



8th Grade Unit

“Watersheds, Wetlands and the Willamette”

Objective: Students will study local watersheds and wetlands, including the history of the west Eugene wetlands and the native Kalapuyas. Students will also learn how pollution in local waterways can impact a broader area.

Materials and supplies to support this lesson: *

- ◆ Topographic maps
 - ◆ Pdf or handouts about Eugene Wetlands, Kalapuya History, and Troubled Waters.
 - ◆ Eugene Parks map
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Lesson 1: Identify Eugene’s Watersheds

In this lesson, students will identify Eugene’s watersheds and determine into which local waterways their neighborhood runoff drains. They will also learn how pollution in local waterways can impact waterways upstream from Eugene.

Definitions

Watershed 1. A ridge between regions whose water drains into two different rivers. 2. The region or area drained by a river system or other body of water. 3. A critical point serving as a dividing line.

Topographical 1. Detailed and precise description of a place or region. 2. The technique of graphically representing the exact physical features of a place or region on a map. 3. The physical features of a place or region. 4. The surveying of the features of a region or place.

Materials

- Large, topographical Eugene map that includes local waterways.
- Student topographical map (smaller version of topographical map). Photocopy a section from Eugene West or Eugene East maps for each student.
- Overhead made from a section of the topographical map.
- Colored pencils
- Classroom Parks and Open Space map.

Orient

Post topographical map in classroom. Use your classroom science textbook to supplement how to read and use topo maps.

Use the map to explain the conventions and markings of a topographical map. Use the altitude lines and the location of one waterway (not in the students’ neighborhood) to demonstrate how a watershed is defined.

* available for teachers from the City of Eugene. See end of unit to order.



Define

Either individually or in teams, have the students define Eugene's watersheds using their student topographical maps. Use colored pencils to trace over each waterway in its own color and then shade in the related watershed in the same color. Students will need to pay close attention to the altitude markings to do this correctly.

Cross Reference

Direct students to locate their homes and school on their topographical watershed maps. They will need to use the Eugene street map, posted on a classroom wall, to accomplish this task.

Discussion

Lead a class discussion about the characteristics of the watersheds where the students live. Have them describe any characteristics of the waterways. How would surface water (stormwater) runoff from their neighborhood be affected by these characteristics? How might Eugene's waterways have changed because of humans?

Extension

Have students observe a neighborhood waterway and write a paper or create a visual presentation describing its characteristics. Observations and descriptions should include:

- Type of terrain and neighborhoods the waterway flows through
- Color and clarity of the water
- Relative speed of the water at different points
- Animal and plant life
- Debris, pollution and possible sources
- Human uses
- Tributaries (where does it flow from or flow to?)

Note: This may best be accomplished in student teams. Caution students to stay out of the water since there may be harmful substances in the waterways. Observations from the bank of the waterway afford a broader perspective.

Extension

Hand out copies of "Troubled Waters." Ask students to read the article and provide written answers to the questions at the end of the article. Discuss the connection between our local watershed and the pollution of the Willamette River upstream in Portland.

Lesson 2: The Importance of Eugene's Wetlands

In this lesson, students will locate wetlands familiar to them on a map of Eugene and will learn the characteristics and importance of wetlands.

Materials

- Eugene Parks and Open Space Map
- Stick pins or dot labels
- Classroom Map of Eugene's Wetlands
- *Values and Functions of Eugene's Local Wetlands* Worksheet

Brainstorm: Wetland Sites

Refer to the Map of Eugene, posted on classroom wall. Have students brainstorm and mark areas on the map they think may be wetlands using stick pins/dot labels.

Use the *Classroom Map of Eugene's Wetlands* as a reference to have students complete the map using the correct wetland area names when known.

Worksheet

Either as a class, in small groups, or as individuals, have students discuss and complete the *Values and Functions of Local Wetlands* worksheet.



Extension

Direct students to survey their peers, parents and other adults in the community to determine the level of public knowledge about the location, extent and values of local wetlands. Based on the results of this survey, students design and implement a public information strategy to educate citizens in those areas that the survey showed were misinformed and/or uninformed. Some possibilities include posters, videos, skits, audio tapes, letters to the editor and illustrated maps. Audiences could be elementary students, peers, parents and the local community through school exhibitions, newsletters and neighborhood meetings.

A broader general audience could be reached through businesses, public access television and commercial television public service announcements.

Extension

Students can learn more about local watersheds and water quality by visiting these websites:

The Environmental Protection Agency website is a great resource for locating watersheds in Oregon and has information about water quality in local rivers and streams. www.epa.gov

The Atlas of Lane County has detailed maps showing Lane County watersheds, precipitation, streamflow, and salmon habitat along with other information about our area. Visit this website at: <http://geography.uoregon.edu/infographics/lcweb/lcindex.htm>

Lesson 3: The History of Eugene's Wetlands

In this lesson, students hypothesize which parts of the Eugene area may have been wetlands prior to settlement by European Americans. They will accomplish this by comparing maps of Eugene's present wetlands with historical information. They will then discuss the impact of wetland loss on Eugene's drainage structure and potential for flooding.

Materials

- Wetland Vocabulary Worksheet
- Wetland Definitions Worksheet "Historical Wetlands of the West Eugene Study Area," by Carol Savonen.
- Student Notes "*Historical Wetlands.*" Copy for each student.
- Classroom map of Eugene's wetlands
- Colored pencils

Define

Distribute copies of *Wetland Vocabulary Worksheet* and have students define the vocabulary terms using the dictionary, prior knowledge, class discussion and/or teacher help. Refer to the *Wetland Definitions* worksheet.

Discuss

Distribute and discuss Student Notes "Historical Wetlands." During the discussion, have students find the wetland areas on the classroom maps.



Write

Have students write a paper about the history of Eugene's wetlands following this suggested outline:

Paragraph 1: Describe the extent, location and type of wetlands that were in the Eugene area before European Americans arrived.

Paragraph 2: How has this information changed since that time? What do the historical wetland areas look like today?

Paragraph 3: What effects might these changes have on water quality, plant and animal life, and flooding potential?

Lesson 4: The Kalapuyas: Living on the Fertile Prairie

Assign

Hand out *History of the Native Kalapuyas* and *The Kalapuyas: Living on the Fertile Prairie*. Ask students to read both handouts and write out answers to the questions provided at the end of the *History of the Native Kalapuyas* handout.

Discuss

Discuss the history of the Kalapuyas. Review students' answers to the questions in class. Learn more at:

http://www.oregonencyclopedia.org/entry/view/kalapuyan_peoples/
or watch a video about the Talking Stones in Alton Baker Park at :

<http://www.eugene-or.gov/index.aspx?NID=2284>



SPLASH! was developed by the City of Eugene Stormwater Management program to support education about water quality in our community. This program is funded by City of Eugene stormwater user fees.

* For more information, supplies for use with these lessons, the SPLASH! Songs CD, or a visit from Lily, contact jeffrey.j.flowers@ci.eugene.or.us or call 541-682-8482 (Eugene schools only)





Values and Functions of Eugene's Local Wetlands

Name: _____

Date: _____

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____





Wetland Vocabulary

Name: _____

Date _____

1. Hydric Soils _____

2. Riverine _____

3. Surveyors _____

4. Prairie _____

5. Seasonal _____

6. Fallow _____

7. Slough _____

8. Swamp _____

9. Swale _____

10. Tarmac _____

11. Dredge _____





Wetland Definitions

- 1. Hydric Soils:** One of the factors used to define a wetland. When determining whether an area is a wetland or not, wetland specialists look for the presence of soils associated with wet conditions (hydric soils) and for plants that can tolerate saturated soil (hydrophytes).
- 2. Riverine:** One of the five basic types of wetlands. This freshwater wetland type is associated with rivers or streams and is readily found in Eugene. It includes channels or streams of moving water. The other four types of wetlands are:
 - Marine** - sea water wetlands undiluted by freshwater
 - Estuarine** - wetlands in estuaries-areas where saltwater and freshwater mix
 - Lacustrine** - freshwater wetlands associated with lakes
 - Palustrine** - all other freshwater wetlands (swamps, marshes, bogs, etc.)
- 3. Surveyors:** The profession or science of making land surveys. To determine the position, boundaries, area and elevation of a part of the earth's surface by measuring angles and distances. The process of surveying land. A map or plan of surveyed land.
- 4. Prairie:** A wide area of level or rolling grassland that in its natural, uncultivated state usually has deep, fertile soil, a cover of tall, coarse grasses and few trees. Wetland prairies are considered rare and valuable and often host endangered native plants.
- 5. Seasonal:** A period marked by particular activities as in seasonal variations of water levels which impact wetland types and related plant and animal life cycles.
- 6. Fallow:** Plowed but left unsown during a growing season. Marked by inactivity.
- 7. Slough:** A place of deep mud or mire. An inlet on a river. A creek in a marsh or tide flat. A muddy hollow.
- 8. Swamp:** These forested wetlands usually occur along river courses. Their vegetation is dominated by trees and shrubs-cedar, spruce, cottonwood, dogwood, spirea and willows among others. Swamps have dense understories (the vegetation growing beneath the trees), and, with their abundance of food and cover, provide diverse wildlife habitat.
- 9. Swale:** A hollowed depression covered with vegetation which filters dirt, sediment and pollutants away from the water that travels through this shallow waterway.
- 10. Tarmac:** A pavement constructed by spraying or pouring a tar binder over layers of crushed stone that is rolled to compress into a hard surface. Tarmac can also be a material of tar and aggregates mixed in a plant that is layed down on the roadway with special equipment. Tarmac is an impervious surface through which rainwater cannot penetrate which encourages runoff.
- 11. Dredge:** A machine used to remove sand or mud from the bottom of a body of water. Dredge also means to clean, deepen or widen by removing earth.





Historical Wetlands: **Student Notes**

Introduction: The following excerpts were taken from “Historical Wetlands of the West Eugene Study Area.” This paper was written by Carol Savonen in April 1988 through a contract with the Lane Council of Governments.

Key Points:

- The majority of the flatter areas below the elevation of 400 feet that have hydric soils were probably historical wetlands.
- Surveyors who measured the Willamette Valley in 1852-1853 reported that many of the prairie flats west of Eugene were seasonally covered with up to three feet of water.
- “There have been countless changes in the west Eugene landscape since the time of European settlement, especially to wetlands. Wet prairies were plowed, drained and planted. Others were grazed and let lie fallow without the clearing benefit of fire. Ash, oak and eventually Douglas fir took the place of the original prairie. Bottom land and (surrounding) woodlands were logged. Sloughs and swamps were dredged or filled in. Creeks were culverted and channelized and rivers were dammed. Now much of the landscape is barely recognizable through the tarmac, shopping centers and neighborhoods.”
- Many small streams found on 1910 maps no longer exist.
- The following wetlands were recorded by surveyors in 1852-1853:
 - A) An ash willow swale over 215 feet wide and two miles long along what is now City View Street.
 - B) An ash willow swale over 250 feet wide next to Bailey Hill Road and Amazon Creek.
 - C) Wet prairies sometimes covered with 1-3 feet of flood water were found in the Willow Creek area between Bailey Hill and Bertelsen Streets and between West 11th and West 18th Avenues.
 - D) A slough that was over 900 feet wide was found just north of Fifth Avenue and between Seneca and Bertelsen Roads.
 - E) A shrub swale over 100 feet wide in the Echo Hollow Road area.
 - F) Seasonally flooded areas in the west Eugene areas of Danebo Street and Royal Avenue.
 - G) Seasonally flooded wet prairies in the Green Hill Road area between West 11th Avenue and the Eugene Airport and between Green Hill Road and Beltline Road.
 - H) Most of the flat area in west Eugene was seasonally flooded.
 - I) A slough near Colin Kelly Middle School was approximately 100 feet wide.
 - J) The Eugene Airport area was originally wet prairie meadow.

