

Grade 7 Expectations in Science and Engineering/ Technology

Learning standards are taken from the October, 2006 MA Science and Technology/Engineering Curriculum Framework. The learning standard numbers in this document correspond to the learning standard numbers in the Framework.

Learning standards from the MA Science and Technology/Engineering Curriculum Framework for the end of Grade 7 are numbered and printed in bold. All students are expected to master all grade level expectations.

STRAND 1: INQUIRY

**Inquiry is integrated throughout all units rather than taught as a separate unit.*

Curriculum Framework Learning Standard
1. Design and conduct an investigation specifying variables to be changed, controlled and measured.
2. Use more complex tools (e.g., microscopes, graduated cylinders, and timers), technologies (e.g., computer probes) and appropriate measurement units to make observations, collect and organize qualitative and quantitative data.
3. Present and explain data and findings using multiple representations including tables, mathematical and physical models, demonstrations and graphs.
4. Communicate scientific procedures, results, and explanations using appropriate science and technology terminology.
5. Critique and revise investigation explanations and procedures without changing data to match expected results.

**Strand 2: DOMAINS OF SCIENCE
EARTH AND SPACE SCIENCE**

Curriculum Framework Learning Standard
Heat Transfer in the Earth's System
3. Differentiate among radiation, conduction, and convection, the three mechanisms by which heat is transferred through the earth's system.
4. Explain the relationship among the energy provided by the sun, the global patterns of atmospheric movement, and the temperature differences among water, land, and atmosphere.
The Earth in the Solar System
8. Recognize that gravity is a force that pulls all things on and near the earth toward the center of the earth. Gravity plays a major role in the formation of the planets, stars, and solar system and in determining their motions.
9. Describe lunar and solar eclipses, the observed moon phases, and tides. Relate them to the relative positions of the earth, moon, and sun.
10. Compare and contrast properties and conditions of objects in the solar system (i.e., sun, planets, and moons) to those on Earth (i.e., gravitational force, distance from the sun, speed, movement, temperature, and atmospheric conditions).
11. Explain how the tilt of the earth and its revolution around the sun result in an uneven heating of the earth, which in turn causes the seasons.
12. Recognize that the universe contains many billions of galaxies, and that each galaxy contains many billions of stars.

**Strand 3: DOMAINS OF SCIENCE
LIFE SCIENCE (BIOLOGY)**

Curriculum Framework Learning Standard
Living Things and Their Environment
13. Give examples of ways in which organisms interact and have different functions within an ecosystem that enable the ecosystem to survive.
Changes in Ecosystems Over Time
14. Explain the roles and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.
15. Explain how dead plants and animals are broken down by other living organisms and how this process contributes to the system as a whole.
Energy and Living Things
16. Recognize that producers (plants that contain chlorophyll) use the energy from sunlight to make sugars from carbon dioxide and water through a process called photosynthesis. This food can be used immediately, stored for later use, or used by other organisms.
17. Identify ways in which ecosystems have changed throughout geologic time in response to physical conditions, interactions among organisms, and the actions of humans. Describe how changes may be catastrophes such as volcanic eruptions or ice storms.

**Strand 4: DOMAINS OF SCIENCE
PHYSICAL SCIENCE (CHEMISTRY AND PHYSICS)**

Curriculum Framework Learning Standard
Properties of Matter
1. Differentiate between weight and mass, recognizing that weight is the amount of gravitational pull on an object.
2. Differentiate between volume and mass. Define density.
3. Recognize that the measurement of volume and mass requires understanding of the sensitivity of measurement tools (e.g., rulers, graduated cylinders, balances) and knowledge and appropriate use of significant digits.
Motion of Objects
11. Explain and give examples of how the motion of an object can be described by its position, direction of motion, and speed.
12. Graph and interpret distance vs. time graphs for constant speed.
Forms of Energy
13. Differentiate between potential and kinetic energy. Identify situations where kinetic energy is transformed into potential energy and vice versa.
Heat Energy
14. Recognize that heat is a form of energy and that temperature change results from adding or taking away heat from a system.
15. Explain the effect of heat on particle motion through a description of what happens to particles during a change in phase.
16. Give examples of how heat moves in predictable ways, moving from warmer objects to cooler ones, until they reach equilibrium.