

LOUISIANA SCIENCE STANDARDS INTRODUCED OR REINFORCED DURING TREES AND TRAILS FIELD TRIP

SCIENCE

7th Grade

EARTH'S SYSTEMS

*Water Purification and Groundwater Recharge are presented as part of the Wetlands Station

- **7-MS-ESS2-4:** Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
MS.ESS2C.a: Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land.
MS.EVSIA.c: Renewable resources such as groundwater and oxygen are purified by the movement through Earth's cycles.

FROM MOLECULES TO ORGANISMS: STRUCTURES AND PROCESSES

- **7-MS-LS1-6:** Construct a scientific explanation based on evidence for the role of photosynthesis and cellular respiration in the cycling of matter and flow of energy into and out of organisms.
MS.LS1C.a: Plants, plant-like protists, (including algae and phytoplankton), and other microorganisms use the energy from light, to make sugars (food) from carbon dioxide from the atmosphere and water from the environment through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use.
MS.PS3D.a: The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen. Cellular respiration in plants and animals involve chemical reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials.
MS.EVSIA.a: Renewable resources have the ability to self-maintain due to the processes of photosynthesis.
- **7-MS-LS1-7:** Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.
MS.LS1C.b: Within individual organisms, food (energy) moves through a series of chemical reactions in which it is broken down and rearranged to form new

molecules, to support growth, or to release energy through aerobic and anaerobic respiration.

MS.LS1C.c: Cellular respiration in plants and animals involves chemical reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials.

ECOSYSTEMS: INTERACTIONS, ENERGY, AND DYNAMICS

- **7-MS-LS2-4:** Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
MS.LS2C.a: Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations.

ANCHOR PHENOMENA THAT CAN BE INTRODUCED IN THE CLASSROOM (PRE-TRIP OPTIONS)

1. The water cycle is a “journey of a water molecule.”
2. Transpiration, it’s a plant “thing.”
3. Why is the water cycle cyclical in nature?
4. A great website for diagrams and introductory information on the water cycle is: <https://water.usgs.gov/edu/watercyclehi.html> .
5. Excellent video on the water cycle by National Science Foundation, <https://www.bing.com/videos/search?q=youtube+water+cycle+for+middle+school+students&&view=detail&mid=1323836D187DE8DD1BC71323836D187DE8DD1BC7&&FORM=VRDGAR>
6. Explain the importance of the wetlands for the cycle of water.
7. Animals return water to the atmosphere.
8. Summarize 4 of the 6 ways the body uses water. (Transport, excretion, temperature regulation, digestion, lubrication, and synthetic reactions).
9. Excellent video for comparing the reactions of photosynthesis and cellular respiration. The video is under 11 minutes in length. <https://www.youtube.com/watch?v=JUmT24R8CyA>
10. What is this chemical reaction: Carbon dioxide + Sunlight (energy) + Water → Glucose + Oxygen? What are the reactants and the products? Why can’t we live without this reaction?

ACTIVITIES TO EXTEND CONCEPTUAL UNDERSTANDING OF PERFORMANCE EXPECTATIONS

1. Have students use the following vocabulary words to make a story describing how an individual water molecule moves through the cycle, (cloud, stream,

evaporation, precipitation, downhill flows, ocean, glacier, and, animal, or use other paths that include, lakes, wells, puddles, plants, and snow).

2. This website has information on cellular organelles and the reactions of photosynthesis and cellular respiration. http://chem4kids.com/files/bio_intro.html
3. This is an excellent activity for modelling photosynthesis and cellular respiration. The game meets national standards and has lesson plans attached. <https://www.calacademy.org/educators/lesson-plans/modelling-photosynthesis-and-cellular-respiration>
4. This lab uses bromothymol blue as an indicator of the presence of carbon dioxide. It is a fun activity to show that in cellular respiration, we exhale carbon dioxide which changes the color of the indicator from blue to green. <http://hhs.helenaschools.org/wp-content/uploads/sites/31/2015/08/Respiration-and-exercise-lab-2016-1-2.pdf>
5. If your students have access to computers, this is an excellent interactive lab that investigates the effects of different colors of light on the growth of plants. http://www.glencoe.com/sites/common_assets/science/virtual_labs/LS12/LS12.html
6. Draw a Venn Diagram and compare the similarities and differences between the mitochondria and the chloroplast in a cell.