

What is a Watershed?

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California Department of Education Science Standards

6th Grade

- Shaping Earth's Surface
 2. Topography is reshaped by the weathering of rock and soil and by the transportation and deposition of sediment.
 - a. Students know water running downhill is the dominant process in shaping the landscape, including California's landscape.
 - b. Students know rivers and streams are dynamic systems that erode, transport sediment, change course, and flood their banks in natural and recurring patterns.
- Investigation and Experimentation
 7. Scientific progress is made by asking meaningful questions and conducting careful investigations.
 - a. Develop a hypothesis.
 - b. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.
 - e. Recognize whether evidence is consistent with a proposed explanation.

7th Grade

- Investigation and Experimentation
 7. Scientific progress is made by asking meaningful questions and conducting careful investigations.
 - a. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.
 - c. Communicate the logical connection among hypotheses, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence.

8th Grade

- Investigation and Experimentation
 9. Scientific progress is made by asking meaningful questions and conducting careful investigations.
 - a. Plan and conduct a scientific investigation to test a hypothesis.

Watershed Ecosystem Lessons

In this lesson the students will learn the concept of a watershed, something that has been mentioned in the previous lessons but not fully explored until now. Students will observe what a watershed is in a hands-on demonstration. Using brown butcher paper, the students will create a landscape with mountains, valleys and plains. They will also create a rain storm with a spray bottle. Students will be able to see for themselves what the water does and where it goes when it falls on their land formations. Students will record their observations from the demonstration and answer questions that connect their model landscape to the real landscape and help them to define and truly understand the concept of a watershed.

B. What is a Watershed?

Objectives:

*The students will understand what a watershed is, which watershed they live in and the importance of a watershed.

Specification: At the end of this lesson, the students should be able to:

- a. Provide a written definition of a watershed.
- b. Identify the name and boundaries of the watershed that they live in.
- c. Explain how a watershed gets its name.
- d. Explain why the watershed is important and provide 2-3 examples to support their explanation.

Introduction:

A watershed is “the land area that drains water to a particular stream, river, or lake. It is a land feature that can be identified by tracing a line along the highest elevations between two areas on a map, often a ridge. Large watersheds may contain thousands of smaller watersheds.” (<http://www.ga.usgs.gov/edu/dictionary.html#W>)

A watershed is important because.....

1. Everyone lives in a watershed; in fact you are in one right now at school.
2. We depend on it as a source for water, food and homes.
3. Plants and animals depend on it as well.
4. If the watershed is polluted we might drink polluted water and get sick, certain pollutants might cause cancer- you don't want to drink those! Also, if the watershed is contaminated, the animals and plants won't have clean food and water either (From Holt: Life Sciences, 7th grade, p. 446).
5. People enjoy being outside in the environment and like to do outdoor activities such as hiking, biking, rock climbing, swimming, surfing, etc. If the watershed where they are

doing all of these activities isn't well taken care of and is polluted, they won't be able to enjoy the outdoors and may even get sick (swimming in really polluted water).

How does a watershed get its name?

A watershed is usually named after the largest creek, stream or river that it drains into.

Activity: (approximate time: 30-45 minutes)

Materials: Brown butcher paper (2 pieces), 2 plastic tubs, 2 spray bottles, Watershed Worksheet, black and white copies of maps with watershed boundaries for each student and 1 color copy for the whole class to look at, and the LTER Runoff Web tool and Watershed flyover tool (found on the included CD-ROM).

- Start by asking the students if they have heard of a watershed before.
- If they have, ask them to explain their idea of a watershed. Open this discussion up to the whole class for a few minutes to get as many ideas as possible. Record the students' ideas up on the board so everyone can keep track of what has been discussed. This can also be done as a journal writing activity.
- Once the students have a general idea of a watershed, use the paper watershed model to demonstrate the boundaries of a watershed.
- Before beginning the demonstration, hand out the "Watershed Worksheet" and have the students read through the questions to help focus their attention for the demonstration.
- Break the students into 2 groups. In each group ask the students for a volunteer. Have the volunteer crumple up the piece of butcher paper, the more crumpled the better! Unfold the paper and you now have a landscape complete with mountains, plains and valleys.
- You (or one of the students) will use a spray bottle to simulate rain at the top of the mountains; all of the students will watch the rain and see where it falls, what its path down the mountain is and where it ends up.
- After watching the demonstration, have the students fill out their "Watershed Worksheet" while the demonstration is fresh in their minds.
- Once the students have filled out the worksheets, ask them to share their ideas and observations. You can use the LTER runoff computer demonstration to illustrate the idea of runoff if you have access to computers in your classroom or on your campus.
- After watching the demonstration, filling out the worksheet and discussing their observations as a class, ask the students if they can improve their definition of a watershed.
- Present the students with the formal definition of a watershed: a watershed is "the land area that drains water to a particular stream, river, or lake. It is a land feature that can be identified by tracing a line along the highest elevations between two areas on a map, often a ridge. Large watersheds may contain thousands of smaller watersheds." (<http://www.ga.usgs.gov/edu/dictionary.html#W>)
- Ask the students where the bottom of the watershed is (*the ocean*).

- Ask the students how the water gets from the mountains to the ocean (*rivers, creeks and streams*).
- So, what feature of a watershed is found throughout the whole watershed? (*water: rivers, creeks and streams*) Based on this, ask the students if they have any ideas about how a watershed might get its name? (*usually its named after the largest river, creek or stream*)
- Ask the students if anyone knows which watershed we live in (or our school is in). If they don't, ask them if they know the names of any rivers, creeks or streams nearby. Use the map of Santa Barbara to show the students where our watershed boundaries are.
- Now that the students have an idea of what a watershed is and where the boundaries of their watershed are, ask them why a watershed is important? This can also be done as a journal activity. (*There are many right answers to this question; the most important things to come up with are that: the watershed impacts our food and water supply as well as the habitats of all of the other organisms that live in the watershed. There are some possible answers in the introduction but it is far from a comprehensive list. If the discussion needs some guiding, bring up the idea of pollution and how that would affect things.*)
- At the end of this lesson you could have the students view the LTER Watershed Flyover on the computer. This will provide them with another way to view what a watershed is. The LTER Watershed Flyover tool is available on the included CD-ROM.

Name _____

Watershed Worksheet

Period _____



After watching the watershed demonstration, answer the following questions based on what you observed:

1. Where does the water go when it lands on the mountain model?

It goes off the edge of the model.

2. How did the land influence how and where the water flowed?

There were ridges on the mountain. The ridges made the water go a certain way.

3. Did the water soak into the mountain or flow over the surface?

The water soaked into the mountains, and it flowed over it.

4. The mountain model was made out of paper, what would you expect to happen if the mountain was made out of:

A. dirt: *The water would soak into the dirt, then it would flow over it.*

B. sand: *It would soak into the sand.*

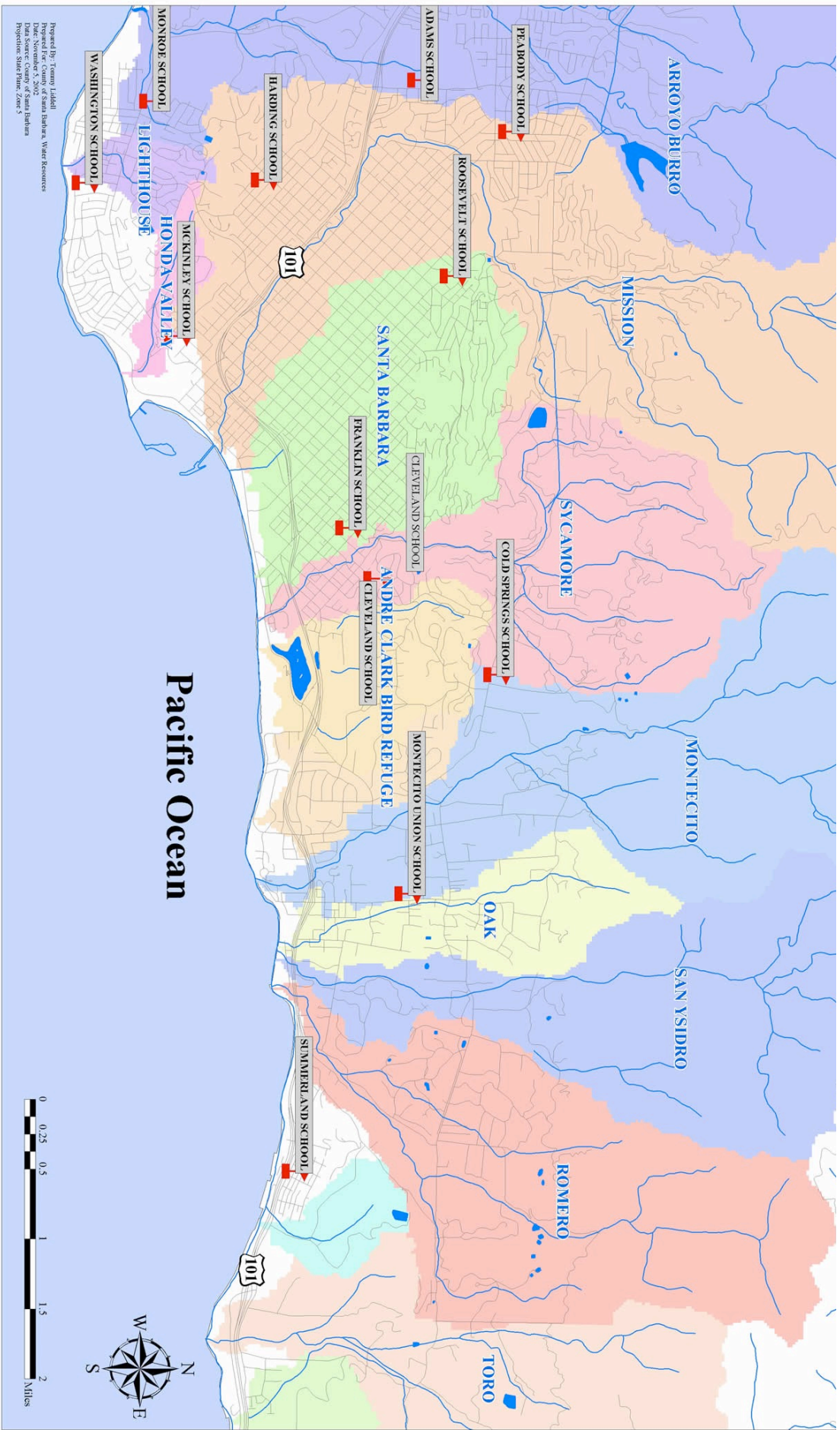
C. concrete: *It would flow over the concrete.*

5. What materials do you think the rain is flowing over in the real watershed?

The rain is flowing over the rocks, dirt, leaves, and branches.

6. Based on what you have observed, how would you define a watershed?

A watershed is an area where the rain flows and leads into one place.



What is a watershed? References

Images:

All images without a reference are from Microsoft Clipart.

Where Are You in the Watershed? : www.sbwater.org/CentralWatershed.htm

Information:

Definition of a watershed: <http://www.ga.usgs.gov/edu/dictionary.html#W>

Holt, Rinehart and Winston. Holt Science & Technology: Life Science. 2001. Harcourt Classroom Education Company, Austin.