

LESSON 2

What A Sound!

KEY CONCEPTS

Puget Sound is an inland arm of the Pacific Ocean.

The geography of Puget Sound provides for a remarkable number of miles of marine coastline.

The Puget Sound Basin contains nine major watershed basins.

OBJECTIVES

Students will predict the shoreline length of Puget Sound and use a non-traditional measuring device to calculate the shoreline of Puget Sound.

Students will identify the major watersheds of the Puget Sound basin.

PROCESS SKILLS

observing classifying measuring communicating
predicting estimating interpreting data

KIT MATERIALS

Activity 1

Transparency #1A - *Puget Sound Basin*

3 large maps of Puget Sound (each cut into six pieces)

16 pieces of string (12 inches long), marked at one inch intervals

Activity 2

copies of student worksheet #1A - *Watershed Basins*

Transparency #1B - *What Is a Watershed?*

NON KIT MATERIALS

overhead projector

VOCABULARY

Puget Sound Basin - marine waters (exactly which marine waters are included is a matter of debate) and the entire land area that drains into them

watershed basins - a geographic region that drains water (and everything water carries) into a stream, river system, or body of water. A watershed includes hills, bottom land, and the body of water into which the land drains. Watershed boundaries are defined by the ridges separating watersheds.

nautical mile - a unit of length used in sea and air navigation
one nautical mile = 6,076 feet while
one statute (land) mile = 5,280 feet

TEACHER BACKGROUND

"What A Sound!" introduces your students to the geography of Puget Sound. As the following article from the November 28, 1988, Seattle Post Intelligencer shows, the definition of Puget Sound is a subject of on-going interest.

No, no, Juneau isn't a Puget Sound port!

By James Wallace
P-I Reporter

Where's Puget Sound? Not that it's lost, but do people who live in the region really know where that ubiquitous body of water begins? Is Everett part of Puget Sound? Port Townsend? Bellingham?

What about the Hood Canal? Are those waters part of the Sound?

"I don't think anyone has ever asked me that question before," said a bemused Capt. Don Schwartzman, board chairman of the state Pilotage Commission and a 25-year veteran of the ferry system who has guided more than his share of ships through the state's inland waters.

As any map or nautical chart clearly shows, Schwartzman said, Puget Sound begins at Point No Point near the northern tip of the Kitsap Peninsula. It's there that Admiralty Inlet empties into the Sound.

But Gary Smith, manager of the local Chamber of Commerce in Anacortes, far to the north of Point No Point, said, "We figure ourselves as being at the north end of Puget Sound."

Bellingham is farther north still, and it's there that Mike Brennan, executive vice president of the local chamber, said Puget Sound "includes us."

All of which prompts Harvey Manning, the well-known writer of guidebooks to hiking trails around Western Washington, to decry what he calls "an imperialistic Puget Sound" that over the years has advanced farther and farther north, until the popular

perception today is that it stretches from Blaine to Olympia.

"Everything wet except martini and rain," quipped Manning, who stirred considerable debate last year when he led a push to limit the size of Puget Sound. "What officials have done, officials can undo."

"Officially," Puget Sound begins far to the north of where Manning would like to see it.

Geographic names can change with time. Puget Sound is a good example of that.

— Rich Meyer

In 1961, the U.S. Board on Geographic Names approved the description of Puget Sound as "extending 90 miles south from the Strait of Juan de Fuca to Olympia; the northern boundary is formed, at its main entrance, by a line between Point Wilson on the Olympic Peninsula and Point Partridge on Whidbey Island; at a second entrance, between West Point on Whidbey Island, Deception Island and Rosario Head on Fidalgo Island; at a third entrance, at the south end of Swinomish Channel between Fidalgo Island and McClinn Island."

The national board reaffirmed that description in 1979, after it met with Canadian officials and the Washington State Board on

Geographic Names to discuss the names and descriptions of the inland waters in the region.

Puget Sound includes all bays, inlets, passages and sounds south of Point Wilson on the Olympic Peninsula, according to the U.S. Board on Geographic Names.

That would include the waters of Admiralty Inlet, Hood Canal, Possession Sound, Saratoga Passage, Port Susan, Useless Bay and others.

It would not include Rosario Strait, Haro Strait, Strait of Georgia or Bellingham Bay, for example.

So why do marine maps and charts show Puget Sound beginning at Point No Point, where it meets Admiralty Inlet?

Rich Meyer of the National Oceanic and Atmospheric Administration office in Seattle said the federal agency's map-makers are well aware of the official description of Puget Sound.

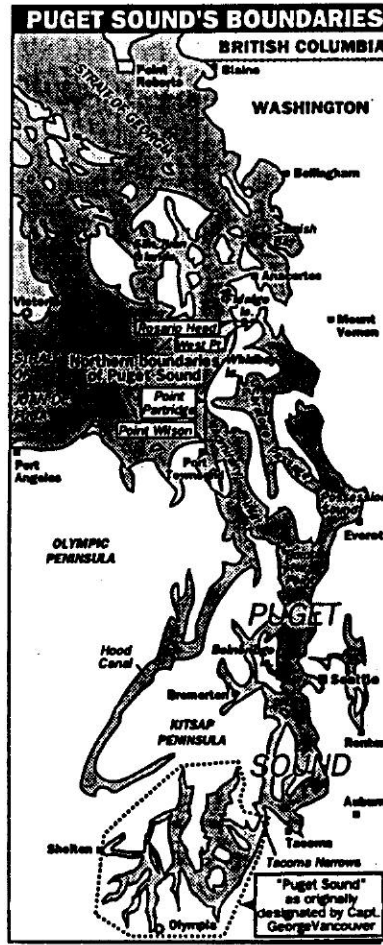
But he said it would be confusing to have Puget Sound and Admiralty Inlet appear on the same place on a map.

"Geographic names can change with time," Meyer said. "Puget Sound is a good example of that."

Trying to size up Puget Sound, he added, is a little like trying to define the northern and southern limits of Seattle. It depends on whom you talk to.

Puget Sound was named by Capt. George Vancouver, the British explorer who sailed into the region's inland waters in 1792. But it included only those waters south of what today is Tacoma's

See SOUND.



Sound: Congress joins the name game

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Point Defiance. Vancouver named it after a member of his crew, Peter Puget. The main channel north of the narrows to the Strait of Juan de Fuca was named Admiralty Inlet.

That description of Puget Sound was changed by an act of Congress in 1869.

The Northern Pacific Land Grant of the 1860s specified that the railroad's western terminus would be on Puget Sound. Vancouver's original description would have eliminated what today is Seattle, Everett and Bellingham from the riches that the railroad from the riches that the railroad was sure to bring. So land speculators persuaded Congress to change the name. It did, proclaiming that "Puget Sound . . . is hereby construed to mean all the waters connected with the straits of Juan de Fuca within the territory of the United States."

Usually, an action taken by Congress cannot be changed other than by Congress. But in this case Congress did not intend to specifically establish the boundaries of Puget Sound. It merely used the description in an incidental way for the purpose of an act. Thus the U.S. Board on Geographic Names could later change the description, said Bonnie Bunning, executive director of the Washington State Board on Geographic Names.

"The board has clearly said where Puget Sound is and where it is not," Bunning said. "But trying to make Puget Sound stay below a certain line . . . I'm not

sure that can be done."

Bunning acknowledges that she herself sometimes uses Puget Sound in a broader sense, as do many people who live in the region.

"I wouldn't think of talking to native people around the San Juan Islands as being in Puget Sound," she said, "but with my relatives back East, I wouldn't be as careful."

Smith, the Anacortes chamber manager, said being part of Puget Sound, even when it's not, helps promote the area to outsiders.

"It gives an association with the larger metropolitan area of Seattle," he said. "For the most part, we promote this area as being part of the San Juan Islands, but when people ask us where's that, we say in Puget Sound north of Seattle."

The outspoken Manning said it's wrong to identify such bodies of water as Hood Canal and Admiralty or Possession Sound as being part of Puget Sound.

"It dilutes the identity of Puget Sound to spread it over too much water, and it lessens the identity of the other waterways."

Manning said he's only willing to accept a Puget Sound that goes no farther north than Point No Point.

"The officials are wrong," he said. "They can make all the decisions they want. . . . The people who accept it are the newcomers. They don't have the right to make such a radical change. They should pack their carpetbags and head back to Alabama."

PROCEDURE

LESSON 2

HELPFUL HINTS

This lesson contains two activities. Each may take 30-50 minutes to complete.

Activity 1 - What A Coastline!

1. Display transparency #1A - *Puget Sound Basin*.

QUESTION "Where is Puget Sound?"

ANSWER *In the state of Washington in the United States*

QUESTION "What are the boundaries of Puget Sound?"

ANSWER *Explain that there exists a continuing debate over the precise boundaries of Puget Sound. One working definition has been the body of water south of Admiralty Inlet, including Hood Canal.*

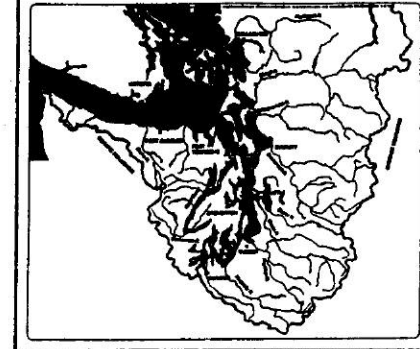
2. Have a student move their finger on the transparency as you read the boundaries as defined by the PSWQA (see Helpful Hints).

QUESTION "Puget Sound is an extension of which ocean?"

ANSWER *Puget Sound is an inland arm of the Pacific Ocean.*

3. Divide students into groups of 10-12 students. Distribute a packet containing the six pieces of the Puget Sound map to each group. Have students put the map together and identify Puget Sound and the location of their town or city on the map.
4. Instruct students to work as a group to list three interesting observations of the Puget Sound area as they study the map. Have each group share their three observations with the entire class.

1.



Students may enjoy sharing stories of their favorite experiences on Puget Sound.

2. The Puget Sound Water Quality Authority's (PSWQA) definition includes the marine waters south of Admiralty Inlet (including Hood Canal and Saratoga Passage), the marine waters north to the Strait of Georgia, and that portion of the Strait of Juan De Fuca that is south of the international boundary.

NOTE: The map students are using does not contain the entire Puget Sound as defined by the PSWQA. It is missing the Strait of Georgia, above the San Juan Islands.

You may wish to discuss the rather arbitrary nature of any definition of Puget Sound. Should it be based on communities? On political jurisdiction?

PROCEDURE

LESSON 2

HELPFUL HINTS

5. Call attention to the amount of coastline created by the geography of Puget Sound. Refer students to the key at the bottom of the map.
6. Have students compare nautical miles to statute (land) miles.
One statute mile = 1.15 nautical miles.

Hold up one of the pieces of string from the kit (12 inches long). Explain that for this chart the 12 inch string equals approximately 30 statute miles (29.9 to be exact). Each inch of string equals approximately 2.5 miles.

7. Have each group estimate the total miles of coastline on the map and record their prediction for comparison at the end of the activity.

QUESTION "How could we calculate the approximate number of miles of coastline on this map?"

ANSWER *Allow students time to share their ideas about the ways they might solve this problem.*

8. Have students find the number of statute miles of coastline, using one of the methods they suggest or have them follow the procedure outlined below:

Step 1. Have each group, gathered around one map, divide into working teams of 2 students.

Step 2. Have each team choose one of the six pieces of the map to calculate the number of miles of coastline. Make certain all six map pieces are delegated for computation.

Step 3. Distribute a marked piece of string to each team. Explain or demonstrate how the string can be used as a measuring device. Students pick a starting point on their map section and begin laying the string on the map to conform to the shoreline, following the configuration as closely as possible. Have them continue this procedure for the entire coastline represented on their map section, recording the number of lengths of string used. The total length of coastline for their map section is the sum of the full 12" string measurements times 30 miles.

6. One nautical mile = 6,076 feet
One statute mile = 5,280 feet

NOTE: Land distances are measured in statute miles. Students are being instructed to measure the coastline in statute miles in this activity because students are probably more familiar with this measure.

Coastlines can be viewed as "land" miles.

PROCEDURE

LESSON 2

HELPFUL HINTS

If students have fewer than 12 inches when they reach the end of their map section, explain that the 12 inches can be further broken down to:

- 1 inch = approximately 2.5 miles, or
- 2 inches = approximately 5 statute miles

Step 4. Have the teams of students rejoin their original group to calculate the total number of miles of coastline for the entire Puget Sound map.

Step 5. Have students compare their original estimate to the total. It may be interesting to compare the total miles calculated by each group. You may average all the totals to arrive at one figure for the class. Averages tend to smooth out the high and low calculations, usually providing a more reliable answer.

Activity 2 - Watersheds of Puget Sound

1. Explain that it is at the coastline that fresh and salt water meet as streams and rivers enter the Sound. Rivers and streams carry soil, nutrients and wastes from the land. Therefore, groups like the Puget Sound Water Quality Authority and other agencies concerned about water quality of the Sound, include in their plans and descriptions the land areas that drain into the Sound. These land areas are most often defined as **WATERSHEDS**. Introduce this term to students by displaying Transparency #1B - *What Is a Watershed?*
2. Distribute copies of student worksheet #1A - *Watershed Basins*, showing the names of the nine watershed basins that drain into Puget Sound. Have students locate the major watershed basin in which they live.

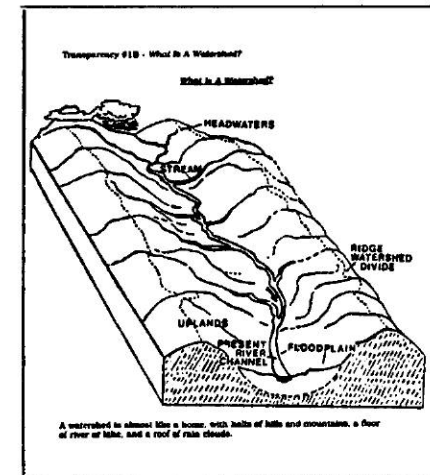
QUESTION "Can you estimate how many major rivers empty into Puget Sound?"

ANSWER *Ten major rivers, 14 minor rivers, with hundreds of streams, empty into the Sound.*

Step 4. PSWQA states that there are approximately 1331 statute miles (or 1157 nautical miles) of shoreline in Puget Sound.

Step 5. A large chart on the black board that the group can fill in may be useful for discussion with the whole class.

1.



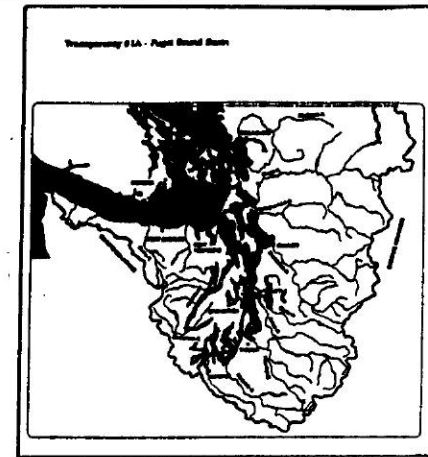
PROCEDURE

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- 3. Display Transparency #1A - *Puget Sound Basin* again. Have students locate and record on worksheet #1A the 10 major rivers identified on the transparency.

3.



You may wish to have each group record their estimates and calculated coastlines on the blackboard using a chart similar to the following:

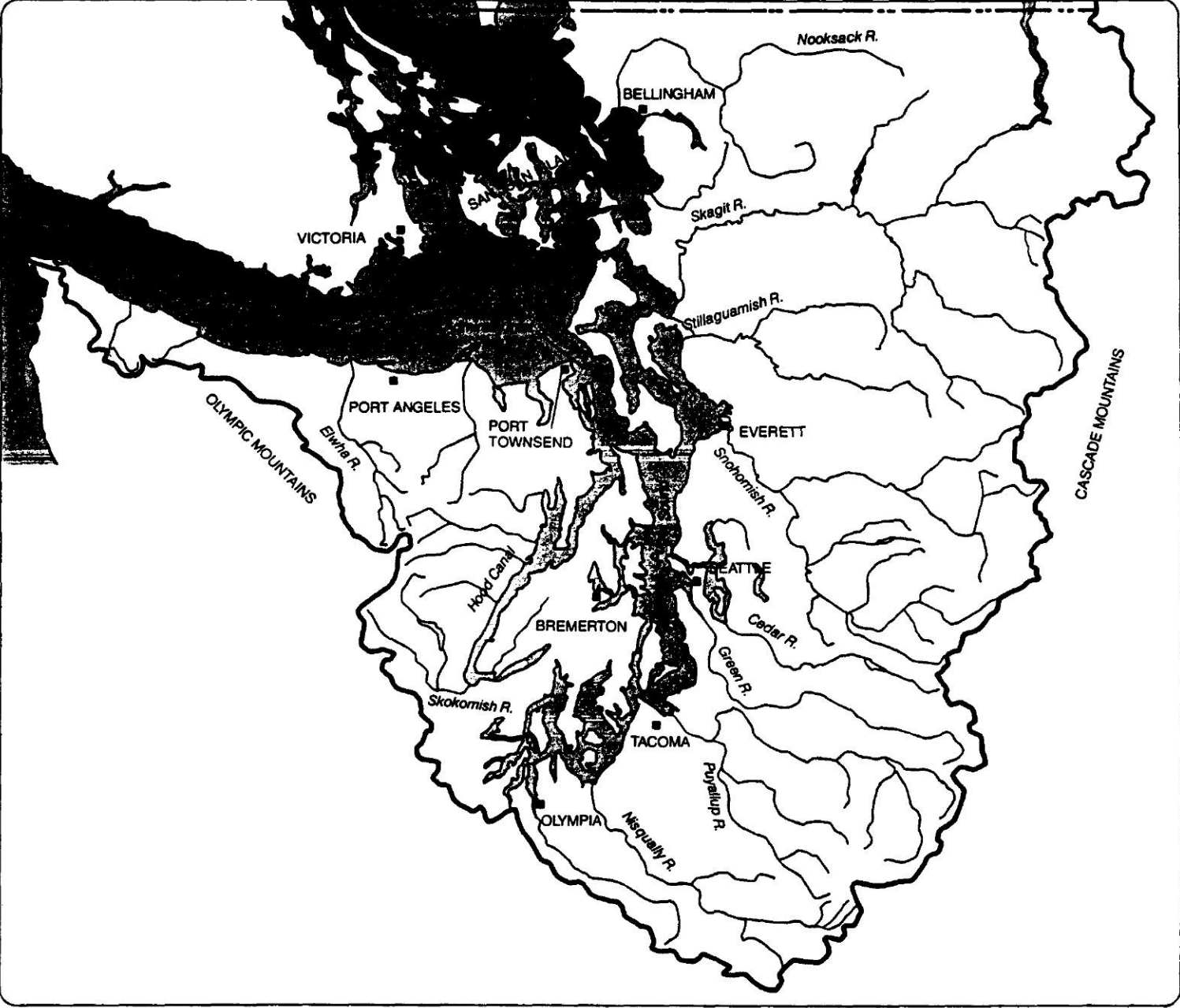
<u>Group</u>	<u>Estimate</u>	<u>Calculated</u>

- 4. Discuss with students the importance of the Puget Sound Basin.

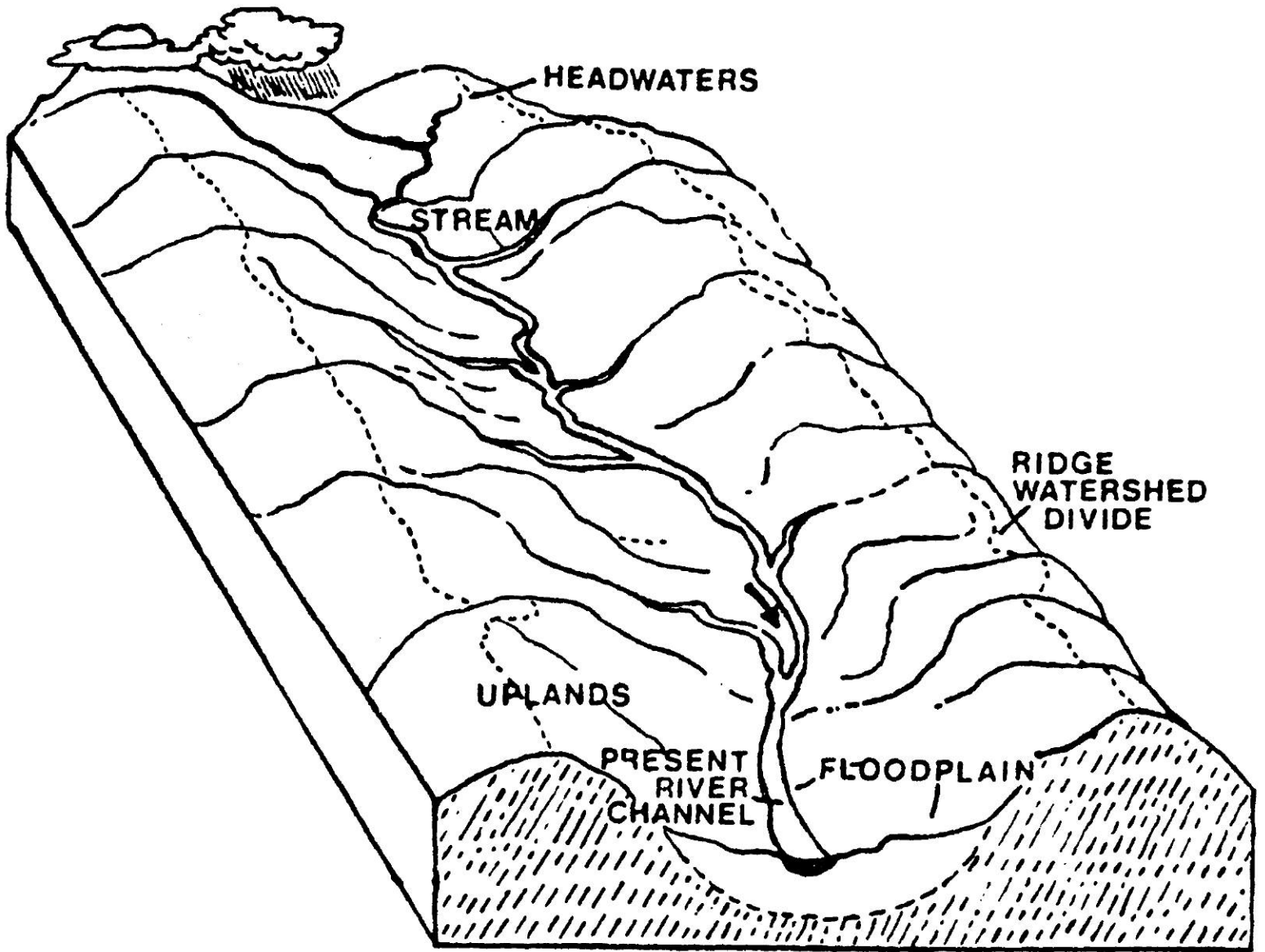
QUESTION "What are some of the ways people utilize the resources of the Sound?"

ANSWER *The Puget Sound basin provides for people: jobs and commerce, food, recreation opportunities, a pathway for transportation, and waste disposal.*

- 4. It may be interesting to ask students to write a few paragraphs, or draw and label a diagram or picture to convey the importance of Puget Sound in their lives. Repeat this assignment at the end of the unit to check for increased knowledge and understandings.



What Is A Watershed?



A watershed is almost like a home, with hills and mountains, a floor of river or lake, and a roof of rain clouds.

Name _____

