Water Drop Patch
for Daisies

The WATER DROP PATCH Project inspires Girl Scouts to learn about water quality and to take action in their communities to protect and restore local water resources, including their local rivers, lakes, streams, wetlands, and groundwater. The project supports the Girl Scout Leadership Experience Program by promoting the following GOALS for Daisies:

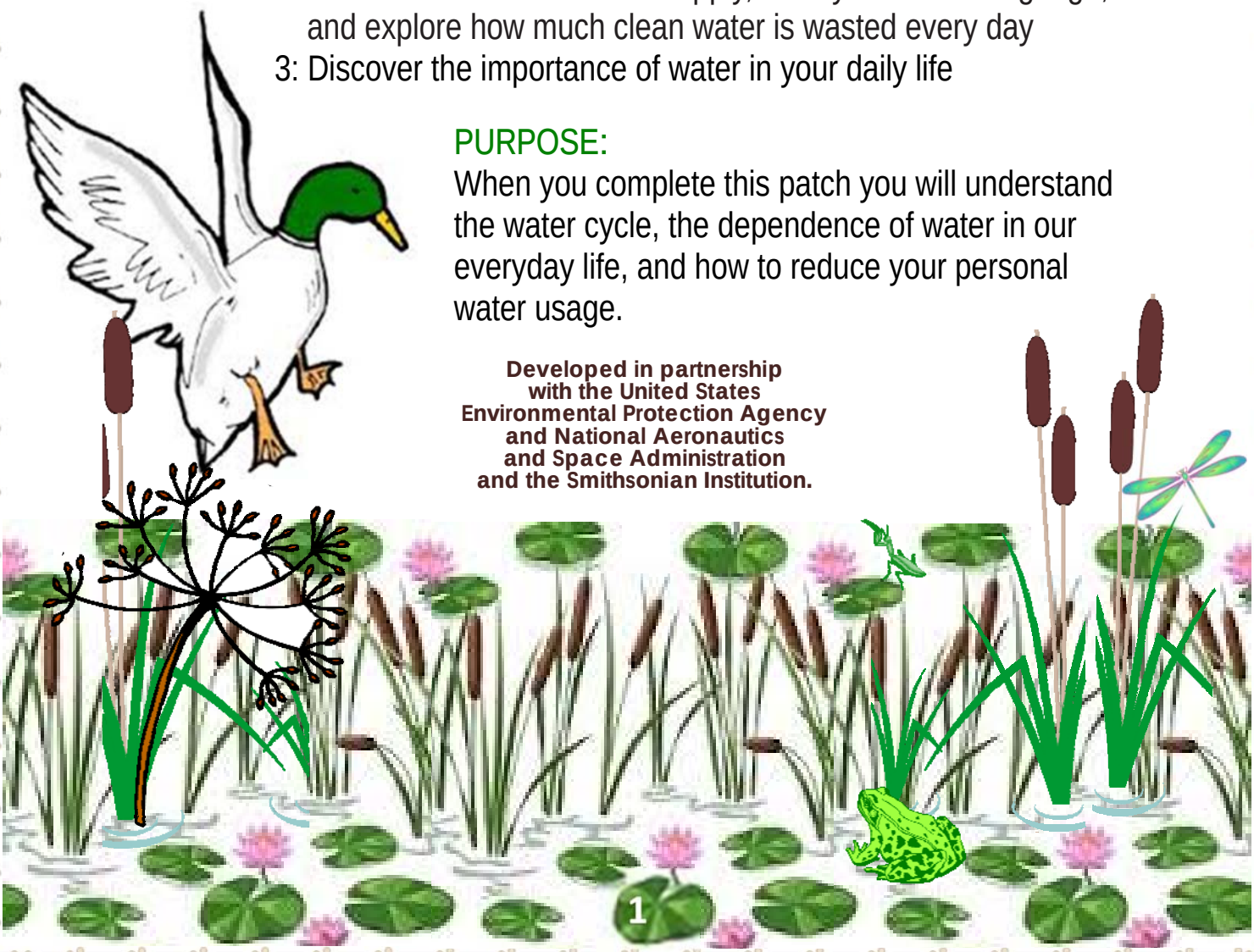
GOALS:

1: Learn how the water cycle works by creating a “Cloud in a Bag”
2: Simulate the world’s water supply, build your own rain gauge, and explore how much clean water is wasted every day
3: Discover the importance of water in your daily life

PURPOSE:

When you complete this patch you will understand the water cycle, the dependence of water in our everyday life, and how to reduce your personal water usage.

Developed in partnership with the United States Environmental Protection Agency and National Aeronautics and Space Administration and the Smithsonian Institution.



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LEADERS:

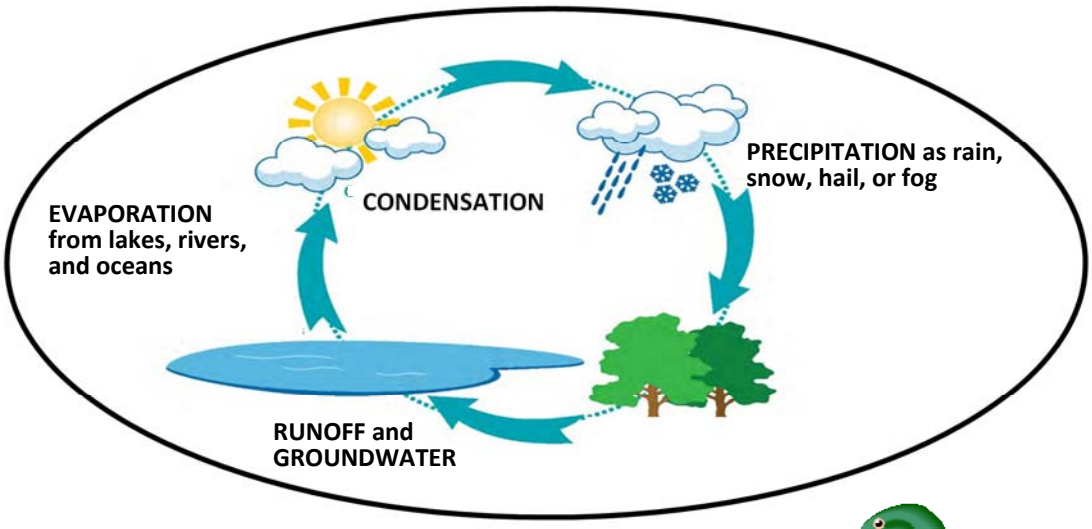
The following guide is to help Daisies complete the Water Droplet Patch. You don't need to be an expert in the water cycle to help your Daisies with this journey! All of the requirements are simple, hands-on activities for both you and your Daisies to explore.

STEP 1:
Create a cloud in a bag and view the steps of the water cycle in action.

There will never be any new water here on planet Earth. All of the Earth's water today is the same water that was here 10 days ago, 10 years ago, and even at the time of the dinosaurs. That water keeps getting recycled over and over again, in the process known as the water cycle!

Next time you take a shower or bath, consider the water's journey before it got to you. Those same water molecules may have passed through birds, cats, dogs, dinosaurs, bacteria, oceans, lakes, clouds, soil, and more. Water molecules are cleansed and purified as they travel through the water cycle. The water cycle explains why rain still falls even when we never have new water. Water from lakes and rivers becomes a gas during the process of evaporation. As water molecules move and bounce around more quickly, they become water vapor. When the water vapor molecules rise high enough in the sky, they cool and lose energy. The molecules slow down again and become liquid water in a process called condensation. This is how clouds are formed. When the droplets of water in a cloud grow and become heavy then they fall as precipitation.

WHAT DOES THE WATER CYCLE LOOK LIKE?



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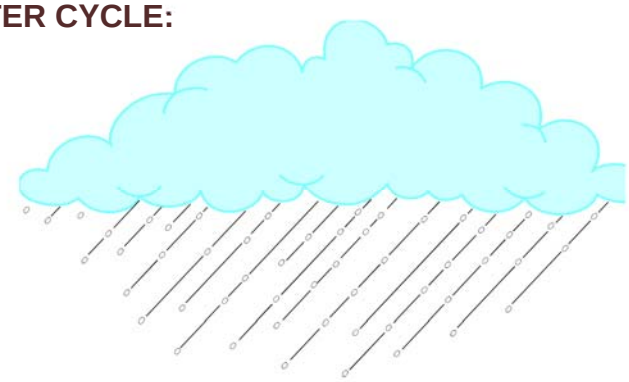
MAKE A CLOUD IN A BAG TO SIMULATE THE WATER CYCLE:



Supplies:

- Spray bottle filled with water
- Ziploc sandwich bags
- Soil (potting soil or natural soil)
- Clear packing tape
- Some sunshine!

Steps:

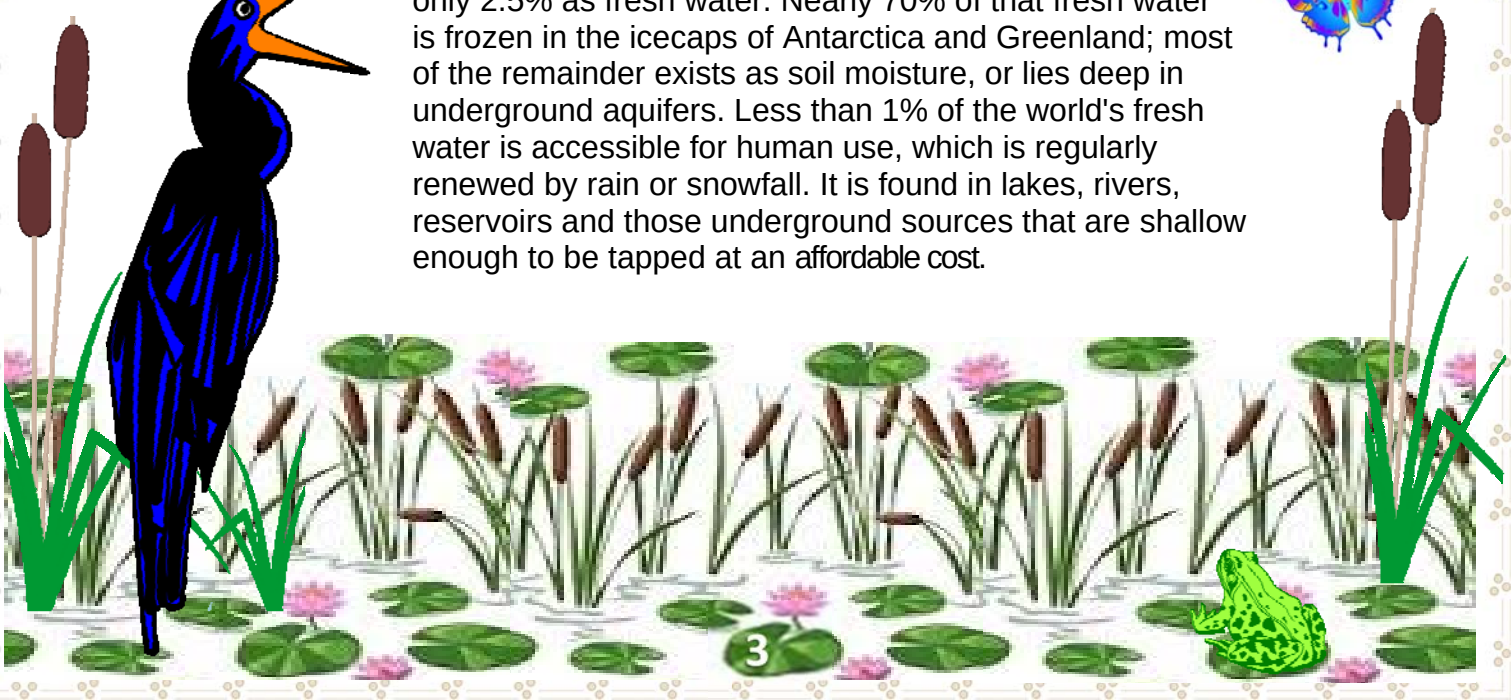
- Spoon roughly ½ cup of soil into a Ziploc bag.
- Mist the dirt with water bottle. Dirt needs to be moist, but not muddy.
- Zip the bag to ensure bag is sealed tightly. Then tape them to a sunny window.
- Depending on the temperature and amount of sunlight, water will begin condensing in the bag anywhere from 2-3 hours to the next day. A foggy “cloud” will form inside the bag. When the “cloud” can hold no more moisture, “rain” will fall down the sides of the bag.

Congratulations! You have demonstrated the three steps of the Water Cycle: Evaporation, Condensation, and Precipitation. This same process continually happens in the environment around us, which is why the water we have now is the same water the dinosaurs had.

STEP 2:
Protecting the world’s water supply starts at home!

Over 70% of our Earth's surface is covered by water (we should really call our planet "Ocean instead of "Earth"). Although water seems abundant, the real issue is the amount of fresh water available.

Of all the water on the Earth, 97.5% is salt water, leaving only 2.5% as fresh water. Nearly 70% of that fresh water is frozen in the icecaps of Antarctica and Greenland; most of the remainder exists as soil moisture, or lies deep in underground aquifers. Less than 1% of the world's fresh water is accessible for human use, which is regularly renewed by rain or snowfall. It is found in lakes, rivers, reservoirs and those underground sources that are shallow enough to be tapped at an affordable cost.



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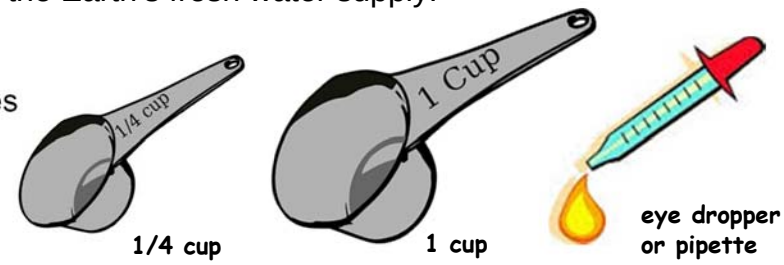
WORLD WATER SUPPLY DEMONSTRATION:

In this lesson, you will simulate the world's water supply and consider how much clean water is wasted every day while exploring changes you can make to live within the limits of nature. By understanding that clean water is a precious resource, you can begin to appreciate the importance of conserving water to sustain the Earth's fresh water supply.

Supplies:

- Measuring cups: 1 cup and ¼ cup sizes
- One 1ml eye dropper or pipette
- Water (3/4 cup)



Steps:

1. To demonstrate the world water supply, fill measuring cup with ¾ cup water. This water represents all the water on Earth.

2. Using the eye dropper or pipette, fill the eye dropper using water from measuring cup. The water in the eye dropper or pipette represents the amount of fresh water in the world. The remaining water in the measuring cup represents all the saltwater on Earth, which can't be used for drinking.

3. Squeeze out 1 drop of water from the eye dropper pipette into ¼ cup container. This drop of water in the ¼ cup container represents the fresh water in the water cycle that is accessible for drinking, bathing, and all other human uses. The remaining water in the eye dropper represents all the fresh water that is frozen, is present as soil moisture, or lies in deep underground aquifers as groundwater not accessible to human use.

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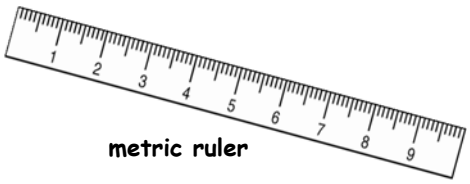
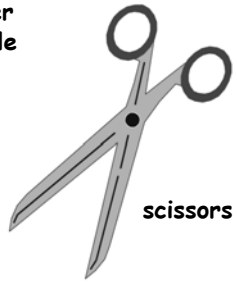
MAKE A RAIN GAUGE:





Supplies:

- Plastic water bottle
- Scissors
- Permanent marker
- Metric ruler

Steps:

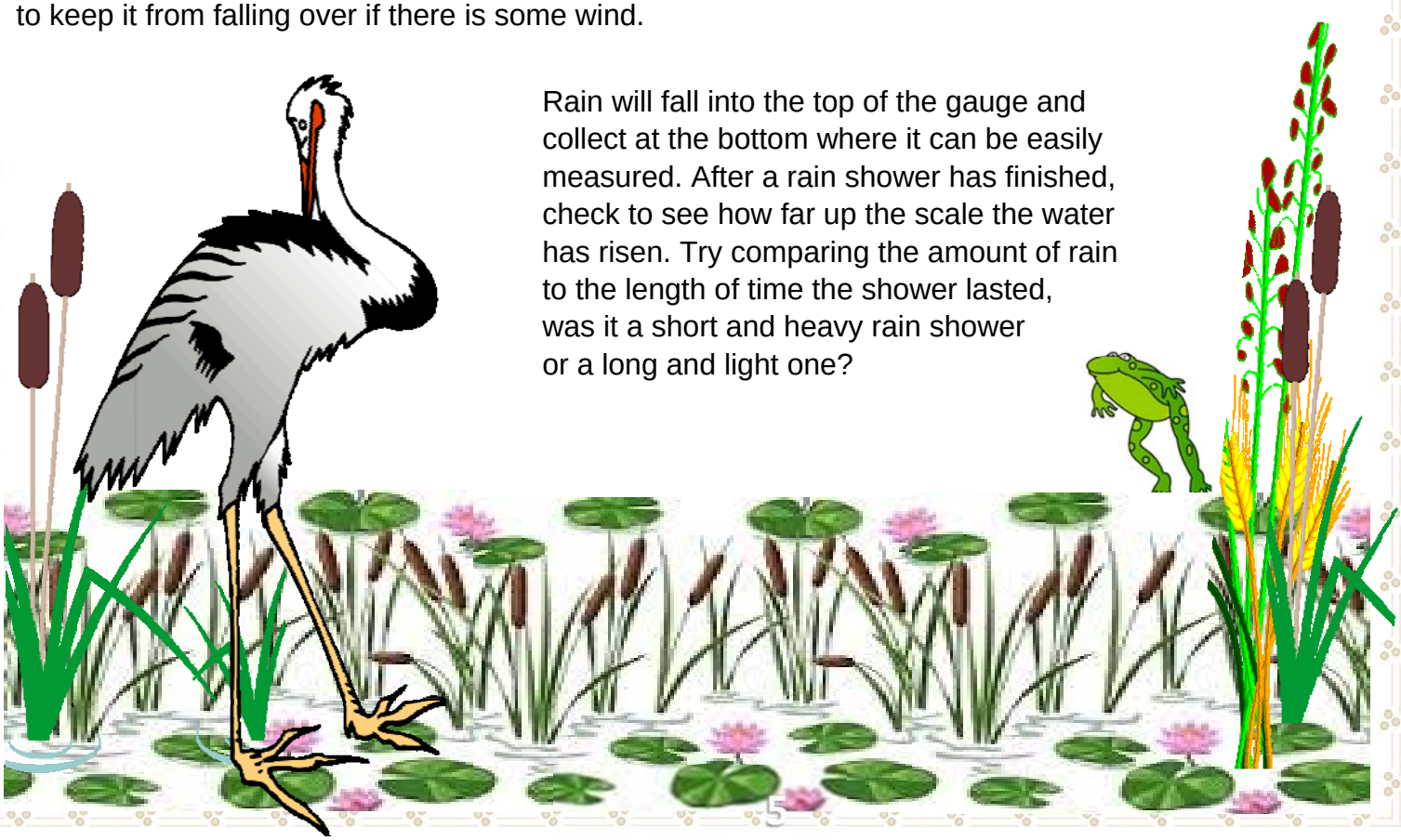
1. Carefully cut the top off of the plastic water bottle. You may need to have an adult help you with this step.

2. Place the ruler next to the plastic bottle, and make lines for each centimeter, and dots for each half centimeter.

3. Write numbers for each centimeter, beginning with 1 from the bottom of the bottle.

4. You will need to figure out a good spot to place your rain gauge so it can collect raindrops as they fall from the sky. It is best to place it in an open area if possible, so the trees, buildings, and bushes don't interfere with the rain as it falls. You should also place some rocks around it to keep it from falling over if there is some wind.

Rain will fall into the top of the gauge and collect at the bottom where it can be easily measured. After a rain shower has finished, check to see how far up the scale the water has risen. Try comparing the amount of rain to the length of time the shower lasted, was it a short and heavy rain shower or a long and light one?



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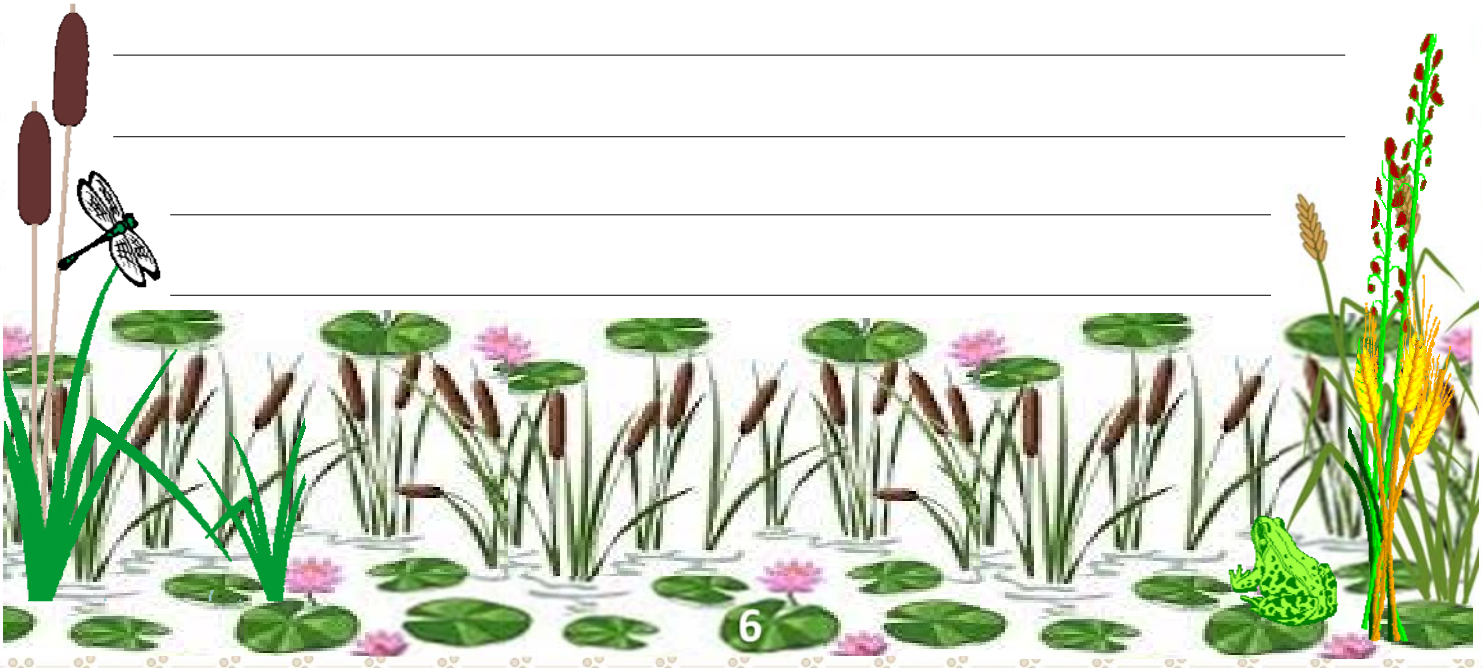
BE A WATER DETECTIVE:

Find sources of water (e.g. puddles, sewers, rain barrels, rivers, kitchen sinks, toilets and sprinklers) in the locations listed below and observe how the water is being used. Fill in the water chart below.

Location:	Sources of water (e.g. river, puddles, kitchen tap, sprinkler, etc.)	How is the water being used?	Is there water being wasted? If so, where?
Home (indoors)			
Home (outdoors)			
In Your Neighborhood			

BRAINSTORM AND RECORD WAYS YOU CAN REDUCE YOUR PERSONAL WATER USAGE:



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STEP 3:
How important is water to your daily life?

Think of all of the things you've done today—all the people you've seen, the things you have eaten and drank, what you have read, etc. Now, let's play back your day with this question in mind—what things in your day required water? What was the first thing in your day that required water? Did you go to the bathroom when you got up? Brush your teeth? Have something to drink? What was the next thing? The vast majority of your activities require water—from the food you eat (plants need water to grow, animals that become meat need water) to exercising (your bodies need water), the building where you are (buildings that are made of concrete require water to be mixed with the cement during construction) to electricity (which is used for lights, stoplights, walk signs, TVs, radios, and cable).

CREATE A PERSONAL WATER-USE COLLAGE:

Using old magazines, cut out any items that you use in your daily life that involve water. You can also use markers, colored pencils, and construction paper to draw pictures of additional water uses. Display collage at your next troop meeting and discuss how almost every aspect of our lives uses water, from our food to clothes, toilets, and cars, etc.