

The Environmental Learning Center



NATURE NEAR YOU

Water Water



Visit our website for more info:
<https://www.discoverelc.org/nature-near-you-kits>
Questions? Or to register for the virtual meetups,
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NATURE NEAR YOU

Water, Water, Everywhere!

Materials Included:

- Thaumatrope template
- Large bowl
- Small bowl
- Rubber band
- Aluminum foil
- Paperclips
- Paper
- Markers
- Spray bottle
- A bottle-cap
- Microscope
- Measuring tape
- String

Water covers almost 3/4th of the surface of our planet. While most of Earth's water is in our ocean, water also surrounds us. It exists on our planet as a solid, a liquid, and a gas. It is frozen in icebergs, floating in the air as water vapor and clouds, gathers in puddles that form after a rainstorm, and even in the very tissues that make up our bodies. All living things depend on water to survive.

In this kit, we invite you to dive deep into the world of water. You will investigate the fascinating ways that water moves around our planet and the microscopic creatures that spend their entire lives in water without our notice. We challenge you to turn salt water into fresh water by harnessing the power of the sun and to construct a boat that will float while carrying a heavy load. The watery world awaits for you to discover all it has to offer!

Happy Exploring!

VOCABULARY

- **Water Cycle:** the path that all water follows as it moves around Earth in different states: liquid, solid and gas.
- **Evaporation:** when the sun heats up water in rivers or lakes or the ocean and turns it into gas/vapor.
- **Precipitation:** The liquid and solid water particles that fall from clouds and reach the ground.
- **Condensation:** is the process by which water vapor turns into liquid.
- **Buoyancy:** the ability of objects to float in water or air.
- **Microorganisms:** living things that are so small that you need a microscope to see them.
- **Watershed:** an area of land where water falls and collects into the same place, like a river, lake or canal.
- **Runoff:** the extra water that flows over land when the soil below it is flooded.

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OUR WATERY WORLD

Earth is the only planet in our solar system known to have liquid water. This water is essential for life as we know it. In fact, when astronomers look for planets that may have other life forms, they look for a blue tint. Can you list all the ways that you use water in your life?



Materials Needed:

- Thaumatrope template (provided)
- String (provided)
- Elmer's Glue
- Markers, crayons or colored pencils

Instructions:

1. In the first circle, draw Planet Earth leaving a blank space in the oval at the center.
2. In the second circle draw yourself inside the center oval.
3. Cut out the two circles along the black lines.
4. On the back side of one of the circles, spread glue evenly.
5. Place your string across the glue, making sure to line it up with the marked edges on the underside of your circle.
6. Lay your second circle on top and make sure
 - a. Your artwork is facing up
 - b. The oval is on the OPPOSITE end as the bottom circle
 - c. The string is aligned with the marked edges
7. Place under a book to dry for 5 minutes.
8. Once your thaumatrope is dry, hold the strings between two fingers and spin.
9. Watch your two images combine as you see your connection to the Blue Marble.

The Blue Marble

- The image above is called the Blue Marble and was taken in 1972 by the Apollo 17 mission while they were travelling towards the moon.
- It was the first full picture ever taken of our planet.
- People all around the world, having never seen anything like this before, were amazed; and the image created an immediate sensation. It was the front page of nearly every newspaper on earth.
- Before, Earth had seemed so big and vast, but from this perspective it suddenly seemed like a small island in outer space with limited resources.
- This first image of Earth has been credited for causing the 1970's environmental movement.
- It is one of the most reproduced images in history.



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PUDDLE SCIENCE

Where do puddles form? How long do they last? In this investigation, learn about the disappearing world of puddles as you experience the water cycle at work.

Materials Needed:

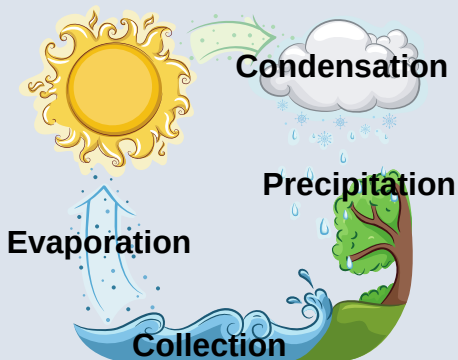
- String (provided)
- Measuring tape (provided)
- Pencil and paper



What is the Water Cycle?

Water is continually moving on, above, and below the surface of the Earth through a process known as the **water cycle**.

Liquid water **collects** in oceans, ponds, lakes, and even underground. Heat from the sun, causes liquid water to turn to water vapor, a gas, in a process called **evaporation**. Water vapor **condenses** into clouds, and then returns to the surface of the Earth as **precipitation** in the form of rain, snow, sleet, or hail.



Puddle Investigation 1:

1. Draw a map of your yard, neighborhood, or other area near you that you can safely observe after a rainstorm.
2. With your map in hand, explore the area and make predictions about where you think puddles would form. Mark these areas on your map.
3. After a rainstorm, take your map and compare your predictions to where puddles formed. As you make your observations, think about:
 - a. *Why do you think puddles form in some places and not others?*
 - b. *Why are some puddles bigger or smaller than others?*

Puddle Investigation 2:

1. After a rainstorm, find a puddle in an area that is safe to investigate. Draw a sketch of your puddle and place a string around the outside of your puddle. Measure how large your puddle is and record your data.
2. After a few hours, return to your puddle. How has your puddle changed? Place string around the outside of your puddle, measure your puddle, and record your observations.
3. Keep returning to your puddle every few hours. What do you notice? How much of the puddle do you think will remain at your next observation? Which part of the puddle do you think will be the last to disappear and why?

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SOLAR STILL

Humans need water to survive- but not just any water will do. The majority of water on our planet is salt water, but we need fresh water to survive. In this activity, discover how you can harness the power of the sun to turn salt water into fresh water using a solar still.

Materials Needed:

- Large bowl (provided)
- Small bowl (provided)
- Rubber band (provided)
- Plastic cling wrap
- Water
- Salt
- Small pebble



How to Make a Solar Still:

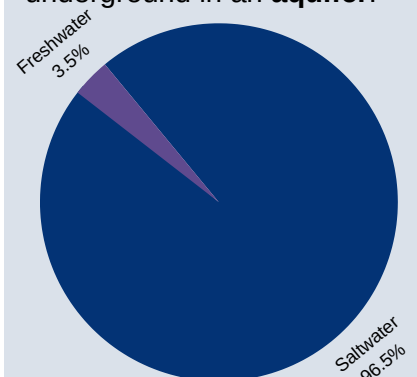
1. First, fill your large bowl about half way with drinking water. Mix as much salt was you can into this water to make salt water.
2. Place your small bowl inside your large bowl. You may need to place a small, clean, heavy object in the bottom so it does not float.
3. Cover the top of your bowl with plastic cling wrap. Secure the plastic cling wrap in place with a rubber band, if needed.
4. Place a small pebble on the top of your plastic cling wrap in the center of your still. This should create a small dip in the plastic cling wrap over the center of your small bowl.
5. Find a sunny spot to place your solar still. Check on your solar still every hour. Over time, the water should evaporate, leaving the salt behind. The fresh water will condense on the surface of the plastic cling wrap and collect in the small bowl.
6. After you have collected water in your small bowl, taste it! Does it taste salty or fresh?

Note: Use drinking water in this project if you would like to taste the water from your solar still. Do not drink water that has not been properly purified or treated and tested to be safe for human consumption.

Searching for Freshwater

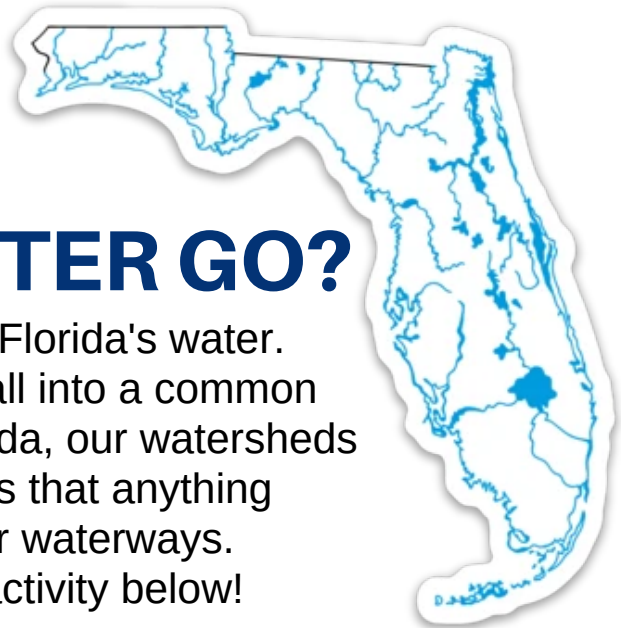
There is a LOT of water on Earth. In fact, if all of the water on the planet was poured into a pool the size of the United States, that pool would be 107 miles deep!

Over 96% of water on Earth, however, is salt water. Freshwater can be found in lots of places, but most freshwater is difficult to access. It is either frozen as snow or ice or underground in an **aquifer**.



WHERE DOES THE WATER GO?

Florida has 29 watersheds which connect all of Florida's water. A watershed is an area of land that drains rainfall into a common place like a river and a lake. In this part of Florida, our watersheds flow into the Indian River Lagoon. Which means that anything someone leaves on the ground can flow into our waterways. Curious to see how watersheds work? Try the activity below!



Materials Needed:

- Markers (provided)
- Piece of paper(provided)
- Spray bottle(provided)

Instructions:

1. Fill up your water bottle with water.
2. Take your supplies outside and find a place to work that can get wet.
3. Crumple your piece of paper into a loose ball.
4. Open up the paper and lay out so there are mountains, slopes, and valleys. This is your model of a watershed.
5. Using your markers, color each ridge of the "mountains" a different color; it should look like thin lines.
6. Consider the following:
 - a. *If there was a heavy rainfall on your model, where would the water go and why?*
 - b. *Where do you predict most of the water will end up on your model?*
 - c. *How is this model similar or different to the watershed you live in?*
7. Now spray your model and watch the watershed work.
 - a. *Where does the water accumulate?*
 - b. *What happens to the colors when they meet?*
 - c. *What could the colors represent in real life?*



FLORIDA WATERSHEDS

Gravity not only helps the raindrops fall from the sky, but also carries water to the lowest point, once it reaches land. This draining away of water is called **runoff**. Once gathered at a low point, this water forms puddles, rivers, lakes and eventually flows to sea-level where it becomes part of the ocean!

Florida is a very wet environment and in the summer is the rainiest state in America! To live in such a wet place, Floridians have dug canals to catch the extra water to keep our houses from flooding. Where do you think water goes after the canal?



To learn more about how you can help achieve a healthy watershed, visit this website: <https://www.covb.org/326/Watershed>

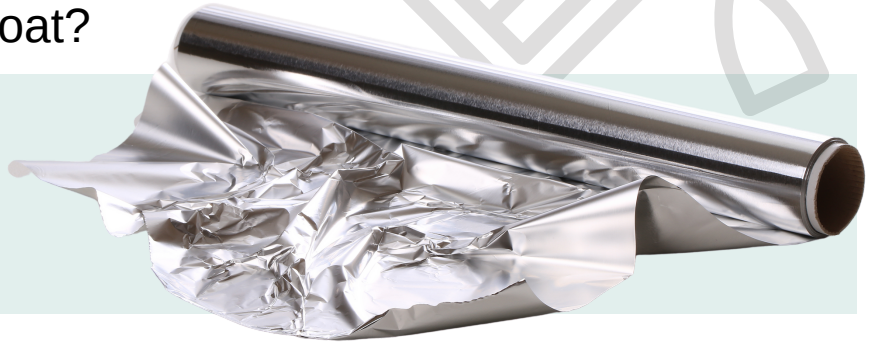
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BUOYANT BOATS: A DESIGN CHALLENGE

Can you build a boat that will float?

Materials Needed:

- Aluminum foil (provided)
- Paperclips (provided)
- Tub of water



Instructions:

1. Fill a tub with water. The tub does not need to be large, just large enough to float your boat. (Even filling your kitchen or bathroom sink with three to four inches of water will work.)
2. Use your aluminum foil to build a boat that will hold as many paperclips as possible before sinking. While building, remember that your boat:
 - a. must be small enough to fit in your tub of water.
 - b. must be big enough to hold the paperclips you will place inside.
 - c. must have some way to keep the paperclips from sliding off the boat into the water.
3. Place your boat in your tub of water.
4. Place the paperclips one by one into your boat. Count how many paperclips you can add before water starts entering your boat.
5. Think about your design. What parts of your design worked really well and what parts could be improved? Build another boat and see if you can hold more paperclips with your redesign! And for an extra challenge, try using pennies!

Is It Buoyant?

Buoyancy is the ability of an object to float in a liquid, such as water, or in the air. What items in your house are buoyant? Gather some items from around your home and see if they sink or if they float when placed in your tub of water.

Are you a boat building master?

Try these challenges to take your boat building to the next level:

1. Try your boat in freshwater and salt water. Does your boat hold more or less paperclips in freshwater than salt water?
2. Build a boat that is meant to move! Can you build a boat that holds paperclips AND can sail from one side of your tub of water to the other? Build your boat, fill it with paperclips, and use a fan or hairdryer to see if your boat can sail.



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UNDER THE MICROSCOPE



From far away a puddle may seem like, well....a puddle. But if you take a closer look, you might notice that there is life thriving in this shallow pool. A puddle, for a small creature, can be an entire habitat. With inhabitants such as mosquito larvae, tadpoles and countless microorganisms, too small to see with the naked eye. Now grab your microscope, and start exploring their tiny puddle world.

Materials Needed:

- Microscope (provided)
- A bottle-cap (provided)
- Pencil
- A puddle near you



Instructions:

1. Practice using your microscope around the house. Some cool things to observe are your fingerprints, hair and fruits or vegetables.
2. After a rainstorm, gather your materials and locate a puddle, or canal near you. *Note: it is important to go with an adult who will make sure it is safe for exploring. If you see oil, bubbles, or dangerous wildlife, you should find a different puddle.*
3. Using your bottle-cap scoop out water samples from the puddle.
4. Using your microscope, look at the water you have collected.
5. Be patient, sometimes it takes a while for the microorganisms to swim past your lens.
6. Once you spot one, be sure to draw it in the boxes.
7. Can you identify what kinds of creatures you spotted?

Draw what you discover in the squares

Note: Make sure the puddle you are exploring has been approved by a parent. You don't want to get sick from bacteria or pollution that may be contaminating the puddle.