



TAKE CARE OF TEXAS: EDUCATOR MATERIALS

# LESSON PLAN

## The Water Cycle

### Objectives:

Students will come to understand the relatively small amount of water that is available for human consumption. Students will learn about the water cycle and its associated terms while also learning the connection between the water cycle and human activities (watering the lawn, washing hands, flushing the toilet, etc.)

### Prerequisites:

None.

### Duration:

Three 40-minute lessons.

### Materials:

- Student Worksheets
- Glass of Water
- Apple and a knife

### Introduction:

Using The Water Cycle poster, review the cycle and different components using the information below.

### The Water (Hydrologic) Cycle

Water (H<sub>2</sub>O) covers 71% of Earth's surface. Almost all of that is salt water in our oceans. Fresh water accounts for only 3% of total water, and more than 2/3 of it is frozen in glaciers. Liquid fresh water in groundwater, lakes, streams, and rivers, —water that people use to drink, farm, clean, and use for most tasks —makes up less than 1% of all the water on Earth! Most of the fresh water we need to live is ground water (about 99%), so understanding the water cycle and learning that water is a limited resource is important for all Texans.



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## Evaporation & Transpiration

The first step that water takes on its journey through the water cycle is **evaporating** from bodies of water or **transpiring** from the leaves of plants. The water molecules are turned from liquids into vapor and then rise into the atmosphere. There is always water in the air we breathe. Meteorologists track this water vapor as **humidity**.

## Condensation & Precipitation

The next step in the water cycle is for the water molecules to condense into clouds. Over time, clouds gather more and more water vapor, growing in size. They move across the sky in a wide variety of shapes and sizes. At a certain point, the clouds cannot hold the water molecules any longer and they are released back down to earth as rain or snow.

## Infiltration

When water is stored in large areas, like rivers and lakes, gravity pulls the water down through the soil into large, underground bodies of water called **aquifers**. Humans can access this water, aptly called **ground water**, through wells for drinking water and irrigation.

## Water's History

The dinosaur bones in the Water Recycles image are a reminder that the water on Earth today is the same water that was on Earth a long time ago when the dinosaurs were alive. That means there is a chance that the water you used to brush your teeth this morning may be the same water that a dinosaur once drank. It also means that, a hundred years from now, your grandchildren may wash their hair with the same water that you drink today. That's why it's so important that we take care of the Earth's water; it's the only water we've ever had and the only water we will ever have.

## Humans & The Water Cycle

Water is the foundation of life on Earth and humans would not exist without it. As the human population grows, water becomes increasingly more important to conserve and protect. Below are a few of the many ways that humans use this valuable resource:

### Drinking Water

For humans, the most important use of this valuable resource is drinking water. Humans pump water from rivers, lakes, and aquifers into large drinking water treatment plants where it is tested and cleaned to ensure it is safe for human consumption. This water flows into our houses, where we use it in sinks, showers, and toilets.

### Wastewater

After use, the water flows out of our homes and into wastewater treatment facilities. Here, it is separated into liquids and biosolids. The solids are typically turned into fertilizer and return to our farms and home gardens. The water is cleaned and used for irrigation and for other industrial purposes.

### Hydroelectric

Water has many other uses outside of our homes. For decades, humans have harnessed the power of water to generate electricity through hydroelectric dams. These dams also provide fresh water for human consumption.

### Rainwater Harvesting

To become more sustainable, many families have added rain barrels to their gutters to harvest rainwater as it runs off their roofs. By doing this, they always have a fresh store of water from which to water their lawns and plants.

# Procedure:

## Activity 1 – What is Water?

1. Separate into groups of 2–3 and fill a clear glass or beaker with water.
2. What do you know about water? How would you describe it? List out your groups' answers below:
3. Where did this water come from? List out your groups' answers below:
4. After you have finished your answers, find another group and compare your answers. Add anything you missed below:

## Activity 2 – Earth's Water

1. In your same groups, take an apple and imagine it represents ALL of the water on the Earth.
2. What percentage of the water on earth is salt water? Make a guess below:
3. Cut a very small slice out of the apple, about 3% of the entire apple.
4. This small slice represents fresh water (3%) and the rest represents ocean salt water (97%).
5. This “freshwater” piece includes water trapped in glaciers and ice caps. We don't get our water from these sources.
6. Next, cut a third off this small slice.
7. The bigger piece is the fresh water trapped in glaciers and ice caps (about 2% of the total water on the Earth); the tiny little piece (only 1% of the total water on the Earth) represents all the ground water and water held in lakes and rivers. This is where all our water comes from, this one tiny, little piece.
8. Now, find the peel of your slice. This represents the water that is in rivers and lakes (only 0.02% of the total water on the Earth).
9. This is why protecting our surface drinking water sources is so important. The ways we conserve water and prevent pollution help us protect our valuable resource, shown here as the peel of that tiny little piece!

## Activity 3 – Water Recycles

1. Examine the Water Recycles graphic in the Introduction section.
2. What are two types of fresh water sources that humans get their drinking water from?
3. After being taken from the source, where does your water go before it gets to the sink in our home? (*Hint: what makes your water at home safe to drink?*)
4. After you wash your hands in a sink, where does that water go? What happens there?
5. Work in groups of 2-3 to complete the activities below

## Glossary:

- **Aquifer** – an underground store of ground water
- **Condensation** – conversion of a gas/vapor into a liquid
- **Drinking Water** – water that has been treated for human consumption
- **Evaporation** – conversion of a liquid into a gas/vapor
- **Ground Water** – water that remains below the surface of the earth
- **Humidity** – the amount of water vapor in the air
- **Hydroelectricity** – energy created by harnessing the movement of water
- **Infiltration** – the movement of water from the surface into the ground
- **Precipitation** – the movement of water from clouds to the earth
- **Rain Barrel** – a way that humans capture rainwater runoff
- **Transpiration** – the release of water vapor from plants
- **Wastewater** – water that has been used in a home or business

## Applicable TEKS:

- **2<sup>nd</sup> Grade** – §112.15.b.1B; 3B; 5A,B; 10B
- **3<sup>rd</sup> Grade** – §112.15.b.1B; 3B; 5A,B; 10A
- **4<sup>th</sup> Grade** – §112.15.b.1B; 3B; 5A,B; 10A-C
- **5<sup>th</sup> Grade** – §112.16.b.1B; 3B; 5A-C; 10A