**Connecticut Science**

# Grade 7

Adopted 2010

**Energy in the Earth's Systems**

3. **Landforms are the result of the interaction of constructive and destructive forces over time.** 7.3
    1. Illustrate and describe in writing the composition of the three major layers of the Earth's interior.
    2. Explain how Earth's internal energy is transferred to move tectonic plates.
    3. Demonstrate the processes of folding and faulting of the Earth's crust.
    4. Correlate common geological features/events (deep sea trenches, mountains, earthquakes, volcanoes) with the location of plate boundaries.
    5. Compare geological features that result from constructive forces (e.g., mountains and ridges) with geological features that result from destructive forces (e.g., canyons and flood plains).
    6. Analyze and interpret data about the location, frequency and intensity of earthquakes.
    7. Compare and contrast the major agents of erosion and deposition of sediments: running water, moving ice, wave action, wind and mass movement due to gravity.
    8. Investigate and determine how glaciers form and affect the Earth's surface as they change over time.
    9. Distinguish between weathering and erosion.
    10. Observe and report on the geological events that are responsible for having shaped Connecticut's landscape.

**Science and Technology in Society**

4. **Technology allows us to improve food production and preservation, thus improving our ability to meet the nutritional needs of growing populations.<br /> This content standard is an application of the concepts in content standard 7.2 and should be integrated into the same unit.** 7.4
    1. Investigate and describe in writing different types of microbes and the environmental conditions necessary for their survival.
    2. Describe the optimum conditions for rapid bacterial growth.
    3. Illustrate and describe the structural differences between bacterial and animal cells.
    4. Discover and discuss how humans use bacteria to produce food and identify examples.
    5. Compare and contrast the role of bacteria in food production and food spoilage.
    6. Evaluate and report how each method of food preservation including dehydration, pickling, irradiation and refrigeration works to stop or inhibit bacterial growth and give examples of each.

**Structure and Function**

2. **Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.** 7.2
    1. Compare and contrast single-celled organisms with multicellular organisms.
    2. Illustrate and describe in writing the structure and the functions of the following: cell membrane, cytoplasm, mitochondria and nucleus of an animal cell.
    3. Explain how the structure and function of multicellular organisms (animals) depends on the interaction of cells, tissues, organs and organ systems.
    4. Investigate and explain in writing the basic structure and function of the human skeletal system.
    5. Differentiate between the structures and range of motion associated with ball, socket and hinge joints and relate human joints to simple machines.
    6. Demonstrate how the muscles, tendons, ligaments and bones interact to support the human body and allow movement.
    7. Label the major parts of the human respiratory system and explain in writing the function of each part (nasal cavity, trachea, bronchi, lungs and diaphragm).
    8. Label the major parts of the human circulatory system and explain in writing the function of each part (heart, veins, arteries and capillaries).
    9. Design and conduct controlled variable experiments to analyze the interaction between the circulatory and respiratory systems as the demand for oxygen changes.
    10. Label the major parts of the human digestive system and explain in writing the function of each part in the chemical and physical breakdown of food (mouth, esophagus, stomach, small intestine, large intestine and rectum).

**Energy Transfer and Transformations**

1. **Energy provides the ability to do work and can exist in many forms.** 7.1
    1. Conduct simple experiments that show and explain how forces work to change the motion of an object.
    2. Calculate work done on an object as force or distance varies.
    3. Explain in writing how the six simple machines make work easier but do not alter the amount of work done on an object, and demonstrate how everyday objects function as simple machines
    4. Determine ways to modify a simple machine (inclined plane, pulley and lever) to improve its mechanical advantage.
    5. Defend the statement, "Work output of a machine is always less than work input because of energy lost due to friction."
    6. Design and create a working compound machine from several simple machines.
    7. Use a diagram or model of a moving object (roller coaster, pendulum, etc.) to describe the conversion of potential energy into kinetic energy and vice versa.
    8. Discuss different forms of energy and describe how they can be converted from one form to another for use by humans (e.g., thermal, electrical, light, chemical, mechanical).
    9. Trace energy conversions that occur in the human body once food enters and explain the conversions in writing.
    10. Calculate potential and kinetic energy and relate those quantities to total energy in a system.