list-style-type: none"> <li>• Investigation 2</li> </ul>
8. Explain how electromagnets can be made, and give examples of how they can be used.	<b>Magnetism and Electricity FOSS</b> <ul style="list-style-type: none"> <li>• Investigation 4</li> </ul>
9. Recognize that magnets have poles that repel and attract each other.	<b>Magnetism and Electricity FOSS</b> <ul style="list-style-type: none"> <li>• Investigation 1</li> </ul>
10. Identify and classify objects and materials that a magnet will attract and objects and materials that a magnet will not attract.	<b>Magnetism and Electricity FOSS</b> <ul style="list-style-type: none"> <li>• Investigation 1</li> </ul>

### **Strand 4: TECHNOLOGY/ENGINEERING**

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