

Leader's Guide

Learning About Water,

Second Edition

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LEARNING ABOUT WATER

Program Summary

This program introduces students to water and its various attributes and properties. It provides insight into the fact that although three-quarters of the earth's surface is covered by water, only one percent is drinkable. The various states of water are also investigated – as student view it in the form of a solid, liquid and gas. The program examines the water cycle, and students learn that water is a valuable energy source, which can also cause great destruction in the world.

Pre-screening Preparation:

- Preview the program before screening it for the students; this allows you to establish any pause points for discussion
- A pre-screening activity has been included for students to prepare them, and give you an understanding of their prior knowledge in order to build upon it.
- The post-screening science activities further extend students' understanding.
- These activities could also be used as an assessment tool. Background information is also provided to assist with explanations if required.

Viewing the Program

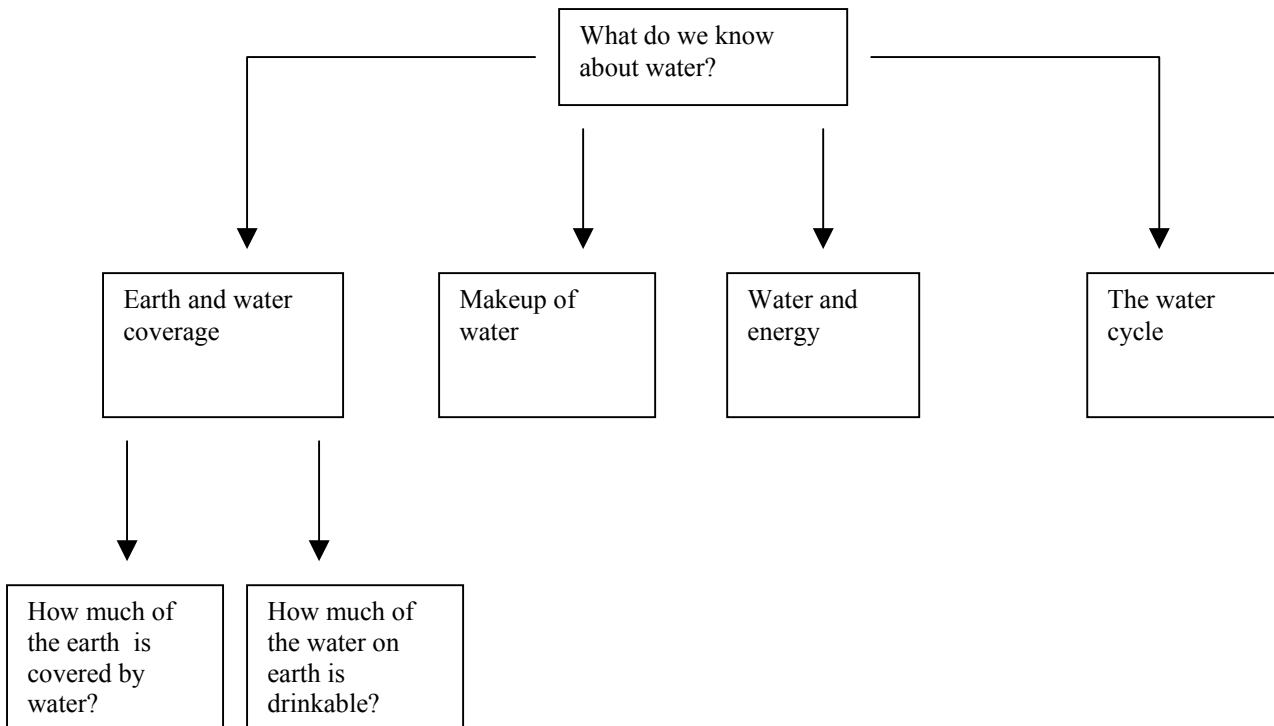
When screening the program for your class, if you feel it is necessary to stop and clarify a point, give further examples or define terms – then do so. The full value of the program will come from how you use it for your individual grade.

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Pre-screening Activity

Cluster Diagram

Have students work in small groups to create a diagram such as the following using 'Water' as the key word. Have the groups brainstorm to link what they see as key components related to water and then write questions related to the key components. This can be a powerful tool for developing student investigation. If your students have not used this tool before then it may be necessary to lead the m in the exercise.



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Post-screening Activity

1. Have students create science journals, starting with a pie graph indicating the amount of drinking water we have here on Earth.
2. Revise with the class the concept that some materials change state when they are heated or cooled. Have students write an entry into their science journals describing the following processes that are used to change the various states of water.

freezing

heating

melting

a) Turning water into vapor

b) Turning ice into water

c) Turning water into ice

3. Have students perform some simple experiments that indicate the concept of water changing state – such as:
 - Experiments on evaporation - place a shallow container of water in the sun and observe over a period of time. Extend by placing containers of water behind translucent and opaque material. Predict observe and explain what occurs.
 - Dry different types of material in the sun. Predict, observe and explain why the material has dried and why some pieces of material have dried more quickly than others.
 - Take a glass of cold water from the fridge and observe condensation. How do the students explain their observations?

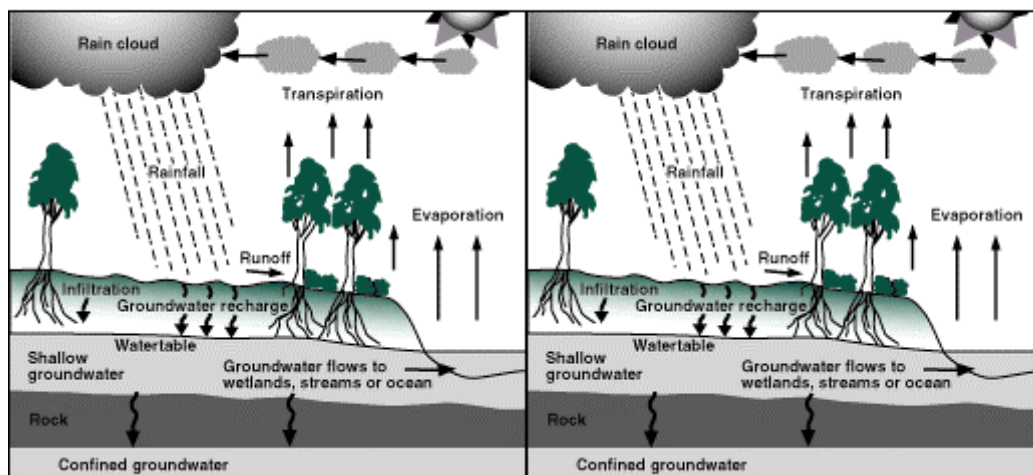
4. The following illustration can extend students' understanding of the Water Cycle. After discussing the water cycle with the group, distribute copies of the unlabeled illustration and have students fill in the appropriate information, as seen on the Answer Key.

(Format: Hillary, please separate these two illustrations – make each a separate page – and remove the labels from the first one, inserting a blank in the place of each label. Please also reproduce these as large as possible, so teachers can Xerox for students to fill in the blanks.)

The Water Cycle

Answer Key – The Water Cycle

Look over this illustration of the water cycle and fill in the blanks to label the actions taking place in the cycle.



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5. Three-dimensional Representations of the Water Cycle: For an alternative example of a water cycle within the classroom, have students work in groups to create a terrarium using a large plastic bottle or fish tank.

Or:

Alternately, students could use various materials to create the water cycle. For example: cotton balls for the clouds, colored paper shapes for rain and the sun's rays etc. Students could also work in groups to create a diorama of the water cycle.

Background Information

The amount of water in the earth's environment never changes, whether it is as a liquid (fresh water, seawater, rain, tiny droplets in clouds), as a gas (water vapor) or in its solid state (snow, ice or hail). There is also water inside living organisms. Water continually circulates between the land, the oceans, and the atmosphere. This circulation is called the Water Cycle or Hydrologic Cycle. How does the water cycle work?

Heat from the sun causes water to become a gas or vapor. This is called evaporation. As the earth's surface warms, rising currents of air carry the water vapor upwards. The water vapor becomes cooler as it rises and condenses into tiny drops, forming clouds. These drops join together and fall back to the earth as rain, hail or snow.

Rainfall may:

- evaporate directly from water, land or vegetation
- run off the land into streams and wetlands
- soak a little way into the ground, be absorbed by plant roots and then return to the water vapor in the air by *evapotranspiration* from the leaves of plants
- soak deeper into the ground and add to the groundwater, moving slowly along the direction of groundwater flow towards rivers, wetlands or the sea.

This cycle has existed since water was formed on earth but human activities change the way water moves through the landscape.

Water can be found in three states of matter; as a solid, liquid or gas. All are reversible dependant on heat being added or taken away. Raising or lowering temperatures can cause water to freeze, melt, evaporate, or form condensation.

Vocabulary

condensation, cycle, energy, erosion, evaporation, hydro, matter, molecules, particles, precipitation, saturated, turbine

Useful Websites

Interactive site of the Water Cycle

<http://www.wrc.wa.gov.au/schools/>

Various water activities

<http://www.proteacher.com/110056.shtml>

Simple definitions of the state of matter

http://www.professorbeaker.com/states_matter.html#water

Properties of Water

http://www.edinformatics.com/math_science/water_ice.htm

Links to many water activities (and other science areas)

http://www.syed.co.uk/primary/pdf/materials/5.1_changing_water.pdf

<http://www.schoolsnet.com/cgi-bin/inetcgi/schoolsnet/primary/unit.jsp?cat=Science&UID=sci5d>

http://www.physics.rutgers.edu/hex/visit/lesson/lesson_links1.html

Length

13 Minutes

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Audience level
Grades 5 – 8

Subject Area
Science

Catalog Number
#2951-EN-VID

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