

The Water Cycle Hexaflexagon

The water cycle is an endless circulation of water from one phase to the next. Water occurs in all three phases on earth; the water in rain, sea water, lakes, streams, clouds, the ground, and in living things makes up the **liquid** phase of water. **Solid** water comes in the form of snow, ice, and glaciers where the temperature is below freezing. Water in the **gas** phase is found primarily in our atmosphere and in the air we breathe. Most, if not all of the water found on or in the earth has been here since the earth was formed, perhaps some 4.6 billion years ago.

Over 97 percent of earth's water is contained in oceans and seas. All icecaps and glaciers contain about 2 percent of all water. Little more than one half of one percent of earth's water is contained in the ground. Each of the remaining sources of water — lakes, inland seas, rivers, and the atmosphere — contain less than one hundredth of one percent of earth's water. Even so, water travels from one source to another in an endless cycle. The same molecule of water that fell from the mouth of a dinosaur 100 million years ago may be in the water you drink from a fountain today.

Water moves from one part of the cycle to another by the processes of evaporation, condensation, precipitation, and melting. When water **evaporates** it changes from a liquid to an invisible gas.

Rapid evaporation takes place when you boil water on a stove, while slower evaporation takes place when you perspire or leave a glass of water in the open air. The rate of evaporation depends on temperature and something called humidity which is the amount of water vapor (gas) that is found in the air. **Condensation** is what takes place when water vapor changes from a gas back to a liquid. Water can condense at any temperature below boiling. The lower the temperature the faster the rate of condensation that can take place. **Precipitation** is when water falls from the air in the form of rain, sleet, snow, hail, or dew. **Melting** is when water changes from the solid phase to the liquid phase.

Sometimes water is stored or locked up for thousands of years. Water that has evaporated, condensed, and fallen as solid snow or ice in cold climates may remain that way for a very long time before it either melts or evaporates and rejoins the cycle. Water that percolates into the ground may also remain in the liquid phase if it is stored in an underground reservoir or bound up within mineral or rock crystals. In other circumstances water may go through the cycle over and over

again very quickly. In the tropics for example, water evaporates from the ocean, condenses, and falls back to the ocean as rain on a daily basis. The water cycle can be very interesting to think about if you consider the possible journeys and history of the water we all use every day. The next time you take a drink of anything, think about the places the water in it may have been.

The Bonneville Power Administration (BPA) depends on the water cycle to provide enough water for generating the region's electricity. The future of fish and other wildlife habitat in the Columbia River's watershed is also dependent on the water cycle to provide a suitable environment for all to enjoy and use. Future generations depend on the preservation of our region's water resources and BPA is committed to helping preserve and educate people about our cycle of water. This hexaflexagon uses a special geometric form to show the phases of the water cycle and how they effect us.

For additional information, please call 503-230-3478 in Portland, or toll free 1-800-622-4519 outside of Portland.

To Assemble the Water Cycle Hexaflexagon:

Items Needed to Assemble: ruler, scissors, clear tape

1. Place drawing with printed side up on a table. Place ruler on paper to connect Point A to point A. Using the long edge of one scissors blade, press the scissors on paper and move along the line from point-to-point to make an indent/mark. (This is known as scoring.) Be careful not to cut through paper. Accurate scoring and folding is essential for easy manipulation of the finished hexaflexagon.
2. Repeat Step #1 for point B to point B, C-C, through point F-F. When done, A-A through F-F will be vertically scored.
3. Repeat Step #1 for point G-G, H-H, I-I, through P-P. These lines are diagonally placed.
4. Cut out the hexaflexagon along the far OUTSIDE border.
5. With the printed side up, fold all vertically scored lines face-to-face. (A-A through F-F). Then, straighten out each fold.
6. Fold all diagonally scored lines (G-G through P-P) so they are back-to-back. Then straighten out each fold.
7. Hold the hexaflexagon with the printed side down and the beak-like flap pointed towards you. Bring the "Accumulation" section to fit over Triangle II. Align and tape open edge.
8. Bring the "distribution" section over Triangle III. Align and tape.
9. Bring the "storage" section over Triangle IV. Align and only tape upper one-half of section. Leave two beak-like flaps free.
10. Take Triangle VI and align over Triangle I and tape together. Place top-half of beak-like flap showing "storage" Triangle VI and place beak-like flap showing "condensation" Triangle V. Align flaps and tape in place.
11. Turn hexaflexagon, checking for any open edges. Tape all open edges to allow for maximum use and durability.

