

Show Us Your Water Appreciation!

These topics of discussion and activities should help your students to discover why water is important to each of them.

Why is water important?

Water is essential to life. People, animals and plants all need water to survive and thrive.

- 2/3 of the human body, by weight, is water.
- Most people could live for a month without food but only about 3 days without water.
- Water helps to digest food, to transport nutrients and excrete wastes, to maintain body temperature, and to synthesize chemicals such as hormones and enzymes. Water is necessary for nearly every function that occurs in the body, even breathing!
- Plants use water to transport nutrients, as part of the photosynthesis process, and to maintain temperatures through transpiration.

What are some of the unique properties of water?

- Water molecules are the smallest unit of water, made up of two (2) hydrogen atoms and one (1) oxygen atom.
- Water has 3 physical phases: liquid, solid (frozen) and gas (vapor). It is unique in that it is the only natural substance which can be found in all three phases at normal Earth temperatures.
- One of water's chemical properties is that it acts as a solvent, and can carry nutrients, toxins, soil and other materials. As minerals are dissolved into the water, the water becomes electrically conductive. Pure (distilled) water is not conductive.
- Water helps to stabilize environmental temperatures through the process of evapotranspiration.
- Discussion point: Unlike many other liquids, water expands as freezes, allowing ice to float. Why is this important? *If ice sank to the bottom, water bodies would freeze solid from top to bottom, killing plants, fish and other life-forms in the water.*

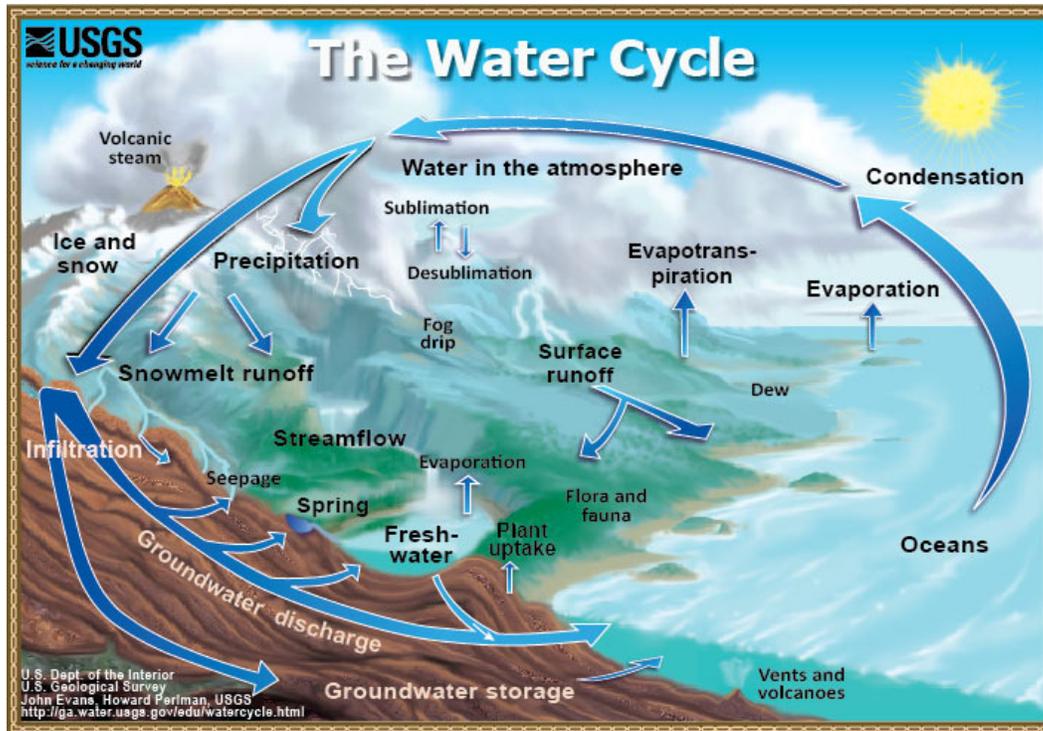
Where does water come from and where does it go?

- Water is a natural resource that connects all Earth systems. Our planet is 70% water; of that 70%, 97% is in the oceans (salty), and 2% is frozen in icecaps.
- Use Water Appreciation Activity 1-All the Water in the World to present additional information about water distribution.
- **Water Cycle:**

The Earth has a finite amount of water. All the water that we use is already here. This water is naturally recycled through a process called the hydrologic, or water, cycle. In this process, the water is collected, cleaned and distributed. (Our water treatment technology has been developed to mimic this process but at a much faster speed.)

Sun shines on the ocean causing water (liquid) to evaporate and form clouds (gas), which are pushed by the wind over land. As the water molecules in the clouds condense around tiny dust particles, the molecules become heavy droplets and gravity caused them to fall, releasing the water from the clouds as precipitation, either rain (liquid) or snow (solid), and the water falls on the land. Some of the water will make its way back to the ocean via streams and rivers, and some will infiltrate into the ground and may eventually make its way into an aquifer where it is stored until we pump it out. Some of the water may also be stored as snow and ice in glaciers or polar ice caps.

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Plants, humans and animals contribute to the cycle as well. Plants draw water from the ground through their roots and up to their leaves where it is given back to the atmosphere through transpiration. In the process they produce food for humans and animals. Humans and animals take in water by drinking and eating, and give some water back to the atmosphere through respiration and perspiration. And so the cycle continues with the same water molecules taking on various phases and traveling through many different systems.

- Discussion points: How does weather affect water supply? What are the local sources of water?

How do you use water?

- In conjunction with Water Appreciation Activity 2-Indoor Water Use, talk about some daily activities, both indoors and out, which use water: *Drinking, cooking, baths/showers, brushing teeth, flushing toilets, washing clothes, washing dishes, cleaning, taking care of pets, gardening, painting, playing (forms of water).*
- Discussion points: Do you think water is used the same ways in other parts of the world? How do you think that you would use water differently if less water was available?

How is water valuable to you?

- Use Water Appreciation Activity 3-Water Log and Poster: Students journal their experience, feelings, and knowledge about water. The journals can include pictures, poems, stories, summaries of water activities, etc. Students can use the information in the journals to help them create individual posters for the City of Santa Fe Water Conservation Office Poster Contest. (See 2013 Call for Entries for additional information.)
- Discussion points: What is the most important thing that you do with water? What could you do to save water so that you can still do what is important to you?

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Glossary

Aquifer: An underground bed of saturated rock or soil that yields significant quantities of water.

Condensation: The process by which a vapor becomes a liquid; the opposite of evaporation.

Conservation: The use of water-saving methods to reduce the amount of water needed for homes, lawns, farming and industry, and thus increasing water supplies for optimum long-term economic and social benefits.

Contaminant: Any substance that when added to water (or another substance) makes it impure or unfit for use.

Erosion: The wearing down or washing away of the soil and land surface by the action of water, wind or ice.

Evaporation: The conversion of a liquid (e.g., water) into a vapor (gaseous state) usually through the application of heat energy; the opposite of condensation.

Evapotranspiration: the loss of water from the soil through both evaporation and transpiration from plants.

Ground water: Water found in the spaces between soil particles underground (located in the zone of saturation).

Humidity: The degree of moisture in the air.

Hypothesis: A potential explanation for a condition or set of facts that can be tested through further investigation.

Infiltration: The process by which water on the ground surface enters the soil.

Percolation: The movement and filtering of water through porous materials such as soil and permeable rock into groundwater storage (aquifers).

Photosynthesis: The process through which green plants produce simple sugars by combining carbon dioxide and water using sunlight as an energy source and producing oxygen as a by-product.

Precipitation: Water falling, in a liquid or solid state, from the atmosphere to earth.

Solvent: A material such as water that dissolves another substance to form a solution.

Transpiration: The process by which water absorbed by plants (usually through the roots) is evaporated in the atmosphere from the plant surface (principally from the leaves).

References and Resources:

- Project WET International Foundation and CEE, 1995, Project WET Curriculum and Activity Guide.
- Water Cycle graphic from <http://ga.water.usgs.gov/edu/watercycle.html>.
- Project WET Worldwide Water Education, <http://www.projectwet.org>.
- WaterSense: An EPA Partnership Program, EPA WaterSense for Kids, Thirsty for Knowledge? <http://www.epa.gov/WaterSense/kids/index.html>.
- Water Resources Education, Albuquerque Bernalillo County Water Utility Authority, <http://www.abcwua.org/education>.
- USGS Education Resources, Science Resources for Grades K-6, U.S. Geological Survey, <http://education.usgs.gov/primary.html>.
- New Mexico Office of the State Engineer, Water Use and Conservation, Educators resources, http://www.ose.state.nm.us/wucp_educators.html.