



WATERSHED

Narrative



BIG IDEAS:

- A watershed is a land area that drains to a low point.
- The edges or boundaries of a watershed are the high points or mountains.
- We all live in a watershed and we manage the land (neighborhoods, farms forests, etc.) for the water quality and health of the people and ecosystem.

MATERIALS:

2 watershed models	Buildings, tractors, cars for each model
4 spray bottles	2 13-inch pieces of plastic tubing
Small cooler with ice	2 containers of sand
2 small pieces of clay	2 containers of instant coffee

Q AND A — Watershed Managers – 5 Minutes.



In a circle away from the model, tell students: **Today, we are going to be watershed managers. What is a manager? Does your classroom have a manager? Do your parents manage anything for you? Does your school have a manager? What do these managers do?** Managers make sure that things run smoothly.

Ok, so we know what a manager is, but what about a watershed? Students may latch onto the word SHED (as in tool shed). **What does a tool shed do?** Ask them to think of a different definition of the word shed. **What about your dog? Does your dog shed? What does that mean?** When something sheds, it means that it falls off. So a watershed has to do with storing water and water falling off of something. I have a special definition of watershed: **A watershed is the land area that drains to a low point.** Teach this with hand motions and have students repeat it (and hand motions) twice.

So, what exactly is most of a watershed? It's the LAND! It is also the water.

So if we're going to manage a watershed, first we need to find the **boundary**, or edge of that watershed. **Where are the edges of the watershed?** The higher areas. Have students identify the mountains that are near their home. If you can see them, have the students point to mountains nearby. These are the edges or boundaries of a watershed. **So do you think we live in that watershed?**

Show the students the large watershed map. **Where are we on this map? What watershed are we in? What would we find at these lines between the watersheds?** Mountains or high points of land.

EXPLORATION — Natural Watershed Features – 8 Minutes.



Divide the students into two groups, one for each model and have each group gather around a watershed model. If classroom management support is needed, involve the

chaperons by assigning them the role of “consultant” – removing students who are not following directions.

Watershed Boundaries

You are looking at a portion of a watershed. Can you point to the watershed boundary or edge on our model? (remind them of the ridges all around them, and relate the big mountain on the model to local mountains.) Point to various features on the model and ask students: **Is this part of our watershed?** Yes

Runoff and Surface Water

Let’s pack this ice, to look and act like snow, up in the mountains. If it snowed up in the mountains what do you think would happen to that snow (let students observe what happens)? The snow or ice will melt and become **snowmelt**.

Where does the water from the mountain sides go? A student sprays some additional water down the mountainsides. **What do you think we call this water?** **Runoff**. Runoff runs over the land and eventually flows into a wash, stream, river or lake.

Why does the snowmelt and water run downhill in a watershed? Gravity. Yes because gravity works! And most of that water that runs down off the mountains seeps back into the ground.

Point to the surface water and ask: What is surface water? Surface water is water that collects on the ground in a stream, river, lake, wetland or ocean.

Erosion

Put some wet sand up on the mountains. **Can water move particles of soil? Sand?** Spray water on the mountains again. **Even pieces of rock?** Yes it can! **What do we call this when water moves particles?** Erosion is the breaking down of rock by water and wind. **Is erosion good or bad? What are some good effects of erosion?** Erosion can bring good fertile soil into a flood plain. Erosion can form beautiful landforms. **What do we have in our state that was formed by the power of water eroding the land?** The Grand Canyon. **What are some bad effects of erosion?** Erosion can bring sediment into a stream changing the habitat for fish and other animals. Erosion can cause landslides or avalanches. Let’s try to create an avalanche with the model!

EXPLORATION — Human Activity in the Watershed – 12 Minutes.



There are no people in this watershed. We are going to put some buildings and other things in this watershed. If I pass something out to you, you are in charge of it. You will have 1 minute to decide where you want it to go. **Now I’m going to count down from 5 and when I get to 0 your hands need to be down by your sides. 5, 4, 3, 2, 1 .. hands by your sides.**

Water Storage and Transportation

People often want water where it is not flowing. **Today, we are going to become engineers looking at the question: How do we move water to where we want to use it? What do you think?** Canals & dams (If students don’t get this right away, that’s ok. We will come back to this soon.). This is one thing that watershed managers do.

Farmers sometimes need to be engineers, because they need to water their fields every day in the growing season. How do they get water that is flowing nearby into their fields? After you've introduced the question, let a group of 3 students try to answer it by engineering a system. They will use clay to build dams trying to water the farm without wasting water. When they are finished test their system by having a student spray extra water into the nearby canal. **Did any water leave the field? Are there ways that you could re-engineer your system so that all the water stays on the field for the plants?** Allow them to re-engineer and then retest the system.

Let's get a new engineering team. Hand a blob of clay to another group of 3. **Now you have a new mission. You'll need to design a system that will store the most water. Where and how will you do that?** Let students place a dam or series of dams in the river to make a lake or series of lakes. When they are finished, test their system. **Does anyone know what we call a human-made lake?** A reservoir.

Let's get a new engineering team. Hand a blob of clay to another group of 3. **This team will now design a way to move water from the reservoir or lake.** Hand them the tube. **But let's think about how to build the transport system in to the dam. So we'll remove the dam that the last team built and you can redesign that system.** Hand them the clay and let them grapple with this and consult their peers. **Try to move water to the neighborhood.** Give them time to think and build, but make sure that they have the opportunity to see their system work before you move on.

Storm Water and Non-point Source Pollution

Have students sprinkle some instant coffee in the neighborhood. **What do you think this instant coffee represents in our watershed?** Dirt. **Yes, it could represent dirt. What about cars, are their cars in your neighborhood? What could they leave on the road?** Oil. **Does anyone here have a dog? What could your dog leave on the grass?** Poop. **Now let's make it rain.** Spray water to simulate the rain. **If that instant coffee represented dirt, oil and poop what happened to it?** It moved in to the low point. **Would you swim in it?** No. **This is a type of runoff we call storm water. Storm water is something that we manage, as watershed managers in our cities. We all live in a watershed and contribute to the quality of the water.**

Can you point to the source of this pollution? No. That's why we call it **non-point-source pollution**. It means that we don't know exactly where it came from. With all of the people adding just a little bit, these substances can build up or **accumulate** in the same place and cause a water quality problem. That's why we all have to watch what we dump or put on the land, so that a little bit here and there doesn't add up to a problem.

Q AND A — Wrap Up – 5 Minutes.

Have students step away from the model back to the original big circle and ask:

- What is a watershed?
- Do you think your house is in a watershed like the one that we talked about today?
- Why do we manage watersheds?

Pair students up and have them talk about the watershed managers they can think of.

