



Earth Connections (5th Gr.) Pre-visit Review

Synopsis

Students use the scientific method, and perform experiments to determine the interactions between **abiotic** and **biotic** factors in two aquatic ecosystems. Students test the temperature, salinity, clarity, pH, and nitrate levels of the water, and observe aquatic organisms using a microscope. Along the trail, students classify marine organisms using a key, and learn about photosynthesis and transpiration. Students discuss the water cycle and water conservation, and play a game to learn about ways that water is polluted and cleaned. They visit the ENC's new "green" building, where students learn how "green design" helps the ENC conserve water. The program is 2.5 hours and costs \$8.50 per student (maximum 120).

State Science Standards: 2.5, 2.6, 2.7, 3.1, 3.2, 3.3, 3.4, 6.1, 6.2, 6.3, 6.6, 7.6, 7.8

Aspects of this program also correlate with California's Environmental Principles and Concepts from the Education and the Environment Initiative (Assembly Bill 1548 and 1721). For more information on the "EPC's" visit www.calepa.ca.gov/education/eei

Vocabulary & Concepts to Review:

- Biotic - the scientific name for living things
- Abiotic - the scientific name for non-living things
- The abiotic components of an ecosystem are Land, Air, Water, and Sunlight.
- Ecosystem - a system where biotic and abiotic things interact together
- Ecology - the study of ecosystems
- The scientific method includes these steps:
 - Observation
 - Hypothesis (testable question)
 - Experiment
 - Conclusion
- Evaporation - the process of water leaving the surface to become vapor.
- Transpiration – the process of plants losing water into the air. It helps the plant pull water from the soil and cool the leaves.
- Condensation – The process of water vapor forming into small droplets, which become clouds or fog.
- Precipitation - When clouds meet cool air over land and dust is present, larger droplets form and water returns to land in the form of snow, rain, and hale.
- Accumulation - Some precipitation soaks into the ground, this underground water is trapped between rock or clay layers, i.e., ground water/aquifer.
- Most of Earth's water located as salt water in the oceans.
- Photosynthesis - the process by which organisms make their own food using sunlight.
- Photosynthetic plants absorb water from the soil through their roots and transport it to their leaves. They absorb CO₂ from the air through microscopic holes in their leaves. They use sunlight to cause a chemical change within the leaves that turns the CO₂ and water into sugar or carbohydrates that the plants use for energy to grow, oxygen that the plant puts back into the air and water, which evaporates into the air.
- Adaptation – a behavior or characteristic that helps a plant or animal survive in its environment.
- Biologists classify species in accordance with appropriate criteria (things they have in common).

State Science Standards Covered

Aquatic Labs

6.2 Develop a testable question (hypothesis).

6.3 Plan and conduct a simple investigation based on a student-developed question.

6.6 Select appropriate tools (e.g., thermometers) and make quantitative observations.

7.6 Record data by using appropriate graphic representations (including charts, graphs, and labeled diagrams) and make inferences based on those data.

7.8 Draw conclusions from scientific evidence and indicate whether further information is needed to support a specific conclusion.

Water Stations

3. Water on Earth moves between the oceans and land through evaporation and condensation.

3.1 Students know most of Earth's water is present as salt water in the oceans, which cover most of the surface.

3.2 Students know when liquid water evaporates, it turns into water vapor in the air and can reappear as a liquid when cooled or as a solid if cooled below the freezing point of water.

3.3 Students know water vapor in the air moves from one place to another and can form fog or clouds, which are tiny droplets of water or ice, and can fall to Earth as rain, hail, sleet, or snow.

3.4 Students know that the amount of fresh water located in rivers, lakes, under-ground sources, and glaciers is limited and that its availability can be extended by recycling and decreasing the use of water.

Classification

6.1 Classify objects (e.g., rocks, plants, leaves) in accordance with appropriate criteria.

Hike: Photosynthesis & Transpiration

2.5 Students know how sugar, water, and minerals are transported in a vascular plant.

2.6 Students know plants use carbon dioxide (CO₂) and energy from sunlight to build molecules of sugar and release oxygen.

2.7 Students know plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO₂) and water (respiration).

Environmental Principles and Concepts Covered in this Program:

- Recognize that because most of Earth's water is salt water located in the oceans, the vast majority of water is not available for human consumption.
- Describe freshwater, coastal and marine ecosystems and compare the chemical characteristics of the water in these systems.
- Explain how humans and human communities can influence the quantity, distribution and chemical characteristics of the water in freshwater, coastal and marine ecosystems (e.g., global climate change, water management practices).
- Describe the roles of evaporation, liquefaction and freezing in the water cycle.
- Identify sources of fresh water and describe the reservoirs of Earth's water.
- Describe the ways in which humans, human communities and their practices use water.
- Recognize that the supply of fresh water is limited at any given time and discuss how some resources within an ecosystem are finite in supply while others are less limited.
- Provide examples of how water use can be decreased by humans and human communities.
- Explain potential consequences when the quantity, distribution or chemical characteristics of water are changed (e.g., contamination of an aquifer can
- Describe how changes to the quantity, distribution and chemical characteristics of water in natural systems can influence the functioning of terrestrial, freshwater, coastal and marine ecosystems (e.g., acid precipitation affecting the growth of trees).