Water Drop Patch
for Juniors

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, estuaries, coastal waters, and groundwater. The project supports the Girl Scout Leadership Experience Program by promoting the following **GOALS** for Juniors:

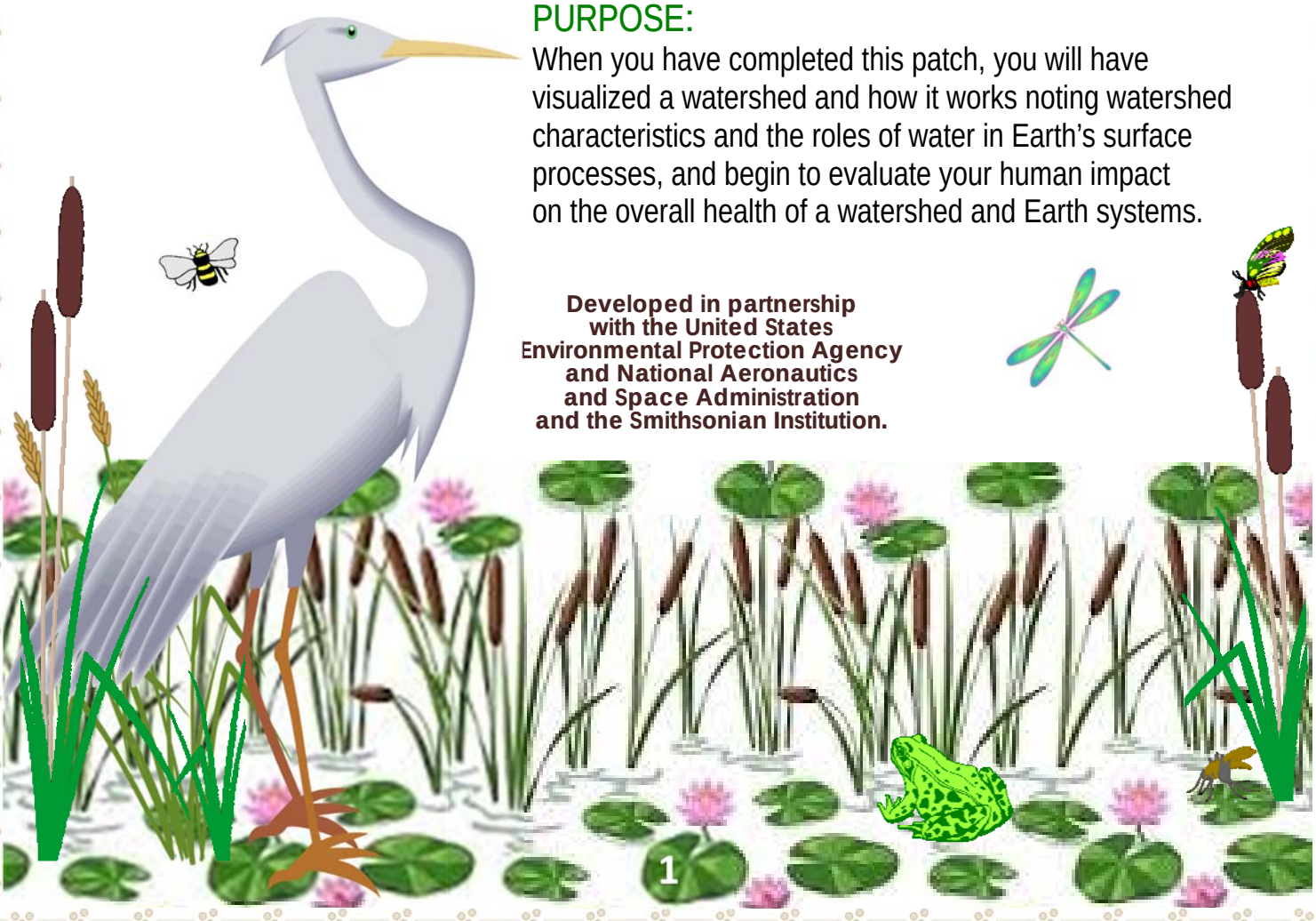
GOALS:

1: Study surface water resources and define characteristics of watersheds and stormwater
2: Participate in a field trip with your troop and introduce yourself to citizen science
3: Share what you've learned with other Girl Scouts

PURPOSE:

When you have completed this patch, you will have visualized a watershed and how it works noting watershed characteristics and the roles of water in Earth's surface processes, and begin to evaluate your human impact on the overall health of a watershed and Earth systems.

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 Juniors complete the Water Droplet Patch. You don't need to be an expert in watersheds to help your Juniors with this journey! All of the requirements are simple and include many hands-on activities for both you and your Juniors to explore.

STEP 1:

Study surface water resources and define characteristics of watersheds and stormwater

CREATE A WATERSHED

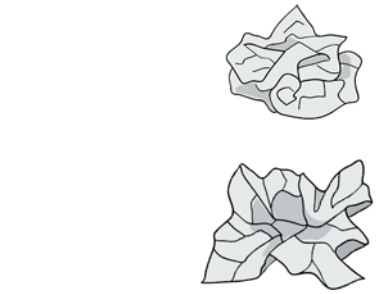
Create a small model of a stream and its drainage area, so you can see an entire watershed in action. Your model will demonstrate the mixing of water and pollutants that occurs in most watersheds.

Supplies:

- Chart paper
- Baking pan
- Markers
- Spray bottle

Steps:

1. Crumple chart paper and then partially smooth it out, being sure to leave some ridges and elevated areas.
1. Color paper with different colors of markers to represent a variety of elements that would be found in a stream or river (i.e., brown for sediment, green for chemical pollutants, black for oil, etc.).
2. Place colored paper in pan and shape it so that it resembles a watershed, using the creased lines to show ridges and elevated areas of land.
3. Simulate rain by slowly and gently spraying water on the top of the watershed until the colors begin to run on the paper.
4. Observe what happens to the colors as they run down into the lowest part of the watershed.



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DEFINE *WATERSHED*:

_____

_____

DESCRIBE THE FOLLOWING:

WATERSHED: _____

LAKE: _____

POND: _____

RESERVOIR: _____

RIVER: _____

STREAM: _____

CANAL: _____

WETLAND: _____

VALLEY: _____

RIDGE: _____

HEIGHT OF LAND: _____

CONTINENTAL DIVIDE: _____

COASTLINE: _____

SWAMP: _____

MARSH: _____

ESTUARY: _____

CAVE: _____

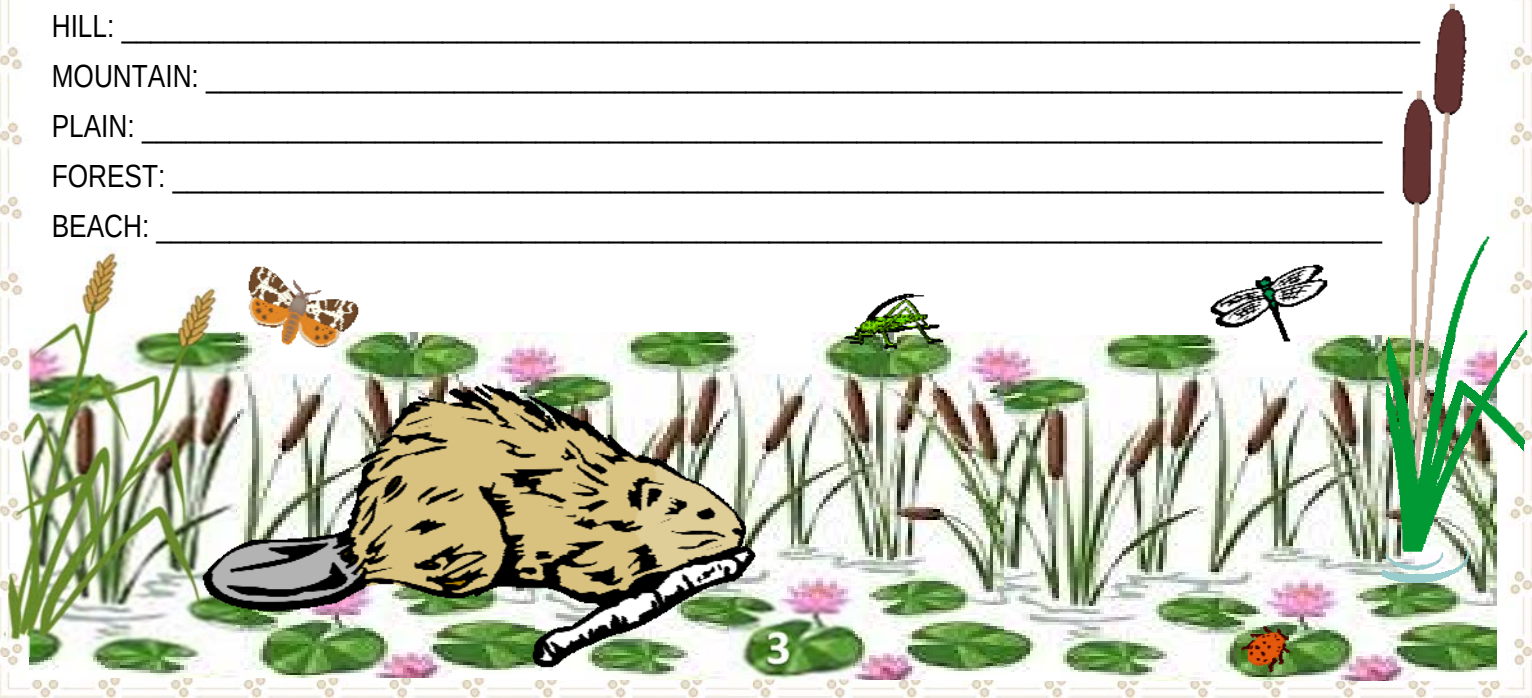
HILL: _____

MOUNTAIN: _____

PLAIN: _____

FOREST: _____

BEACH: _____



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MAKE IT RAIN:

In this activity, Juniors will observe the processes of runoff, infiltration, and erosion and how they affect water quality. By comparing three different models of land use, Juniors will discover how land management practices affect water resources.

Describe the following:

RUNOFF: _____

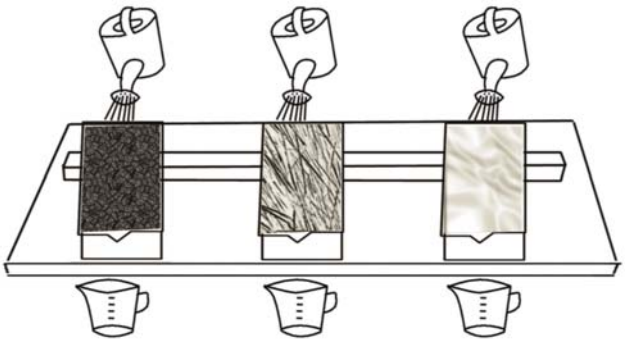
EROSION: _____

INFILTRATION: _____

IMPERVIOUS SURFACE: _____

Supplies:

- Three shallow boxes, aluminum foil roasting pans, or shoe boxes lined with garbage bags
- Watering can
- Beakers or wide mouth measuring cups to collect runoff from pans
- A wooden board (2x4 or something similar) to place under one side of tray to create a slope
- Loose soil for each tray
- A piece of sod to cover the entirety of one of the trays
- Aluminum foil or plastic wrap to cover the third tray
- Two stopwatches



Preparation:

Prepare three aluminum foil roasting pans with 2-4cm notches on one end. Fill one pan with soil to represent bare surface, put sod atop the soil in the second pan to represent cover crops or buffer strips, and put plastic wrap or foil atop the soil in the third to represent impervious surfaces such as parking lots. Wood blocks or books can be used to slope the pan. Juniors will also need a watering can, two stop watches, and measuring cups to collect runoff. Pans must be tilted equally, water must be poured from the same height and at the same rate, and close attention must be paid to keeping time accurately.

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Make it Rain Data Collection:

Ask other Girl Scouts or family members to help you with this project. You will need a water pourer, a timekeeper #1 to measure time until runoff, a timekeeper #2 to measure runoff time, a water reporter to measure water input and output, and a data recorder to complete the following data sheet:

DATA	BARE SOIL	SOIL WITH VEGETATION	IMPERVIOUS SURFACE
Starting amount of water in watering can (mL)			
Ending amount of water in watering can (mL)			
Water input (mL) = Starting amount of water in can minus Ending amount of water in can			
Water output (mL) = Amount of water collected in the runoff cup			
Water absorbed by the soil (mL) = Water input minus Water output			
Time until runoff (seconds) - Start the stopwatch when water begins pouring over the pan and stop when water begins to run off the pan into collection container			
Runoff time (seconds) - Start the stopwatch when runoff water begins to flow from pan into collection cup and stop when water lessens to a drip from the pan			
Soil erosion (none, a little, a lot)			

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Make It Rain Observation Questions:

1. How does the type of material covering the surface of the ground affect the amount of runoff?

_____
_____
_____
_____

2. How can runoff affect water quality?

_____
_____
_____
_____

3. How might the amount and speed of the runoff affect erosion and water quality?

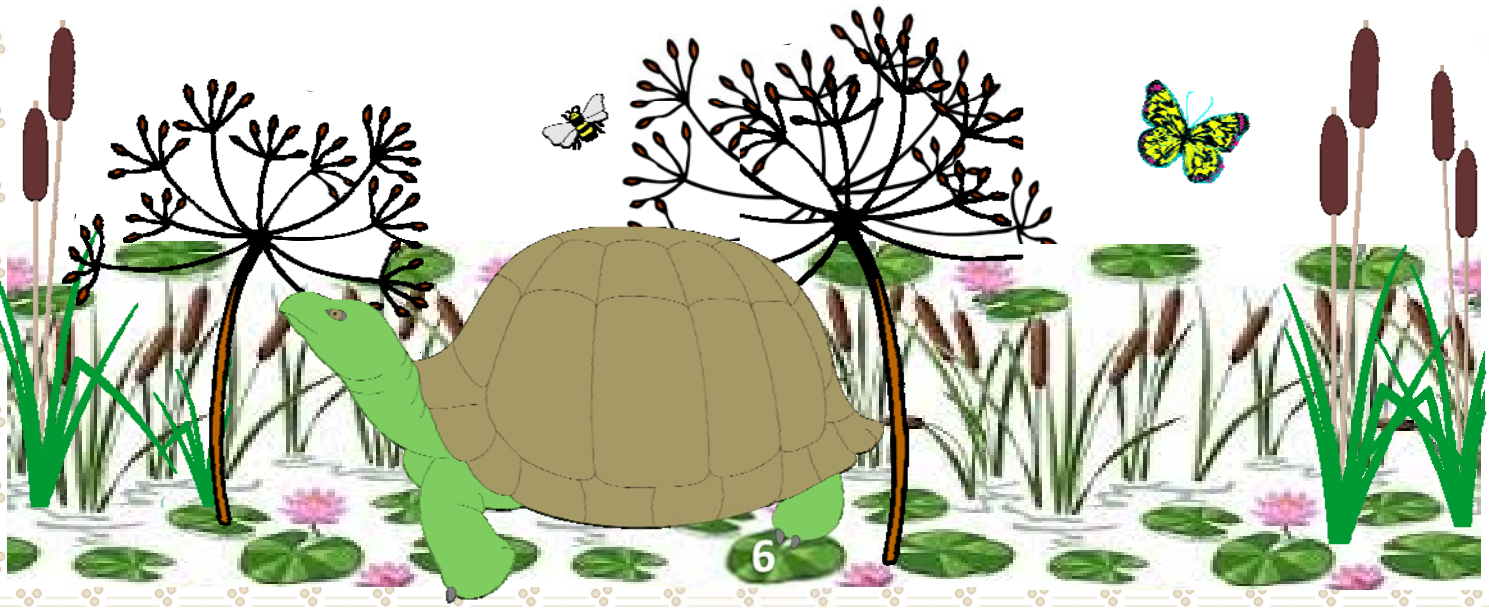
_____
_____
_____
_____

4. How does the presence of vegetation affect runoff, erosion, and water quality?

_____
_____
_____
_____

5. How does water quality affect you?

_____
_____
_____
_____



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STEP 2:

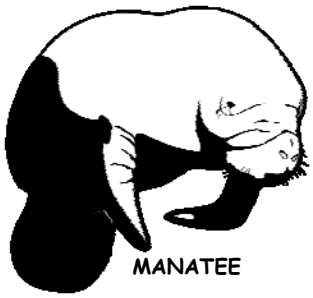
Get outside! Participate in a field trip with your troop and introduce your troop to citizen science

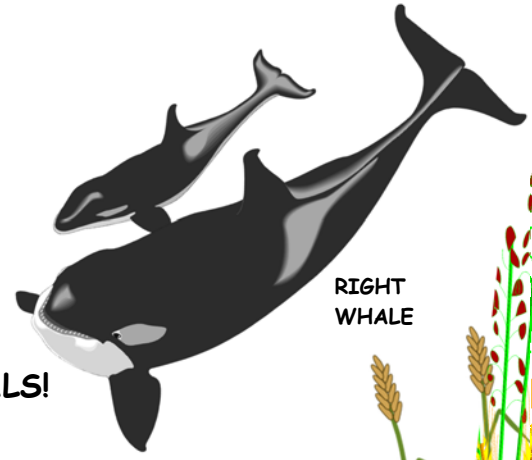
GO ON A HIKE

Go on a hike with your troop or group and follow a local creek or stream flowing to a river, basin or sea. Where does the stream drain? What does it pick up along the way? What happens when it rains? How does the stream change? What insects, birds, plants or aquatic life do you observe? Use a United States Geological Survey (USGS) map or draw your own to illustrate your local watershed. Identify characteristics of the watershed using the terms you used to identify surface water resources and characteristics of watersheds and stormwater.

OR VISIT A LOCAL AQUARIUM OR NATURAL HISTORY MUSEUM

Visit a local aquarium or a natural history museum to see specimens of aquatic life. Share your experiences with your troop or group and family. Consider visiting one of Coastal America's Coastal Ecosystems Learning centers if there is one near you. Check out Coastal America's online at www.coastalamerica.gov, and find out how Coastal America, a partnership of eleven federal agencies and the Executive Office of the President, is helping to protect the manatee, the whooping crane, salmon and the right whale.





PROTECT ENDANGERED ANIMALS!

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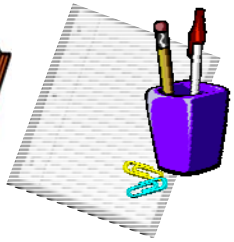
STEP 3
Take Action by sharing what you've learned with other Girl Scouts. Be Creative!



DESCRIBE WHAT YOU'VE LEARNED THROUGH STORYTELLING, WRITING, OR PAINTING

Can you tell a story about the roles of water in Earth's surface processes? Can you inspire others to minimize their human impact on the overall health of a watershed and Earth systems? What can you do to help the environment? Are you now interested in any water-related careers and if so, what are they?

OR CREATE AN ATTRACTIVE WALL MURAL FOR YOUR SCHOOL OR COMMUNITY

Create an attractive wall mural for your school or community with messages about clean water. Some ideas for themes might be "We all live downstream," "What is a watershed?" "Where does my drinking water come from?" or "The Wonders of Wetlands." You might take a look at a poster series developed by the USGS at www.water.usgs.gov/outreach/OutReach.html for some ideas. Display your mural where others in your community can see it!

OR MAKE A MAP SHOWING HOW WATER MOVES TO YOUR LOCATION

Find your location on map (http://nationalmap.gov/streamer/webApp/streamer.html) and make a map showing how water moves to your location from either the Atlantic or the Pacific Ocean.