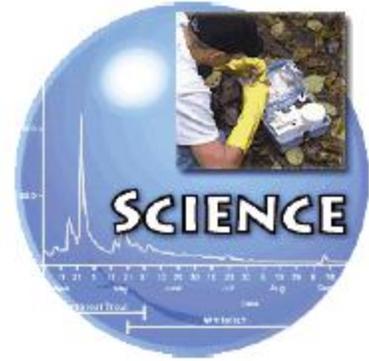


LESSON 1: WEATHER PATTERNS OF THE PACIFIC COAST



ESSENTIAL QUESTION:

What combination of factors both natural and manmade is necessary for healthy river restoration and how does this enhance the sustainability of natural and human communities?

GUIDING QUESTION:

How can learning about weather patterns help us to understand our water resources?

OVERVIEW:

The weather in the Pacific Northwest is dependent on the Pacific Ocean. Generally speaking, weather in the region is mild, with cool wet winters, and warm dry summers with extremes in temperature and precipitation being unusual. However, despite the moderating effects of the Pacific Ocean, the mountains are very important in terms of the distribution of precipitation across the region and the development of water storage in the form of a snowpack during the summer drought. The mountain, via topographical lifting and the rainshadow effect, causes some areas to be temperate rainforests, while others become deserts.

TOPICS:

Precipitation/Climatic Patterns in the Northwest, the Rainshadow Effect, Snowpack and Glaciers

TIME:

One class period

MATERIALS:

- **Lesson 1- Precipitation Patterns of the Pacific Coast.pptx**
- **Lesson 1a- Precipitation Patterns of the Pacific Coast.pdf**
- Glass jar with top
- Ice bath or refrigerator/freezer
- Heater or hot water in a pitcher
- Reflection journal Pages (Printable Handout)

- Vocabulary Notes (Printable Handout)

PROCEDURE:

1. Go over the essential question, introduce the guiding question.
2. Have students take a few minutes to respond to the reflection journal prompt. Discuss responses then questions they may have.
3. Hand out and go over the vocabulary notes. Have students define vocabulary words as they watch the PowerPoint Lesson. Some words may need to be defined elsewhere.
4. Present the PowerPoint Lesson
5. Discuss the concepts of dew point, topographical lifting, condensation, and the formation of clouds and precipitation.
6. Run Demonstration on Condensation
7. Discuss the seasonal precipitation patterns of the Pacific Northwest and the concept of the Rainshadow Effect, which results in heavy precipitation on the windward slopes facing the ocean and drier conditions on the leeward slopes.
8. Discuss snowpack and the formation of glaciers.
9. Finally have students respond to the second reflection journal page.

WASHINGTON STATE STANDARDS:

SCIENCE

1. **EALR 4:** Earth and Space Science
2. **ES2C** In the water cycle, water evaporates from Earth's surface, rises and cools, condenses to form clouds and falls as rain or snow and collects in bodies of water.
 - a. Describe the water cycle and give local examples of where parts of the water cycle can be seen.
3. **ES2B** The Sun is the major source of energy for phenomena on Earth's surface, such as winds, ocean currents, and the water cycle.
 - a. Describe the role of the sun in the water cycle.

READING

1. **EALR 1:** The student understands and uses different skills and strategies to read.
 - a. **Component 1.2:** Uses vocabulary (word meaning) strategies to comprehend text.

SOCIAL STUDIES

1. **EALR 5:** The student understands and applies reasoning skills to conduct research, deliberate, form, and evaluate positions through the processes of reading, writing, and communicating.
 - a. **Component 5.2:** Uses inquiry-based research.

WRITING

1. **EALR 2:** The student writes in a variety of forms for different audiences and purposes.
 - a. **Component 2.1:** Adapts writing for a variety of audiences.

ADDITIONAL RESOURCES AND ENRICHMENT:

<http://science.howstuffworks.com/weather.htm>

GLACIERS

<http://library.thinkquest.org/3876/glaciers.html>

[http://depts.washington.edu/rocknout/Lesson%20Plans/Glaciers On The Move.pdf](http://depts.washington.edu/rocknout/Lesson%20Plans/Glaciers%20On%20The%20Move.pdf)

RAIN SHADOW ANIMATIONS AND TUTORIALS:

<http://bcs.whfreeman.com/thelifewire/content/chp56/5602001.html>

http://trc.ucdavis.edu/biosci10v/bis10v/media/ch31/rainshadow_v2.html

VOCABULARY TERMS:

- **Condensation:** The transition of water vapor into liquid
- **Dew point:** The temperature at which relative humidity reaches 100% and liquid water condenses from the air.
- **Rainshadow Effect:** As clouds pass over the mountains, they drop precipitation on the windward side. But, when the air drops on the leeward side, it warms up, causing the clouds to evaporate again into vapor due to the temperature rising above the dew point temperature. This **adiabatic heating** and cloud evaporation results in drier conditions on the leeward side of the mountains
- **Adiabatic Heating:** The compression and heating of air as it descends from high elevation to low elevation
- **Snowpack:** The seasonal accumulation of snow in the winter that is available for melting in the spring and summer.
- **Glacier:** A body of compacted ice that flows due to gravity under the weight of the ice above.



**Elwha River Restoration
Weather Patterns of the Pacific Coast
Reflection Journal 1**

What kind of weather do you most enjoy? Why do you enjoy it?

What questions do you have about the weather here on the Olympic Peninsula?



**Elwha River Restoration
Weather Patterns of the Pacific Coast
Vocabulary Notes**

Condensation:

Dew point:

Rainshadow Effect

Adiabatic Heating: (a-dē-ə-ba-tik)

Snowpack:

Glacier:



**Elwha River Restoration
Weather Patterns of the Pacific Coast
Reflection Journal 2**

How do you think the weather patterns of the Pacific Coast affect the Elwha River?

What questions do you still have about our weather patterns? How can you go about finding answers to your questions?



The dark green colors are old-growth forests. The light green colors are logged areas, fields, and housing. The beige and white colors in the middle of the peninsula are alpine meadows and glaciers on the mountaintops.

The boundaries of Olympic National Park are visible in this satellite image, as logging and other human activities have eliminated the old growth forests of the region right up to the park boundaries.

