

Massachusetts Science and Technology/Engineering Curriculum Framework 2006

Appendix I PreK through High School Learning Standards Organized by Strand and Broad Topics

Broad Topic	STRAND: EARTH AND SPACE SCIENCE	
	PreK–2	Grades 3–5
Energy in the Earth System	3. Weather changes from day to day and over the seasons. 4. The sun supplies heat and light to the earth and is necessary for life.	6. Air temperature, moisture, wind speed and direction, and precipitation make up the weather in a particular place and time. 7. Various forms of precipitation are connected to the weather in a particular place and time. 8. Global patterns influence local weather, which can be measured. 9. Weather is different from climate.
Materials and Energy Resources	1. Water, rocks, soil, and living organisms are found on the earth’s surface. 2. Air is a mixture of gases all around us and wind is moving air.	1. What a mineral is. 2. Physical properties of minerals and tests for those. 5. The properties of soil include color, texture, and the abilities to retain water and support the growth of plants.
Earth Processes and Cycles		3. The three categories of rocks and the processes that create them. 4. Soil is formed by the weathering of rock and decomposition of plant and animal remains. 10. Water on earth cycles in different forms and locations. 11. Cycling of water, both in and out of the atmosphere, has an effect on climate.
Structure of the Earth		12. Earth’s surface changes due to slow processes such as erosion and weathering, and rapid processes such as landslides, volcanic eruptions, and earthquakes.
Earth in the Solar System	5. Events around us have repeating patterns, including the seasons of the year, day, and night.	13. Earth is a part of the “solar system” that includes the sun, planets, and many moons. Earth is the third planet from the sun. 14. Earth orbits the sun in a year’s time and rotates on its axis in approximately 24 hours. The rotation of the earth, day/night, and apparent movements of the sun, moon, and stars are connected. 15. Changes occur in the observable shape of the moon over a month.
	STRAND: LIFE SCIENCE (BIOLOGY)	
	PreK–2	Grades 3–5
Characteristics of Living Things	Animals and plants are living things that grow, reproduce, & need food, air, & water. 2. Characteristics of living and nonliving things. Plants and animals have life cycles that vary.	1. Physical characteristics of plants and animals 3. Plants and animals go through predictable life cycles, including birth, growth, development, reproduction, and death. 4. Major life cycle stages of the frog and butterfly.
Systems in Living Things		Structures in plants that are responsible for food production, support, water transport, reproduction, growth, and protection.
Heredity	. Plants and animals closely resemble their parents in observed	. Observed characteristics of plants and animals can be fully inherited or they can be affected by the climate or environment.

	appearance 5	
Evolution and Biodiversity	Fossils provide us with information about living things that inhabited the earth years ago.	Inherited characteristics may change over time as 6. adaptations to changes in the environment enable organisms to survive. 7. Changes in the environment have caused some plants and animals to die or move to new locations.
Living Things and Their Environments	People and other animals interact with the environment 8. through their senses. Animals and plants go through changes in appearance as the seasons change. 8. An organism's habitat provides for its basic needs.	Organisms meet needs by using behaviors in response to information from the environment. Some behaviors are instinctive and others learned. 9. Plants have characteristic behaviors. Plants and animals can survive harsh environments via seasonal behaviors. 10. Organisms can cause changes in their environment to ensure survival, which may affect the ecosystem. 11. Energy derived from the sun is used by plants to produce sugars and is transferred within a food chain from producers to consumers to decomposers.
STRAND: PHYSICAL SCIENCES (CHEMISTRY)		
	PreK–2	Grades 3–5
Properties of Materials and Matter	1. Observable properties of objects include size, shape, color, weight, and texture.	1. Properties of objects and materials.
States of Matter, Kinetic Molecular Theory, and Thermochemistry	2. Objects and materials are solid, liquid, or gas. Solids have a definite shape; liquids and gases take the shape of their container.	2. Solids, liquids, and gases have distinct properties. 3. Water can be changed from one state to another by adding or taking away heat.
Forms of Energy		4. Basic forms of energy, which cause motion or create change. 5. Energy can be transferred from one form to another.
STRAND: PHYSICAL SCIENCES (INTRODUCTORY PHYSICS)		
	PreK–2	Grades 3–5
Position and Motion of Objects	3. Objects can move in various ways. 4. Change the motion of an object by applying a force. The greater the force, the greater the change in motion. 5. Objects can be balanced under some conditions.	
Forms of Energy		4. Basic forms of energy, which cause motion or create change. 5. Energy can be transferred from one form to another.
States of Matter	2. Objects and materials are solid, liquid, or gas. Solids have a definite shape; liquids and gases take the shape of their container.	2. Solids, liquids, and gases have distinct properties. 3. Water can be changed from one state to another by adding or taking away heat.
Electrical and		6. Electricity in circuits requires a complete loop for an

Magnetic Energy		<p>electrical current. Electricity can produce light, heat, and sound.</p> <p>7. Objects and materials can be conductors or insulators of electricity.</p> <p>8. Making and using electromagnets.</p> <p>9. Magnets have poles that repel and attract each other.</p> <p>10. A magnet will attract some objects and materials but not others.</p>
Sound and Light Energy		<p>11. Sound is produced by vibrating objects and travels through a medium. The rate of vibration is related to the pitch of the sound.</p> <p>12. Light travels in a straight line until it strikes an object or travels from one medium to another. Light can be reflected, refracted, and absorbed.</p>

STRAND: TECHNOLOGY/ENGINEERING

Broad Topic	PreK–2		Grades 3–5	
	Materials, Tools, and Machines	<p>1.1 Characteristics of natural and human-made materials.</p> <p>1.2 Possible uses for natural and human-made materials.</p> <p>1.3 Safe and proper use of tools and materials to construct simple structures.</p>		<p>1.1 Materials used to accomplish a design task based on specific properties.</p> <p>1.2 Appropriate materials and tools to construct a prototype safely.</p> <p>1.3 Differences between simple and complex machines.</p>
Engineering Design	<p>2.1 Tools and simple machines used for a specific purpose.</p> <p>2.2 Human beings and animals use parts of the body as tools.</p>		<p>2.1 Problems that reflect the need for shelter, storage, or convenience.</p> <p>2.2 Different ways a problem can be represented.</p> <p>2.3 Relevant design features for building a prototype of a solution to a problem.</p> <p>2.4 Natural and mechanical systems are designed to serve similar purposes.</p>	