

How wet is our planet?



This activity center is part of the **Water Science** theme.

improved visibility

What's the purpose of this activity?

To describe the amount and distribution of water on Earth. Students will discover why Earth is considered the “water planet” but that much of its water is not readily available for human use. Participants will come to understand that much of the water available to humans and wildlife depends largely on how its quality is maintained; therefore it is important to conserve water and take care of it!

Key messages:

- Earth is considered the “water planet” as approximately 75% of its surface is water!
- Water is found in a variety of locations and forms on Earth.
- All of this water is part of the hydrologic cycle.
- There is a difference between fresh water and salt water.
- Water available to humans is very limited.
- Water conservation is important.

Materials:

- Large map of the world or 12” diameter globe (preferably one which depicts clouds)
- Water Cycle poster (laminated)
- Five-gallon container (1/4 blue Rubbermaid with line demarking 5 gallon mark)
- 2 clear buckets: 1 marked Freshwater, 2 marked Groundwater
- 1 smaller clear container (cup/glass) marked rivers, streams & lakes
- Tablespoon
- Eyedropper
- Blue food colouring (optional) – can be used to add a few drops to the water to tint the water for

Activity Set Up:

1. Fill the ¼ blue Rubbermaid labelled Earth, with 5 gallons of water → to the demarked line on the outside.
2. To increase the visual effect, can add a few drops of blue food coloring to Earth's water
3. Set out:
 - 2 clear containers, Fresh Water & Groundwater, set out beside Rubbermaid
 - Smaller clear cup labelled Rivers, Streams & lakes set out as we
 - Tablespoon measure
 - Eye dropper
4. Have map or globe ready.

What will I be doing?

You will be helping students understand how much water exists on Earth and where, but how relatively little is available for use. Through this visual activity students should become aware that it is important for us to be conscience of fresh water and to take care of the Earth's water.

1. When students arrive, using the map/globe, begin a discussion on how much water is present on Earth.

Q: Where is water found on Earth?

A: River, lakes, oceans, glaciers, ground water, clouds.

Water is found in many different places and in many different forms on Earth. All of this water is part of the hydrologic cycle.

2. **Q:** Do you know what the hydrologic cycle is?
A: It is the water cycle! ... use the water cycle poster to briefly go through how water cycles on earth!

Evaporation:

Heat from the Sun causes water on Earth (in oceans, lakes etc) to evaporate (turn from liquid into gas)

and rise into the sky. This water vapor collects in the sky in the form of clouds.

Condensation:

As water vapor in the clouds cools down it becomes water again, this process is called condensation.

Precipitation:

Water falls from the sky in the form of rain, snow, hail, or sleet, this process is called precipitation.

Collection:

Oceans and lakes collect water that has fallen. Water evaporates into the sky again and the cycle continues.

3. **Q:** Do you think there is a lot of water on Earth?

A: Yes, there is! Approximately 75% of the Earth's surface is covered in water! That is why it is also known as the "water planet"!

Indicating to the students, the 5 gallons of water in the Rubbermaid ...

This large bucket represents all the water on Earth! ... lakes, rivers, ponds, streams, groundwater, oceans, glaciers, ice caps, and the atmosphere!

So, yes, it seems there is a lot of water on Earth!

Instruct a volunteer to use the tablespoon and take 25 tablespoons of water from the "Earth" water and place into the container labelled "Freshwater".

This is how much freshwater there is on Earth available to us! Only approximately 2.5%!

Indicate what is left in the blue "Earth Water" container ... 97.5% of the Earth's water is in our oceans! It is salt water!

Q: What is the difference between fresh and salt water?

A:

Saltwater	Freshwater
High density	Low density
High salinity	Very little, if any salt
Dangerous to drink	Good to drink (if clean!)
Different fish and plant makeup	Different fish and plant makeup

4. **Q: Should you drink water from the ocean?**

A: No! ... it is salt water and would not be very

good for you!

5. Ask another volunteer to put 8 tablespoons from the freshwater container and place in the other container labeled "groundwater".

This represents all the groundwater on Earth.

Q: What is groundwater and where does it come from?

A: Use Water Cycle Poster to help explain ... Groundwater is water located underground in the cracks and space within the soil. It comes from rain and snow that soaks into the ground. The water moves down into the ground because of gravity, passing between particles of soil, sand, gravel and rock until it reaches a depth where the ground is filled, or saturated, with water. The area that is filled with water is called the saturated zone and the top of this zone is called the water table.

The top of the water table may be very near the ground's surface or it may be hundreds of feet below.

6. Ask another volunteer to put 25 drops using the eyedropper (or 1/4 of a tablespoon) in the small clear container labelled "Rivers and Lakes"

This water represents all the water in rivers and lakes on Earth!

7. Now, we have removed the water contained in groundwater, rivers and lakes from the world's "freshwater" container ... therefore, the "freshwater" container now represents all the water contained in the atmosphere (clouds, rain, snow) and all the water on the planet that is frozen (polar ice caps and glaciers).

Q: Do you think it would be easier to make a trip to Antarctica to chip away a chunk of ice, and then melt it in order to get a drink? ... or use what is already available in the groundwater/rivers & lakes?

A: Use what is readily available ... ground water and Rivers & Lakes

Q: Do you think it would be easier to catch a cloud or wait for it to rain in order to get a drink? ...or use what is already available in the groundwater/rivers & lakes?

A: Use what is readily available ... ground water and Rivers & Lakes

8. So, there is very little freshwater available to us, "drinkable water", compared to the other

freshwater.

9. And now compare the amount of “drinkable water” available to us and other wildlife, to the amount of “un-drinkable” water (that what is remaining in the Earth’s Water blue bin). The salt water of the Earth!

10. **Q: Do you think it is important that we conserve our freshwater?**

A: Yes!

Q: What are some ways that we can conserve water with our daily activities?

A:

- Shorter showers
- Low flow shower heads, use better/newer technology
- Using rooftop water for gardening/washing care, etc.
- Reusable water bottles
- Turning the tap off while brushing your teeth

Additional Background Information:

All Water on Earth:

Oceans -----→97.24%
All ice caps/glacier -----→2.14%
Groundwater -----→ 0.61%
Freshwater lakes -----→ 0.009%
Inland seas/salt lakes -----→ 0.008%
Soil Moisture -----→ 0.005%
Atmosphere -----→ 0.001%

What kinds of water are there?

- Surface water
- Ground water

What is surface water?

- Surface water is easier to understand because we see it every day. It is any water that travels or is stored on top of the ground. This would be the water that is in rivers, lakes, streams, reservoirs, and the oceans.
- Runoff is the water that runs quickly off of the surface of the ground, comes out of in gutters,

off of roofs, etc. This is surface water as well.

- Runoff can be a problem as it can carry contaminants in the water supply.
- If surface water is used for drinking, it should be treated before use.

What is groundwater?

- Groundwater is water that you can’t actually see. It is water that is underground.
- Most people drink from ground water sources.
- During the water cycle, some of the precipitation sinks into the ground and goes into watersheds, aquifers and springs. The amount of water that seeps into the ground depends on how steep the land is and what is under ground. For example, areas that have a lot of sand underground will allow more water to sink in than those areas with more rock.
- When water seeps down, it reaches a layer of ground that already has water in it. This is the saturated zone. The highest point in the saturation zone is called the water table. The water table can raise and lower depending on seasons and rainfall.
- Ground water flows through layers of sand, clay, rock and gravel. This cleans the water.
- Because all water found on the surface does not make it into groundwater and the fact that the water that does make it into groundwater is filtered through various layers of material, it tends to stay cleaner than surface water.
- But pollutants can find their way into it. Pollutants like fertilizers, insecticides, pesticides, oil, gasoline etc. can be washed by rain into our groundwater.

Snow can become surface and groundwater. An example of this is when it snows a few times on a mountain. The snow might not melt in between snows. When it warms up in the spring, there could be too much water for the Earth to absorb therefore the melted snow water runs down the mountains as surface water until it reaches a body of water.

Sometimes surface water is absorbed into the ground and becomes ground water.

The Earth is referred to as the “water planet” because approximately 75% of its surface is water. Water is found in rivers, ponds, lakes, ocean, ice caps, clouds and as groundwater. All of these forms of water are part of a dynamic and interrelated flow called the hydrologic cycle. Each part of this cycle shares a portion of the total amount of water on the planet. Many people have a perception that water is a limitless

resource, yet the amount of water on our planet is actually limited. The amount of water available to humans and wildlife depends largely on how its quality is maintained. Therefore every person has the responsibility to conserve water, use it wisely, and protect its quality.

We all have a responsibility to protect water in all of its forms on Earth. Of immediate concern, the protection of our drinking water sources! The amount of freshwater on Earth represents a very small percentage of the total water available. The freshwater found in groundwater, rivers, and lakes is our primary source of drinking water. Although there is a much larger amount of salt water in our oceans, it takes a massive amount of resources and energy to desalinate (remove the salt) water from the ocean for it to be drinkable!

Clean Up Procedures:

- Dump all water (if there is food colouring in the water, make sure to put down toilet or sink)
- Dry as best you can and store all smaller containers, glasses and measuring cups in the larger "Earth" container and place lid on.
- Return to Activity Centre Volunteer Sign in area along with Earth map/globe and laminated water cycle poster.
- Return Activity Centre folder.