



**Pima County Natural Resources, Parks and Recreation  
Environmental Education**

**Exploring Watersheds  
Elementary and Middle School – 4-8 Grade Lesson Plan**

**Description:** Exploring Watersheds

Students learn about the water cycle and construct a watershed model to track the movement of water through the landscape to discover the connections that plants and animals have to water.

**Linked to Arizona Academic Standards:** Science S4, C2, GK-4; S4, C4, GK-8; S6, C3, GK-4.

**Duration:** 1-2 hours

**Objectives:**

- Students learn the definition of a watershed (a land area that drains into a body of water)
- Students understand the water cycle
- Students understand they and everyone else live in a watershed
- Students understand how non-point source pollution as well as point source pollution can pollute a watershed
- Students construct a watershed model and observe how water moves across the landscape
- Students discuss land uses and learn how land uses determine the watershed's water quality

**Conceptual Framework:**

- Renewable natural resources are replenished through natural cycles, but are still finite.
- Effective conservation practices depend on clearly defined management objectives, and understanding of natural processes and the application of knowledge from many disciplines.
- The decisions and actions of individuals and groups of people impact natural systems.

**Vocabulary**

Aquifer, condensation, evaporation, infiltration, lake, land use, ocean, pond, precipitation, ridge, river, spring, stream, transpiration, valley, water body, watershed, water cycle.

**Materials:**

Clipboards, pencils  
Construction paper & White paper

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Tape

Markers (green, blue, brown, purple, red)

Spray bottle

White board & markers

Topographic and relief maps of Arizona

### **Description of Activity**

#### 1. Open a discussion of the water cycle & watershed

Sit at the tables or in a circle on the ground.

Encourage students to describe the water cycle and introduce vocabulary.

Define watershed "A land area that drains into a water body" Write the definition on a whiteboard.

Ask students for examples of water bodies. Ask students for examples of land areas.

Write examples on a white board. Have students repeat watershed definition.

#### Construct Watershed model

Seat students at a table or use clipboards to secure paper.

Pass out construction paper and white paper 1 each per student and 4 small pieces of tape per student

Demonstrate the making of the mountain ranges by crumpling the white paper and taping the corners to the construction paper.

Ask the students to do that step.

Pass out markers

Demonstrate the use of each color of marker

Brown (trace along folds) - Ridges (define what a ridge is and even point to the ridges on the paper and mountain ridges that surround Agua Caliente Park)

Blue (trace along creases) – Valley (define and describe)

Green (squiggle mark) – Farms or agricultural areas (ask students to describe the activities that occur on a farm) they should put at least 1 farm and student must decide where to put the farms)

Purple (cross hatch) – Cities (ask students to describe the activities the activities in a city)

Red (X mark) – Mines or landfills (briefly describe mining today and in the past)

Have students share markers and complete their watershed models.

Add rain to the watersheds (spray water on each model)

#### 2. Discussion

What happens?

Do you have any water bodies? How many?

What happened to the city, farm, mine?

How would you go about counting the watersheds? How many watersheds are there in your landscape?

Define and discuss point source and non-point source pollution.

Nonpoint source (NPS) pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes,

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rivers, wetlands, coastal waters, and even our underground sources of drinking water.

These pollutants include:

Excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas;

Oil, grease, and toxic chemicals from urban runoff and energy production;

Sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks;

Salt from irrigation practices and acid drainage from abandoned mines;

Bacteria and nutrients from livestock, pet wastes, and faulty septic systems;

Atmospheric deposition and hydro modification are also sources of nonpoint source pollution.

Now that you see how the watersheds function would you have put your city in a different place? How about the farms?

Set watershed models to the side or move to different tables

### 3. Identifying Watersheds on Topographic and Arizona Relief Maps

Explain how to identify the boundaries of a watershed. Make drawing on white board of mountain ridge with valleys and a water body on either side. Use arrows to indicate flow of water and left side #1 watershed, east side #2 watershed.

Pass out the maps among the students

Provide instruction on how to read a topographic map

Ask the students to find:

- 1) Agua Caliente Park, Feliz Paseos Park or their school and identify the features marked on the map.
- 2) Identify the watershed that the park site/ school is a part of.
- 3) Follow the wash and identify its larger watershed all the way to the Gulf of California.
- 4) Review the definition of watershed.

Work with the students to identify the peaks of the mountains surrounding the park/school. Ask the students to look at the area within the boundaries that you have drawn on the maps and draw lines to indicate the route that rain water might take using arrows to indicate the direction that it would flow.

4. Scenario: (this is an extension if time allows and if appropriate for group). The town of XXXXXXXXXX is growing and needs to identify a place for a new landfill somewhere on the topographic map. The land planners are concerned about damage to the watersheds in the area which is home to the pequeño endangered fish. You are fish biologists who at the request of the land planners have been asked to identify locations that would be inappropriate to locate a landfill and those that might pose the least threat to pequeño fish habitat.

### 5. Closing & Wrap-up

Closing discussion: What did your group consider when placing the landfill? How could the understanding of watersheds effect land use planning decisions? What other considerations or information would be helpful in making a land use decision such as the construction of a landfill?