Natural Water Cycle

Water is constantly on the move. Whether it is on the surface of the earth, underground or in the atmosphere, water's continuous movement is called the water cycle (or the hydrological cycle).

During this natural process, water can change between three different states of matter: solid, liquid and gas, depending on the temperature. This sequence serves to naturally remove some of the impurities in the water. An example of this is when water from the ocean evaporates. The salt, minerals and metals are left behind in the ocean, and only 'freshwater' returns to the atmosphere to form clouds.

There is no real start or end to the water cycle, but when explaining the stages it is often easiest to start with evaporation.

Evaporation

The sun heats water bodies across Earth, causing the liquid water to transform into water vapour. The vapour (or gas) is light enough to rise into the atmosphere.

Condensation

Water vapour rises into the air where the temperature becomes colder, and condenses the water vapour into small droplets which form clouds.

The shape, size and texture of clouds can be quite revealing and indicate a variety of weather patterns. Clouds are categorised according to their shape, their size, how high they sit in the sky, and how fast and in which direction they're moving. The layer of atmosphere where all clouds exist is called the troposphere.

Precipitation

When so much water has condensed in the clouds that the air cannot support its weight, water falls from the clouds as rain, hail, sleet or snow. Much of this water flows across the land and collects in rivers, lakes and eventually the ocean. However, some of the water is absorbed into the ground and gathers in the cracks and pores of rocks, forming groundwater. These areas of water-filled crevices are called aquifers.

In addition to supplying water for natural ecosystems, groundwater provides an alternative drinking water supply for humans and animals when surface water is limited or of poor quality. It can also be used for irrigation, agriculture and industry.

Transpiration

Water is absorbed by a plant's roots as a liquid, then travels up to its leaves before it is released as water vapour through the plant's stomata into the atmosphere.


Precipitation
Condensation
Evaporation
Transpiration
Groundwater

Water Cycle in a Jar

The water cycle is the continuous movement of water on Earth. As water moves through the cycle, it changes states and can be found naturally as a solid, liquid or gas. The stages of the water cycle include:

- **Evaporation:** water is heated by the sun and transformed into water vapour (or gas).
- **Condensation:** the cool air in the atmosphere changes the water vapour into tiny droplets that form clouds.
- **Precipitation:** water falls from the clouds when so much water has condensed that the air around the cloud cannot support it. This water falls to the ground as rain, snow, sleet or hail (precipitation), and seeps into the earth (infiltration).
- **Transpiration:** water absorbed by a plant's roots travels up through to the leaves before being released through the stomata into the atmosphere as water vapour.

Recreate the water cycle by making your own terrarium in this simple experiment.

WARNING: There are some risks associated with the use of bagged compost and potting mix. To reduce these risks, please:

- **read the warning on the bagged compost/ potting mix before use**
- **always wear gloves when handling soil, potting mix or compost**
- **avoid inhaling the mix by wearing a face mask**
- **carefully dampen the mix to reduce airborne particles**
- **wash hands thoroughly after using potting mix or compost, even if you've been wearing gloves.**

Main Activity

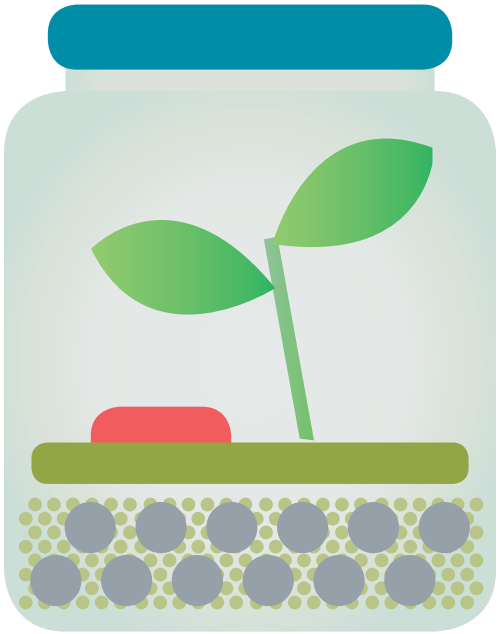
Materials

- rocks
- soil
- small plant
- soft drink bottle cap
- plastic glove
- sand
- jar with lid (you could also use an old soft drink bottle cut in half and covered with plastic wrap)

Method

1. Place a layer of rocks over the bottom of the jar, approximately 0.5-1 cm deep.
2. Sprinkle a thin layer of sand over the rocks, approximately 0.5 cm deep.
3. Cover the sand with a thick layer of soil (3-4 cm). The rocks, sand and soil create a similar soil structure to that found on Earth.
4. Wearing a glove, use your finger to make a small hole in the soil for your plant.
5. Keep your glove on and put the plant in the hole. Pat the soil firmly around the plant's roots.
6. Fill the soft drink bottle cap with water and carefully place the cap on the soil.
7. Screw the lid on the jar (or use plastic wrap to seal the container) and place it in a sunny position.
8. Observe your experiment over the next seven days. Once you have finished your experiment, you may like to transfer the plant to your garden.

Note: If you are making your terrarium in groups or pairs, take turns for each of the steps.



Engage

Draw and label your experiment on days 1, 2 and 7. Comment on the experiment on each of these days; write down what you notice happening. Present this information in a poster.

Connect

Draw and label your experiment on days 1, 2 and 7. Explain how your terrarium acts like the water cycle. Use the **Detailed Lab Report template** to write a report on this experiment.

Explore

Examine your terrarium over several days and compare the jar to a real ecosystem. Does the plant have everything it requires to continue to survive? Expand on this question by writing a short essay with your findings. You may like to record your responses over several days on a blog or wiki comment thread.