

Exploring the Water Cycle...

Concepts covered in this activity:

- Evaporation
- Condensation
- Precipitation
- Absorption
- Photosynthesis
- Transpiration



Background:

Water is constantly in motion. It moves from one state to another; solid, liquid or gas when the conditions are favorable. When water sits in a puddle after a rain, it is exposed to the energy of the sun which warms the water. Water has a specific amount of energy that it can absorb. Once it reaches that capacity, the molecules, in an excited state move apart enough that it alters its state to a gas and it rises into the air. This is **evaporation**. As the warm gaseous water rises, it cools and being adhesive it clings to suspended dust particles. Adhesion causes additional molecules to join the original droplet. This is called **condensation** and the heavier the combined droplets the greater the chances of gravity pulling it from the sky to the earth as **precipitation**. Depending on the air temperature, this precipitation can be rain, sleet or snow. Once it returns to the ground, it can once again sit in a puddle or through **absorption**, it can be taken into the earth to be picked up by plants or held in an aquifer to be used later. Moving through the plant it is used to complete **photosynthesis** to make food for the plant and can again be sent into the air as a gas in the process of **transpiration**. One of the best ways to watch this process is in the 'micro-ecological-system' of a terrarium.

Building a Terrarium... materials needed...

- A container that has clear plastic or glass sides and a tightly fitting lid. Size should be large enough to fit your hand into and give room for plants to grow (soil and pebbles can be a depth of at least 1" to 2"). A large mouth jar, plastic storage container, a small aquarium or goldfish bowl is good. (Substitutes for a lid can be plastic wrap, piece of wood or smooth edged glass.)
- Small washed pebbles; enough to cover the bottom of the container.
- Clean potting soil, enough to cover 1" to 2" of the bottom of the container.
- (2-3) Small plants; usually the house plant varieties are good as they grow a little slower and are comfortable in small systems. Also choose plants that like the same conditions. Ex. Do not choose a cactus and a violet. Mosses and small ferns are a good match.

Setting up your terrarium...

Wash the container, rinse and dry. Spread the layer of washed pebbles on the bottom of the container and follow with the potting soil. Plant the plants into the soil evenly spaced in the container. A decorative rock or other object can also be added for interest but this is optional. Add a 1/4 cup of water for two to three plants in a small container or enough to moisten the soil in a larger container. Cover the container tightly and set it in a window that gets sun for a portion of the day. Make a calendar journal and make observations daily beginning on the first day. Tip: If the terrarium should look dry add some water, or if mold appears open the lid to dry it.

- What changes take place in the container?
- Can you see the water absorption in the soil? (The soil will appear wet.)
- Can you see the water as it evaporates or transpires? (Water will disappear from the pebbles and the soil will look dryer.)
- Do you see condensation? (Water droplets will be seen on the side of the container.)
- Can you observe photosynthesis? (The plants will grow as they produce food in photosynthesis and let go of water vapor in transpiration.)