

BE A WATERSHED STEWARD

For Learners in Grades 4 and Up



Earn the
We are Water
Patch!

Brought to you in partnership with your local library
www.wearewater.colorado.edu



What does water mean to you and your community?

The *We Are Water Patch* demonstrates that you know how to protect and steward the land and water in your local watershed.

We are Water is a traveling exhibit that creates a meeting place to learn and share stories about water together. Learn more about the exhibit at our website: wearewater.colorado.edu.

WATER IS PRECIOUS.

Water is precious, especially in the Four Corners Region where so much life is dependent on so little rainfall. We all understand the importance of water - it connects us to the land and to one another. Water is part of a cycle that includes the land and the sky. Rain and snow fall from the sky and onto the land. Water then spends a long time in or on the ground before draining into a body of water and evaporating up into the clouds again. If the land is polluted, the water becomes polluted.

What can we do to protect and care for water? We can protect water by becoming familiar with our local watershed. The watershed is the land that the raindrops roll over as they drain into nearby streams and lakes.

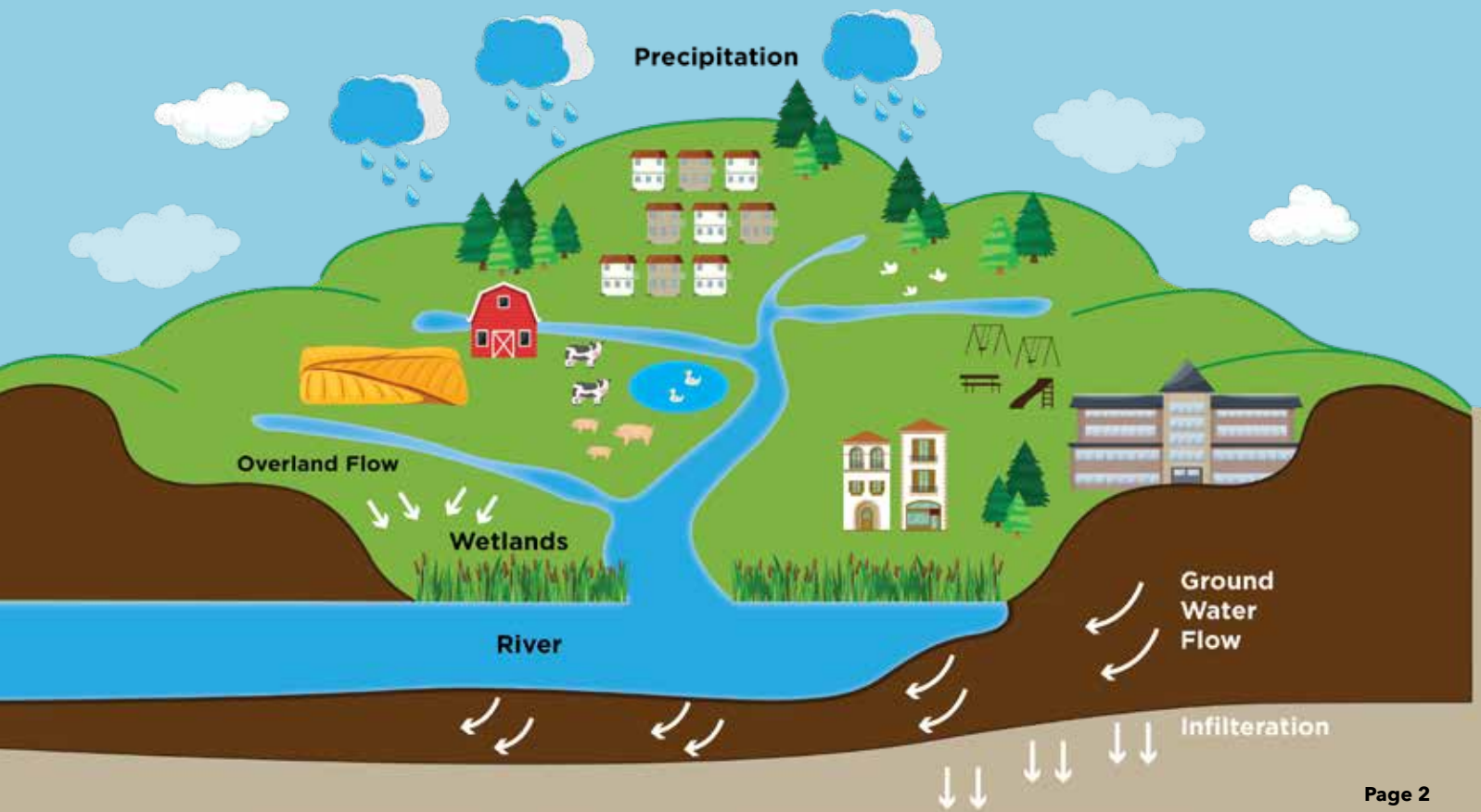
STEWARDSHIP
means to take care of something, to be responsible for something entrusted to your care.

Everyone lives on land and therefore lives in a watershed. Knowing your watershed is especially important in the Four Corners region. The rain and snow we receive is vital to every living thing so we must understand how to keep it clean and plentiful.

Becoming a watershed steward is a great way to protect water. A steward cares for and protects the irreplaceable. Watershed stewardship means helping to heal and restore the land around you so that water is clean and available for everything in the watershed.

The following activities are an introduction to steps you can take to become more familiar with your local watershed. The activities will help you learn a few basic principles for understanding the health of the watershed. We encourage you to apply these principles to conduct a small watershed restoration project of your own.

What is a watershed?



INSTRUCTIONS

How to earn your patch



Find an adult that can work with you to complete the requirements. Your adult will check and approve your work.

Patch Requirements

Grade	Complete these steps
4th and 5th Grade	<input type="checkbox"/> Principle 1 - Step 1, 2 and 3 <input type="checkbox"/> Principle 2 - All steps <input type="checkbox"/> Principle 3 - All steps <input type="checkbox"/> Principle 4 - Step 1, 2 and 3
6th Grade and up	<input type="checkbox"/> Principle 1 - All steps <input type="checkbox"/> Principle 2 - All steps <input type="checkbox"/> Principle 3 - All steps <input type="checkbox"/> Principle 4 - All steps and <ul style="list-style-type: none">• Submit interview questions and responses.• Submit reflection paragraph• Submit letter from your future self

Steps for receiving the patch

1. Ask your adult to approve your work. Once approved, check the boxes of the steps you completed.
2. Check our website (wearewater.colorado.edu) for a list of public libraries where you can go to receive your patch.
 - Take your completed booklet to the library.
 - Show the booklet to a librarian.
 - The librarian will give you a patch.
3. If you completed the fillable PDF, save it and rename it as your name. Send the file to wearewater@colorado.edu.
4. If you completed the booklet on paper, request your patch via the Google form at bit.ly/wearewaterform.

Basic principles for protecting the watershed

01 Understand the flow



02 The soil holds it all together



03 Keep the water on the land



04 Understand historical trends



Principle 1 Understand the flow



A healthy watershed is one where the land can absorb rainwater and snow melt. It's best if the soil stays moist for as long as possible to provide water to plants. The plants' roots help to keep the soil in place so that more plants can grow. Without plants and soil, the rainwater flows off the land too quickly and causes erosion. Erosion takes more soil away from an area, and over time, nothing can live there.

Activity - Rainfall investigation

- 1. Find an outdoor area near you where you can make observations.**
This area might be your backyard, the land in front of your building, or somewhere at your school or church. Ideally, this area would also be a place where you would be allowed to make changes to it. At a minimum, your study area should be about the size of a small playground. Be sure the area is mostly unpaved.
- 2. Go to the study area and make a simple drawing of it.** On the next page, sketch everything that you see in the landscape: the plants, rocks, trees, pavement, and buildings.

We & OUR
ENVIRONMENT
depend on a healthy watershed



Principle 1

Understand the flow



A large rectangular area with a dashed orange border, intended for writing or drawing.

Principle 1

Understand the flow



3. Find evidence of how water flows on the land. Mark this evidence on your drawing.

- In areas with no plants, can you see if the soil has been moved by water? The ground will look very smooth and even. This is called sheet erosion.
- Are there any cracks in the ground when it's dry? Is there a mini stream path in the area?
- Is there dirt on the sidewalk?
- Mark where water pools or puddles in the area.

4. [Optional] Keep an eye on the weather forecast. The next time it rains, go to your study area with the drawing you made in step 2.

- As it rains, observe where the water goes on the land. In your drawing, make arrows to show the water's flow.
- Make note of whether the water stays mostly on the land or if it flows off to the pavement and into the sewer drains.
- Does the water flow away from the area or is it allowed to pool and sink into the earth? Write your answer below.

Principle 2

The soil holds it all together



The ground in the driest parts of the Four Corners Region may look like lifeless dirt, but when it is healthy, the desert soil is actually full of organisms and structures that are vital to the arid ecosystem. Healthy desert soil captures water and delivers it to roots underground. Healthy desert soil also helps to clean rainwater and snow melt. The following observations will help you understand the soil's condition.

1. Make observations of the soil's texture. The texture will be a clue about how much water the land can absorb.

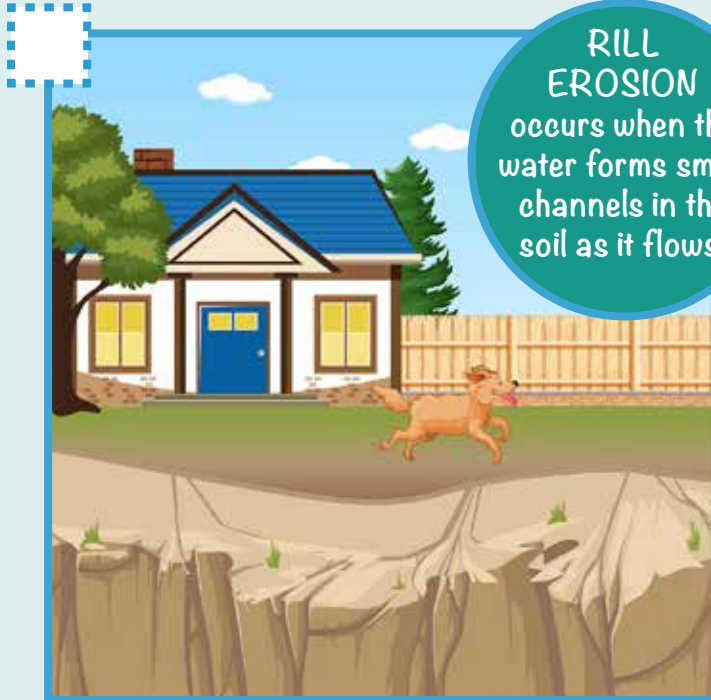
- Gather a small amount of soil into a ball. You will probably need to sprinkle the soil with drops of water or moisten the soil with a spray bottle.
- Move the ball of soil around in your hand to feel its texture.
- Does it feel gritty? That means the soil has a high sand content. Water will drain easily in soil with a high amount of sand.
- Is the ball of soil smooth and slippery? If so, it means that the soil is silty. Silty soil is often more fertile, meaning it is good for growing plants.
- Does the soil ball feel sticky? If so, it has a high clay content. Water needs a long time to be absorbed in soil with a lot of clay in it.
- Can you see and measure individual particles? Describe the texture of your soil here:

Principle 2

The soil holds it all together



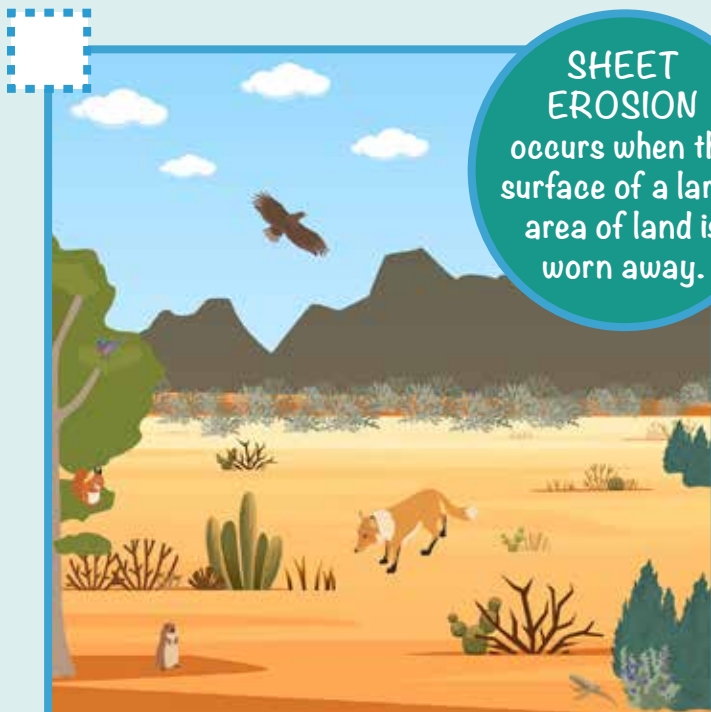
2. What portion of the study area is bare earth? Look for evidence of erosion such as cracks in the ground, gullies or small streams on the landscape, or exposed roots. If you see erosion in your study area, check the box of the picture that looks like the bare earth in your study area.



RILL EROSION
occurs when the water forms small channels in the soil as it flows.



GULLY EROSION
occurs when running water erodes soil to form deep channels.



SHEET EROSION
occurs when the surface of a large area of land is worn away.



EXPOSED TREE ROOTS
occurs when heavy rainfall can quickly wash soil downhill.

Principle 2

The soil holds it all together



3. What kind of vegetation is in the area? How does the soil look or feel different around the plants and trees in the area? Write the plant names in your area here:



Principle 2

The soil holds it all together



4. What kind of wildlife use the area? Observe from a distance to see what creatures visit the area. Write what critters you observe here:



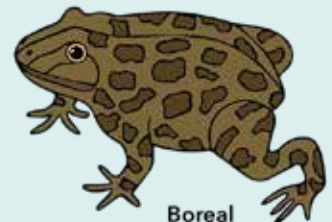
Greater Short-Horned Lizard



Pinyon Jay



Western Black Widow



Boreal Chorus Frog



Cottonwood Stag Beetle



Black Chinned Hummingbird



Two-Lined Skink



Montane Vole Muskrat



Canyon Wren



Rattlesnake



Prairie Dog



Long-Tailed Weasel



Red-Tailed Hawk



Colorado Chipmunk



Desert Hare

The presence of birds, insects, reptiles, and rodents shows that the water and land are working together to provide food and shelter.

Principle 2

The soil holds it all together



5. How much trash is in your study area? Do you see other pollutants like motor oils or pet waste? How do you think these pollutants affect the soil?

How do you think these pollutants affect the soil?



Principle 2

The soil holds it all together



6. Visit the area at different times to observe if the conditions change during the day.

7. After completing your observation, use the rubric below to give your study area a rating. Circle the descriptions that match your study area's conditions.

	Poor Condition	Fair Condition	Good Condition
Land/Soil	<ul style="list-style-type: none">• A lot of erosion.• Many pollutants in the area. Mostly dusty bare earth.	<ul style="list-style-type: none">• Has some areas of bare earth. Hardly any signs of erosion.	<ul style="list-style-type: none">• Soil is dark brown in color, water easily drains into soil.
Vegetation	<ul style="list-style-type: none">• Only one or two plants in the area.	<ul style="list-style-type: none">• Several trees and plants are alive.	<ul style="list-style-type: none">• A large variety of native trees and plants are healthy and growing.
Wildlife	<ul style="list-style-type: none">• Very few insects and birds are present.	<ul style="list-style-type: none">• There are several birds and insects in the area.	<ul style="list-style-type: none">• A lot of insect and bird activity. Many other critters like rodents and lizards are present. Many pollinators are attracted to the area.

For further learning:

Soil texture video demonstration: [YouTube.com/watch?v=ezWik5GryYM](https://www.youtube.com/watch?v=ezWik5GryYM)

Soil Activity Book: mda.maryland.gov/resource_conservation/counties/SoilActivityBook.pdf

Soil experiments for kids: soils4kids.org/about

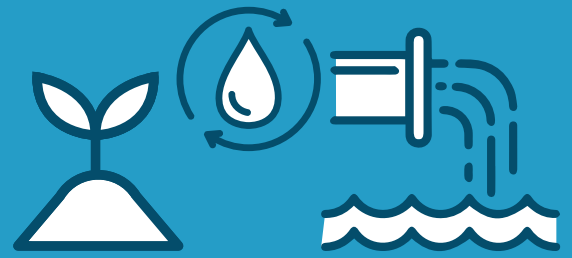
Teacher's Manual (Understanding Soil Health and Watershed Function): climatehubs.usda.gov/sites/default/files/USHWF.pdf

Resource Guide to Healthy Desert Soils (Watershed Management Group): watershedmg.org/sites/default/files/documents/resource-guide-to-desert-soils.pdf

Principle 3

Keep the water on the land

- slow it, spread it, sink it



We can be good watershed stewards by taking positive actions that will help to ensure the watershed's healthy functions.

Activity - Make a small improvement

Goal: Make small changes to your study area that will help the land provide cleaner and more water to the larger watershed system.

1. Review your study area observations.

- What was a particular problem that you noticed?
- Was there something that was working particularly well?

2. Decide what small improvement you will make and predict how you think it will improve the area's healthy functioning. Be sure to get permission before doing your project. Write a paragraph describing your small improvement project here:

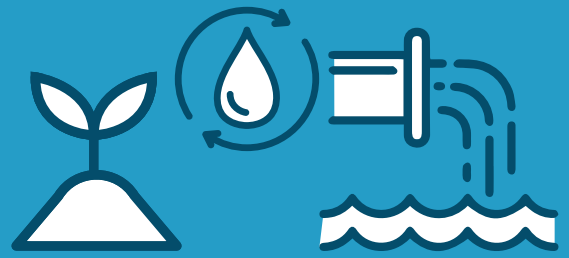
Here are some project ideas:

- Clear out any trash and pollutants that are in and around your study area.
- Make a designated walking path so only a portion of the soil gets compacted.
- Plant a few native flowering plants in the area.
- Remove non-native plants that use a lot of water, or that take water from native vegetation.
- Spread a layer 2 to 3 inches deep of mulch under the existing trees and plants in your area to shade the soil for moisture retention.

Principle 3

Keep the water on the land

- slow it, spread it, sink it



3. Take action to keep rainwater and snow melt in your study area. Here are small things you can do to slow it, spread it, sink it.

- Find the areas where the water flows off the land. Place several large branches in this area, perpendicular to the water's flow. The branches will provide a barrier to slow the flow so the water has more time to sink into the ground. Take before and after photos to record the change over time.
- If branches aren't available, use large rocks. Place three or four rocks close together in a row to form a barrier perpendicular to the water's flow.

4. If you have permission to dig in the study area, you can do a more intensive project.

- Review the drawing you made in the Principle One activity. Find the areas where the rainwater forms puddles. These are the area's low spots. If you have permission, remove a few inches of soil in this area to form a shallow basin. Make sure the basin is wide and shallow so that the water drains within a few hours.
- Create a waffle garden as a way to grow food in a desert environment. Find easy-to-follow instructions at: bit.ly/3S7x4FY

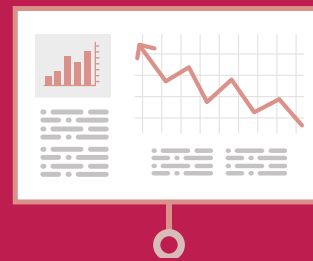
For further learning:

Rainwater Harvesting: harvestingrainwater.com/water-harvesting



Principle 4

Understand the historical trends



Understanding the trends in the area can help inform decisions about what actions to take to ensure the area's future health. For example, is the area becoming drier or wetter over time?

Activity - Changes over Time

Goal: Identify historical changes to your study area.

1. Find your study area in Google Maps.

- Watch this short video to learn how to use Historical Imagery in Google Maps Street View: youtu.be/rVtqHMcF9ZU
- Go to the beginning of the historical imagery. Click through the years, making note of any changes to the plants and buildings.
- What changes do you see in your study area over time?

- Has your study area become more or less healthy over time?

- What do you think is causing these changes?

Principle 4

Understand the historical trends



2. Ask a Community Expert.

- Identify a person your family knows who has lived in the area for more than 10 years.
- Think of four open-ended questions you can ask this person about how the area has changed over time. Create your questions so that the person responds with a story and not only a yes or no answer.
- Write down your interview questions and the responses below.

- After conducting the interview, write a reflection paragraph answering this question: How did the interview make you feel about the area?

Principle 4

Understand the historical trends



3. Envision the area's future.

- Now that you're more familiar with the area's present and past conditions, imagine what you think the area will look like in 100 years.
- What do you want it to be in the future?

4. Write a letter from the future.

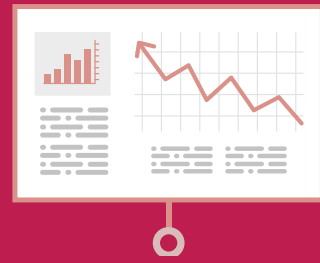
- Pretend you have lived in the area for 100 years. What does the area look like 100 years from now? Why does it look this way? How did the small improvements you made affect the land and water? On the next page, write a one-page letter to your present-day self describing the area in the future.

What do you want it to be in the future?



Principle 4

Understand the historical trends



Congratulations on completing these steps toward becoming a good watershed steward!

Please refer to page 3 for instructions on requesting your patch.

Please share your knowledge about what makes for a healthy watershed with others. Be sure to visit your study area often to see how it changes over time. Your attention and stewardship contribute to healthy and plentiful water for all beings in your community!

Tell us what you think!



bit.ly/WaWKitFeedback

For more information, please visit our website:
WeAreWater.colorado.edu/engage/activities



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