

Fifth Grade Elementary Science Curriculum
2007

Unit 1: Patterns and Cycles

Fifth graders begin the year exploring objects other than planets in our solar system. They will investigate the effects of Earth's rotation and revolution around the Sun, movement of celestial bodies, as well as repeating patterns of celestial events. Students continue their study of our Sun-centered solar system to explain that the Sun serves as the main source of energy that powers the water cycle and causes changes in the states of water on Earth. Students will explain the importance of water's ability to exist as a liquid, solid, or gas on Earth.

- a) Identify and describe the physical properties of comets, asteroids, and meteors.
- b) Observe and use models of the Earth, Moon, and Sun to:
 - Recognize that the Earth's rotation produces **the day and night cycle**.
 - **Describe that the rotation of Earth on its axis makes it seem as though the Sun, Moon, planets, and stars orbit Earth.**
 - Cite evidence that the moon's apparent shape and position change.
- c) Describe the revolution of the planet Earth around the Sun.
- d) **Recognize that Earth's revolution causes the:**
 - **Length of the year**
 - **Apparent change of positions of stars**
- e) Identify, observe, and describe that water can exist in three states on Earth.
- f) **Provide evidence to describe that matter changes from one state to another without the loss of any mass.**
- g) **Describe the changes heating and cooling cause to the different states in which water exists (Heating: ice to melt, liquid water to evaporate; Cooling: water freezes, water vapor becomes liquid).**
- h) **Explain that the sun serves as the main source of energy that causes changes in the water on Earth.**
- i) **Describe the water cycle (condensation, precipitation, evaporation) and explain its importance and relationship to the survival of living things.**
- j) Compare surface water flow and groundwater flow, identify their significance in the water cycle, and identify the impact of human activity on the quality of surface water and groundwater.
- k) **Recognize and describe that the amount of water on Earth continues to stay the same even though it may change from one form to another.**
- l) **Based on data explain the importance of water's ability to exist in all three states within the temperatures normally found on Earth.**

Unit 2: Earth Matters

In this quarter, fifth graders will continue the study of states of matter, conservation of matter, and physical and chemical changes in matter, with a focus on water. Students will develop background knowledge about bodies of water in Maryland, specifically the Chesapeake Bay, and the impact of human activity and environmental factors on that ecosystem.

- a) Compare samples of like materials using appropriate tools to measure, estimate, and calculate size, capacities, masses and weights.
- b) Use appropriate measuring tools to verify that the weight of the whole object is always the sum of the weights of all its parts.**
- c) Cite evidence, from investigations, that supports the statement, “All matter takes up space and contains a certain amount of material.”**
- d) Investigate samples of matter to describe that matter is composed of parts too small to be seen without magnification.
- e) Investigate and **explain that some materials can be combined (i.e., mixtures – salt and coffee; vegetable salad), but each of the materials will retain their original properties.**
- f) Investigate and **explain that some materials can be combined and will form a new substance that has properties that are different from those of the original materials (i.e., baking soda and vinegar; steel wool and water).**
- g) Investigate the properties of water (i.e. density, temperature, salinity).
- h) Describe the bodies of water on Earth (i.e. fresh, salt, brackish).
- i) Identify components of the Chesapeake Bay ecosystem.
- j) Recognize and explain how renewable (plants, soil, water, animals) and nonrenewable resources (oil, coal, natural gas, minerals, metals) found in Maryland are used by people to meet their basic needs.**
- k) Identify and describe that human activities in a community or region are affected by environmental factors such as presence and quality of water, soil type, temperature and precipitation.**
- l) Describe the effects of salinity on living things in an aquatic environment and state reasons why certain animals (e.g., whales, salmon) could not survive in the Chesapeake Bay ecosystem to survive while other animals (e.g. whales and salmon) could not survive there.

Unit 3:

What Can We Do? (Lessons 1-7 taught first half of Quarter 3)

Students will continue to apply their knowledge of matter to determine factors that can influence the health of the Chesapeake Bay ecosystem. Students will investigate the positive and negative impact of human activity on the environment. They will focus specifically on the importance of ground water, as it relates to the health of the Chesapeake Bay and single and multi-cellular organisms that live in that ecosystem. Students will learn the positive consequences of ecosystem restoration projects, such as the planting of Riparian Buffers.

- a) **Recognize and describe that consequences may occur when Earth's natural resources are used.**
 - **Positive consequences – recycling, native plantings, good farming practices**
 - **Negative consequences – damage to habitats, air, water and land pollution**
- b) Observe and describe single celled organisms, (e.g., amoeba, euglena, paramecium, etc.), and compare their behaviors (i.e. movement, taking in food and water, giving off waste) to multicellular organisms.
- c) Cite evidence from data gathered that supports the idea that most single celled organisms have needs similar to those of multicellular organisms.
- d) Use microscopes and other video technology to investigate and describe that some organisms are composed of a collection of similar cells working together to meet basic needs of a “colony” of cells.
- e) **Describe and compare cells in a variety of multicellular organisms such as elodea and onions, muscle cells, nerve cells, skin cells, etc. in animals.**
- f) **Select information gathered from readings that supports the need for specialized cells in multi-cellular organisms.**
- g) **Identify and describe than an environmental issue affects individuals and groups differently.**
- h) *identify and describe that an environmental issue affects individuals and groups differently (HCPSS objective)*
- i) *record predictions, observations, results, and conclusions for each of the field trip activities as described in the Student Field Journal (HCPSS objective)*

Unit 4: Energy, Forces, and Motion (Lessons 1 – 7 taught last half of Quarter 3)

During fourth quarter, students will investigate the relationships between distance, time, and speed, as well as how mass affects motion. They will see examples of gravity and friction causing changes in an object’s speed and direction. They will conduct investigations to learn about, describe, and compare the different types of motion: uniform, variable, and periodic. Students will apply this knowledge, while learning about potential and kinetic energy. They will then have an opportunity to use this knowledge in a “real life” situation – designing roller coasters!

- a) Use measurements to describe the distance traveled as the change in position.
- b) Use data to describe speed as the distance traveled per unit of time.
- c) **Describe and give examples that show forces, such as gravity and friction, can cause changes in speed and/or direction.**
- d) **Observe, describe, and compare different types of motions.**
 - **Uniform motion – equal distances traveled in equal times, such as escalators, conveyor belts**

- **Variable motion** – different distances traveled in equal times, such as an accelerating car, falling objects
 - **Periodic motion** – motion that repeats itself, such as a child on a swing, a person on a pogo stick
- e) **Observe and describe that the more mass an object has, the less effect a given force has on the object.**
- f) Observe and describe that the greater the force, the greater the change in motion.

Unit 4: – Complete Energy, Forces, and Motion Lessons 8 – 10 in Quarter 4

This quarter, students will conduct investigations to explore different types of motion and forces.

- a) Identify examples of stored (potential) energy (i.e., raising an object above the ground; compressing a spring; stretching a rubber band).
- b) Recognize that the greater the mass and speed of an object, the greater its energy of motion (kinetic) will be.
- c) Observe and cite examples showing that energy of motion (kinetic energy) can be converted to stored energy (potential energy) and vice versa.