

WE KEEP WATER FLOWING

Patch Program

December 2022

girl scouts 
in the heart
of pennsylvania


PENNSYLVANIA
AMERICAN WATER

WE KEEP LIFE FLOWING®



PROTECT

CONSERVE

RESTORE


PENNSYLVANIA
AMERICAN WATER



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“The We Keep Water Flowing patch helps future leaders connect with and understand their role in protection drinking water resources.”

Marcus Kohl
Director of Water Quality and Environmental Compliance,
Pennsylvania American Water



INTRODUCTION

Pennsylvania American Water and Girl Scouts in the Heart of Pennsylvania partnered to develop the “We Keep Water Flowing” patch program. It will inspire Girl Scouts to learn more about water sources in their community, strive to protect them and explore careers in the water industry.

The patch program aligns with the Girl Scout Leadership Experience to achieve the following goals:

- **Discover:** Seek opportunities to learn about the wide world of water.
- **Connect:** Collaborate with others to expand water knowledge.
- **Take Action:** Do something to help protect water sources.

This patch program manual is for both the Girl Scout and the facilitator. It serves as a guide through the activities to complete the “We Keep Water Flowing” patch. It is a three-step process. All Girl Scouts will complete the step one activities. Step two and step three activities are age appropriate.

Safety should always be the top priority in this patch program. Adults should review the Safety Activity Checkpoints manual to follow Girl Scout safety standards and guidelines. The intent is to provide a safe and positive experience for the girls.

ACRONYMS

- | | |
|-----------------|--|
| • USEPA | United States Environmental Protection Agency |
| • USGS | United States Geological Survey |
| • PEC | Pennsylvania Environmental Council |
| • POWR | Pennsylvania Organizations for Watersheds and Rivers |
| • PA DEP | Pennsylvania Department of Environmental Protection |

BACKGROUND

Who is Pennsylvania American Water?

Pennsylvania American Water is a drinking water and wastewater utility that has been serving customers in Pennsylvania since 1886. We provide drinking water and wastewater services to approximately 2.4 million people in 36 counties and 408 communities in Pennsylvania. That represents about 19% of the state's population. We operate 37 water treatment facilities, 105 groundwater facilities, 23 wastewater facilities, 11,457 miles of water and sewer pipes and X fire hydrants! Our drinking water sources come from 97% surface water supply, 7% groundwater, and 2% purchased water sources.

Our priority is to provide clean and reliable drinking water and wastewater services to the communities we serve. This starts at the source! Protecting our sources of supply supports the overall treatment process and benefits the community as a whole.

We are stewards of water resources and the environment. We work with partners upstream in our watersheds on challenges that could impact sources of supply now or in the future. Water is an integral part of life, and we take great pride in taking care of it.

What is a Watershed?

We all live in a watershed. Watersheds are areas of land where runoff from rain and snow drains into a lake, stream, river or wetland. Water constantly travels over the land's surfaces that include farmland, lawns and city streets, on its course to a waterway. When

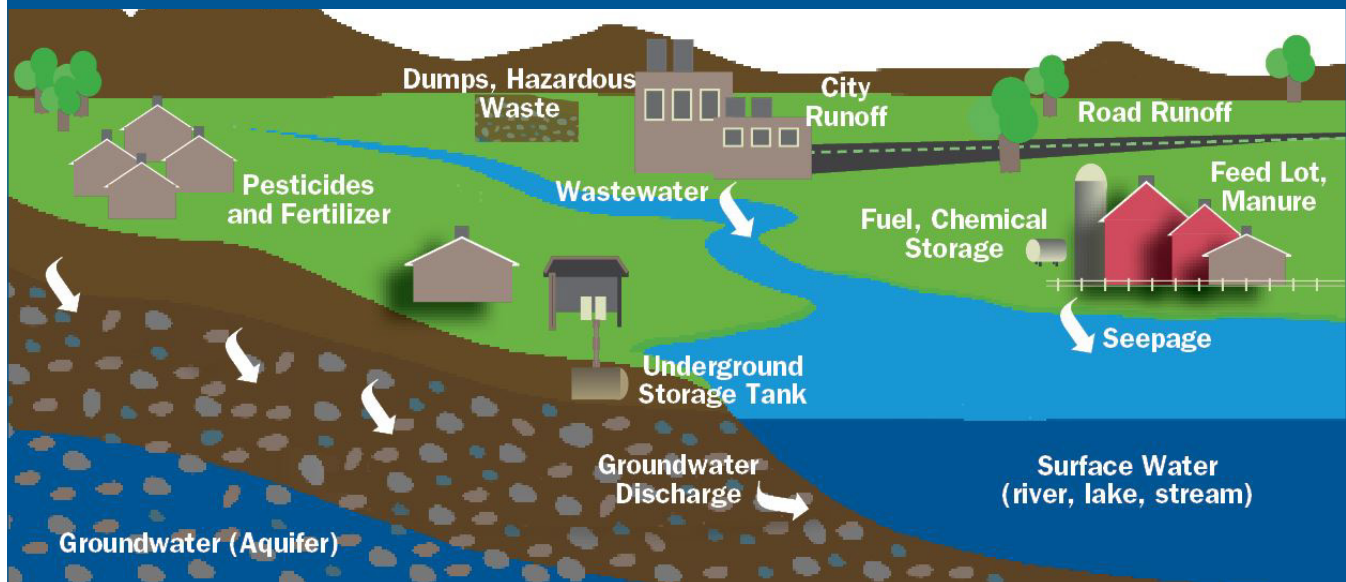
it rains, water runs over the surface picking up any pollutants across the land. Small amounts of motor oil, pet waste, pesticides or litter are collected along the journey and released into the nearest waterway.

These watersheds are full of life. They provide homes for fish, birds and wildlife. They are also a source of drinking water for homes and businesses. No matter where you live, work or play, you are always in a watershed.

What we all do to the land makes a difference in the quality of water in our rivers and streams. Because of this, we spend a lot of our time and efforts protecting our water resources.



Types of Pollution



Types of Pollution

Various sources of pollution can exist within watersheds. They come from natural sources such as minerals that leach out of soil and rock, and man-made sources such as factory-made chemicals or waste. Pollution can enter water supplies by land runoff, other streams, and/or by soaking into the ground.

Pollution sources are often grouped into one of two categories: point sources and non-point sources. Point source pollution occurs at a specific location, such as a pipe or a leaking storage tank above or below the ground. Non-point source pollution occurs across a larger area that is not tied to a specific point or location. Examples of non-point source pollution include excess fertilizers and pesticides from farming or neighborhoods, waste or chemicals from city rainwater runoff, and sediment from erosion.

Each watershed is unique and can contain different types of pollution sources depending on land use. Drinking water utilities develop Source Water Protection Plans to reduce the risk to their drinking water supply from pollution.

Protecting Drinking Water Supplies

Source water is water used as a supply for drinking. It can take the form of surface water, which flows on top of the land surface within a watershed, or groundwater, which is stored in underground aquifers in the pore spaces of soil and rock.

What is Source Water Protection?

- Proactive approach to safeguard, maintain or improve the quality of drinking water sources.
- Involves identifying upstream land uses and addressing potential impacts those activities may have on water supplies.
- Provides value to our customers, employees, and operations – clean water is easier and less expensive to treat.

How We Protect Drinking Water Supplies

- Identify potential sources of pollution located upstream of our surface water intakes
- Monitor for changes in water quality
- Establish emergency plans to prepare and respond in case of potential contamination
- Engage community through outreach & education
- Partner with the community, agencies, and non-government organizations on watershed efforts

The #1 Ingredient





PATCH REQUIREMENTS

ALL GRADE LEVELS

Step 1

To complete the We Keep Water Flowing patch program, pick **one** of the step 1 activities:

Research and follow the safety measures you need to take prior to your activity. Remember to follow the Girl Scouts Safety Activity Checkpoints.

- **Take a tour of your local water treatment plant.**
If you are unable to visit the facility, contact your local water system's community outreach team to set up a meeting, interview, or virtual tour. Find out what the source of your drinking water supply is, how they treat the water, and how it gets to your house.
- **Identify one or two women who work in the water utility business and invite them to speak to your troop about their career.**
Before they come to speak, have the troop develop a list of questions they want to ask. Another idea is to ask the girls if they have any water careers they would like to hear about and then try and find speakers from those fields (laboratory, water treatment, education, engineering, environmental protection, etc.) *
- **Find out the following information about your local water utility:**
To what areas does your local water utility provide drinking water service? How many customers do they serve? How many miles of pipeline do they have? How many fire hydrants do they maintain? How much water do they pump a day? *

- **Pick one of the lessons from the American Water Educational Toolkit or activities from Pennsylvania American Water.**

The toolkit contains 12 lessons that teach young people about the importance of water in their lives. Select at least one lesson that is age appropriate and meaningful to you. To view the lessons, visit American Water Educational Toolkit (<https://www.amwater.com/paaw/Water-Wastewater-Information/water-learning-center/water-curriculum-kids-activities>.) You can also visit Pennsylvania American Water's YouTube page (https://www.youtube.com/channel/UCh-jWYPeLQWCxNgXymz_fVA) and click on the Water Education sub-list for video lessons and hands-on activities about watersheds and water treatment.

* Can be combined with the water treatment plant tour.



DAISY/BROWNIE (K-3)

Step 2

To complete the We Keep Water Flowing patch program, Daisy groups **pick two** of the of the step 2 activities; Brownie groups **pick three** of the step 2 activities.

- **Draw, color, or paint a picture of The Water Cycle and label the four main stages.** You can learn more about The Water Cycle by watching our video Water and You: The Water Cycle (<https://www.youtube.com/watch?v=LJNV4sNrCHY>)
- **Learn the different types of water bodies.** Pick the body of water that is most important to you. Create a picture collage to share with your troop and tell them why it's important to you.
- **Explore watersheds.** Define the word "Watershed." Discover what watershed YOU live in. Make a list or draw a picture of plants and animals that you have observed in your watershed. Use the United States Environmental Protection Agency's (USEPA) [How's My Waterway website](#) to locate your watershed. Visit [Stroud Water Research Center's WikiWatershed](#) to learn more about watersheds and the impacts they face.
- **Discover source water protection.** Define "source water protection." List two ways YOU can protect your drinking water source and share it with your troop and family.
- **List all the ways you used water this week.**
- **Learn what it means to conserve water.** Learn about [All the Water in the World](#) and how much fresh water we have on Earth. List two ways you can conserve water at home or school.
- **Take the water pledge (See Resources).**

Step 3

To complete the We Keep Water Flowing patch program, **pick one** of the step 3 activities:

Research and follow the safety measures you need to take prior to your activity. Remember to follow the Girl Scouts Safety Activity Checkpoints.

- **Go on a hike with your troop or family beside a river or stream.** What animals, insects, birds, plants, etc. do you notice? What else do you see? Is the water clear or muddy? How is the land around the water used? Are there houses, roads, businesses, farms? Are there any pipes flowing into the water? Are there boats or people in the water? Discuss your observations with your troop.



Visit Stroud Water Research Center's [Leafpack Network](#) to learn more about your findings and report the health of your stream.

- **Reach out to a local watershed protection group. Learn what they do and volunteer for one of their activities.** To find a watershed group in your area use this [interactive map from Pennsylvania Environmental Council \(PEC\)](#). Or reach out to your state environmental protection agency for help finding a local watershed group or a watershed protection activity.
- **Take part in a litter clean-up around a body of water to protect that water source and the wildlife who live there.** Watershed groups or your state environmental protection agency are familiar with upcoming events.

JUNIOR/CADETTE (4-8)

Step 2

To complete the We Keep Water Flowing patch program, Junior groups **pick three** of the of the step 2 activities; Cadette groups **pick four** of the step 2 activities.

- **Draw, color, or paint a picture of The Water Cycle and describe how the stages work.** You can learn more about The Water Cycle by watching our video [Water and You: The Water Cycle](#).
- **List the different types of water bodies.** Pick the body of water that is most important to you. Create a collage to share with your troop and tell them why it's important to you.
- **Explore watersheds.** Define the word "Watershed." Discover what watershed YOU live in. Gather information about your watershed that you find interesting and share it with your troop and family. Use [USEPA's How's My Waterway website](#) to locate your watershed. Visit [Stroud Water Research Center's WikiWatershed](#) to learn more about watersheds and the impacts they face.

- **Discover source water protection.** Define “source water protection.” List two ways YOU can protect your drinking water source and share it with your troop and family.
- **Research your water system’s water quality report.** What substances are they monitoring for? Are they achieving compliance with regulations?
- **Take the water pledge (See Resources).**
- **Understand water conservation.** If you pay attention to how much water your family uses, you can find opportunities to conserve water in your own home.

HOW MUCH WATER DOES IT TAKE TO?	
Activity	Gallons Used
Flush the toilet	3 gallons
Take a shower	25-50 gallons (3 gal per minute)
Take a bath	36 gallons
Wash clothes	33 gallons
Run dishwasher	10 gallons
Brush teeth	1 gallon
Wash hands	1 gallon
Outdoor watering	15 gallons per minute

1. Record the amount of water used at your home over a one-week period. Read your water bill to find that information. You may need take the total monthly gallons and divide by four for a weekly total.
2. Record the number of toilet flushes, showers (including length), washing machine loads, dishwasher cycles, etc.
3. Make a pie-chart graph showing the percentage of your total water use in each activity.
4. Research and list ways that your family could use less water. Share your findings with your troop and family.

Step 3

To complete the We Keep Water Flowing patch program, **pick one** of the step 3 activities:

Research and follow the safety measures you need to take prior to your activity. Remember to follow the Girl Scouts Safety Activity Checkpoints.

- **Go on a hike with your troop or family beside a river or stream.** Where does the stream drain? Do other streams contribute to this stream? What happens when it rains? How does the stream change as you walk? What insects, birds, plants or aquatic life do you observe? How is the land around the water used? Are there houses, roads, businesses, farms? Are there any pipes flowing into the water? Use [United States Geological Survey’s \(USGS\) Current Water Data website](#) for stream gauge information to learn more about the stream. Record the data, from one gauge, that is available for the stream on the day of your hike (e.g. gauge height, discharge, temperature, etc.) Define any words you are unfamiliar with. Discuss your observations with your troop. You can also report your findings to [Stroud Water Center’s Leafpack Network](#).
- **Organize a water bracelet activity for a younger Girl Scout troop in your Service Unit.** Explain the water cycle phases as you make the bracelet (See Resources).
- **Explore green infrastructure.** Define the term “green infrastructure.” Learn more about [green infrastructure](#) through Pennsylvania American Water’s website. Reach out to an organization in your community who utilizes green infrastructure. Interview them or tour the project to learn how it is improving water quality. Your local stormwater authority, state environmental protection agency or Environmental Department. at a local university can help identify a green infrastructure project in your community.
- **Organize a showing for Girl Scouts of After the Storm**, a free video co-produced by USEPA and The Weather Channel. After showing the video discuss with the group how you can do your part to protect your watershed (See Resources).
- **Create an attractive wall mural or bulletin board 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.” Display your mural where others in your community can see it!
- **Take part in or organize a litter clean-up around a body of water to protect that water source and the wildlife who live there.** Watershed groups or your state environmental protection agency are familiar with upcoming events. Contact [Pennsylvania Organization for Watersheds and Rivers \(POWR\)](#) for information and assistance with organizing an event or contact your state environmental protection agency.

SENIOR/AMBASSADORS (9-12)

Step 2

To complete the We Keep Water Flowing patch program, **pick three** of the step 2 activities:

Research and follow the safety measures you need to take prior to your activity. Remember to follow the Girl Scouts Safety Activity Checkpoints.

- **Explore watersheds.** Define the word “Watershed.” Discover what watershed YOU live in. Gather information about your watershed that is interesting to you and share it with your troop and family. [Use USEPA’s How’s My Waterway website](#) to locate your watershed.
- **Locate two industrial facilities upstream from your drinking water intake or on a major river near your home.** Use the [USEPA’s Enforcement and Compliance History Online \(ECHO\) database](#) to research the facilities. Make a report of the facility including the location, what USEPA region it is located in, what type of Clean Water Act (CWA) permits it has and any details about the permits you can find. Include in your report if the facility has had any violations of noncompliance. If so, list when the violations/ noncompliance was and what they were for. In the conclusion of the report, research and describe why this information is important for protecting drinking water sources and what industrial facilities can do to protect drinking water source.
- **Do a display or presentation on source water and explain how pollutants threaten its quality.** Show where your drinking water comes from. Show maps or data from one of the following websites. [USEPA’s Drinking Water Mapping Application](#) to Protect Source Waters or [Pennsylvania Department of Environmental Protection’s Source Water Protection Program](#).
- **Organize a showing for Girl Scouts of After the Storm**, a free video co-produced by USEPA and The Weather Channel. After showing the video discuss with the group how you can do your part to protect your watershed (See Resources).
- **Organize a water bracelet activity for a younger Girl Scout troop.** Explain to them the water cycle phases as you make the bracelet (See Resources).

- **Explore green infrastructure.** Define the term “green infrastructure.” Learn more about [green infrastructure](#) through Pennsylvania American Water’s website. Reach out to an organization in your community who utilizes green infrastructure. Interview them or tour the project to learn how it is improving water quality. Your local stormwater authority, state environmental protection agency or Environmental Department at a University can help identify a green infrastructure project in your community.

Step 3

To complete the We Keep Water Flowing patch program, **pick one** of the step 3 activities:

Research and follow the safety measures you need to take prior to your activity. Remember to follow the Girl Scouts Safety Activity Checkpoints.

- Work with other Girl Scouts to **organize or participate in a [World Water Monitoring Day](#)** event, or comparable water monitoring program through a local watershed organization.
- **Organize a litter clean-up around a body of water to protect that water source and the wildlife who live there.** [Pennsylvania Organization for Watersheds and Rivers \(POWR\)](#) may be able to assist with organizing an event or contact your state environmental protection agency.
- **Create an attractive wall mural or bulletin board 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.” Display your mural where others in your community can see it! Reach out to a local watershed protection group. Learn what they do and volunteer for one of their activities. To find a watershed group in your area use the [POWR’s interactive map](#).

A photograph of three children in a forest. In the foreground, a girl with long brown hair and a pink shirt looks off to the side. Behind her, a boy with sunglasses on his head and a blue shirt looks down. To the left, another girl with dark hair and a red shirt is partially visible, holding a blueberry. They are surrounded by green foliage and blueberries.

RESOURCES

ONLINE RESOURCES

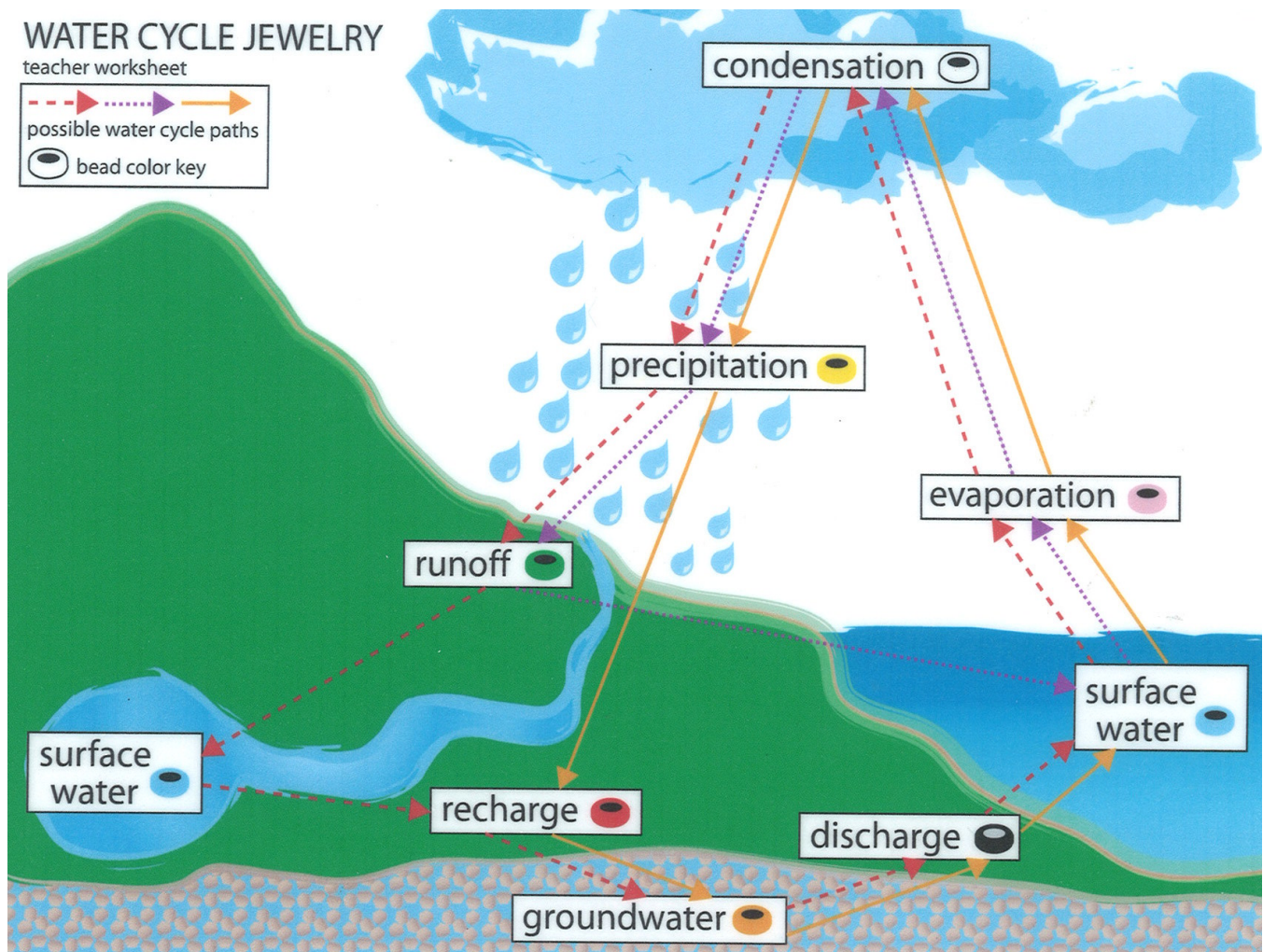
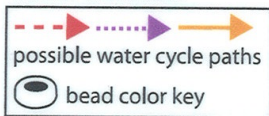
- **Pennsylvania American Water** www.pennsylvaniaamwater.com
- **American Water Educational Toolkit** <https://www.amwater.com/paaw/Water-Wastewater-Information/water-learning-center/water-curriculum-kids-activities>
- **Pennsylvania American Water Educational Activities** <https://www.youtube.com/playlist?list=PLZWGIYMaJ90I5XVYbYCrdWatubTZ6BXP>
- **USEPA's How's My Waterway** <https://www.epa.gov/waterdata/how-s-my-waterway>
- **Pennsylvania Organization for Watersheds and Rivers's Watershed Organization Map** <https://pecpa.maps.arcgis.com/apps/Minimalist/index.html?appid=e3912a4138cf408c89b0d404b7dce628>
- **United States Geological Survey (USGS)** <https://waterdata.usgs.gov/nwis/rt>
- **USEPA "After the Storm" Video** <https://www.youtube.com/watch?v=OfIXhs6DzIE>
- **Drinking Water Mapping Application to Protect Source Waters** <https://geopub.epa.gov/DWWidgetApp/>
- **Pennsylvania Department of Environmental Protection - Source Water Assessment & Protection** <https://www.dep.state.pa.us/dep/deputate/watermgt/wc/subjects/srceprot/sourceassessment/default.htm>
- **USEPA Enforcement and Compliance History Online (ECHO)** <https://echo.epa.gov/>
- **World Water Monitoring Day** <http://www.worldwatermonitoringday.org/>
- **Project WET** www.projectwet.org
- **Water Education Resources** <https://www.amwater.com/paaw/water-information/water-learning-center/our-story>
- **Stroud Water Research Center** <https://stroudcenter.org/>

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- https://www.gscm.org/content/dam/girlscouts-gscm/documents/Volunteer%20Resources/Program%20Resources/WaterDropPatchProjectManual_March2009.pdf
- <https://www.gscnc.org/content/dam/girlscouts-gscnc/documents/Kits%20and%20Patches/Water%20Drop%20Cadette%20Leader%20Guide.pdf>

WATER CYCLE JEWELRY

teacher worksheet



WATER CYCLE BRACELET

What You Need:

- Beads of the following colors: blue (2 if choosing the red path), pink/purple, white, yellow, green, red, orange and black *Note: You may use one of each color or repeat the pattern to fill up the bracelet.
- Pipe cleaner
- Water Cycle Jewelry Worksheet Diagram

What To Do:

- Loop one end of the pipe cleaner and twist to prevent beads from falling off the bracelet.
- Refer to diagram for several pathways a water molecule may travel along its journey.
- Example (as seen in the red path): With the help of the sun, surface water (represented by a blue bead) evaporates into the atmosphere (pink or purple bead). It then cools and condenses into clouds (white bead). When the clouds are heavy enough, water falls back to the earth's surface in the form of precipitation as rain, sleet, snow or hail (yellow bead). Runoff is water that travels across the land (green bead). Some of this water may also seep into the earth and recharge (red bead) the underground supply. This groundwater (orange bead) may eventually be discharged back into lakes, streams, rivers or oceans (black bead). The sun heats this water once again, causing it to evaporate and continue through the cycle.
- After all beads are placed onto the bracelet, fasten the remaining end by twisting the pipe cleaner to prevent the pointed end from exposure.

WATER CONSERVATION PLEDGE



I pledge to the planet and everything on it to try my best not to waste water.

I'll turn the faucet off when brushing my teeth, washing my face, and later when I shave.

I'll try to keep my showers short, and only run the dishwasher or washing machine when they're full.

If I see a leak, I'll report it to my parents.

Finally, I'll share my knowledge of water conservation with others so that we can all be better stewards of the environment and leave plenty of water for future generations!

Signed Name and Date

