Is the Climate Changing in Oregon?

LaCuKnoS Language Booster

Oregon's **climate** is very different depending on which side of the state you live on. For example, if you live in Corvallis, where OSU is located, and in the Willamette **ecoregion**, you have experienced warm and dry summers and mild, wet winters. But if you live in Nyssa, in the Northern Basin and Range ecoregion, Oregon's driest, you have experienced hot summers and cold winters.

Oregon's Ecoregions

But is the climate changing in Oregon's ecoregions? Yes, it is. Oregon's ecoregions, like the Earth's climate, have been changing naturally for a long time, long before humans arrived. But recently, scientists have observed unusual changes that seem connected to human activity. For example, Earth's average temperature has increased much more quickly than expected over the past 150 years. In Oregon, **average** temperatures have risen about 2.2 degrees Fahrenheit since 1895. For most of the past 23 years, Oregon was warmer than normal, and because **precipitation** was also below average, this contributed to increases in **evapotranspiration** and **drought** frequency. This has been connected to human-caused **climate change**[1].

How are these changes affecting us? This year scientists discovered a record number of dead fir trees east of the Cascades. An ongoing drought, paired with extreme heat in recent summers, has caused trees like **firs** to struggle to adapt[2]. The combination of drier summers, higher temperatures, and earlier snowmelt in Spring is also increasing the frequency and severity of **wildfires**. As a result, the 2020 wildfire season was one of the most destructive in Oregon's history. Fires, mainly in the Cascades ecoregion, burned more than 1,000,000 acres (in metric units that is 400,000 ha) of land and destroyed thousands of homes.


PHOTOGRAPH: DANNY DEPINTE/US FOREST SERVICE

We know about climate in the past because of natural evidence that scientists can study, like tree rings, or the layers of ice in glaciers, and use it to compare climate from the past with today's climate. Scientists also have been observing Earth for a long time. They use satellites and other instruments to collect many types of information about Earth's land, atmosphere, ocean and ice. But also people's lived experiences and observations of the **weather** over time also help us better understand our changing climate in Oregon. Through cultural stories and **oral history**, local knowledge provides additional evidence to complement scientific knowledge. For example, when senior citizens talk about the climate and changes to the environment they are usually basing their observations on their life experience. Their long term observations of issues that scientific research only investigates for short periods of time provides scientists with different perspectives.

[1]Fleishman, E., editor. (2023). *Sixth Oregon Climate Assessment*. Oregon Climate Change Research Institute, Oregon State University, Corvallis, Oregon. https://blogs.oregonstate.edu/occri/oregon-climate-assessments

[2]Lundeberg, S. (2023, January 11). As climate warms, drier air likely to be more stressful than less rainfall for Douglas-fir trees. OSU Newsroom. https://today.oregonstate.edu/news/climate-warms-drier-air-likely-be-more-stressful-less-rainfall-douglas-fir-trees

How Do We Know Earth Is Changing today?

Watch this 5-minute video from NASA about the changing Earth. Then talk with a partner about these questions. After you talk about it, write your answers.

1. How do the satellite pictures taken from space help you understand the changes on Earth that were described in the video?

   _____

   _____

   _____

2. Why does it matter for us to understand how the Earth is changing over time?

   _____

   _____

   _____

3. How might the changing climate affect your family and your community in the coming years?

   _____

   _____

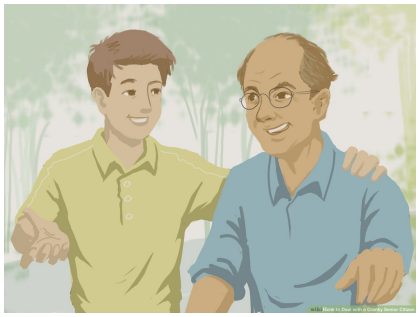
   _____

Changing Climate in My Community
LaCuKnoS Science Investigation

In the following LaCuKnoS investigation, you will look at how climate change affects the place where you live. In the first part of the activity, you will learn from a member of your family or a neighbor that has lived in your community for at least 20 years about the changes they have observed happening in your community. In the second part, you will compare what you learned from talking to people with data that scientists have collected over the years and see if you can find any similarities.

Materials:

- Interview guide
- Ecoregions of Oregon Map



Part 1 (To take home) – Stories about Climate Change

In this investigation you will collect some of your own data to see firsthand how climate change has affected your community by interviewing a member of your community.

Here are three example of short videos of members of the Confederated Tribes of Warm Springs talking about changing climate in their community:

- "Through the eyes of a Native Veteran"- Tamera Calhoun
- "Cycle of Life"- Danny Martinez
- "Survival" – Karlen Yallup

Procedure:

1. Practice interviewing one of your classmates and taking notes of their answers. Ask them the following questions:
    a. How do you like to spend your time?
    b. What are you good at?
    c. What do you think your future job will be?

2. Pick someone who has lived in your community for at least 20 years. This can be someone in your family, a neighbor, or someone else who you know.

3. Using the interview guide called **"Changes close to home"** ask the questions on that page to the person you identified in #2.

4. After you finish your interview answer the following question:

    Did the person you interviewed see changes in the climate (temperature or precipitation) over the last 20 years?

    _____

    _____

Part 2 (During SMILE Club) - Changes close to home

Procedure:

1. Look at the Oregon Ecoregions map and find where you live. Which ecoregion describes your community?

2. Using NOAA's Climate at a Glance website, select your state and county. Look up the annual temperature and **precipitation** for the past 30 years for your county.

3. Next, open this google sheet: Changes over the last 30 years. Find the tab for your county and fill in the table with the information you looked up on the NOAA website.

4. Calculate the **average** annual temperature and precipitation for the first 20 years (1983-2011) and for the last 10 years (2013-2021). How similar or different are these averages?

5. Choose a county in a different Oregon ecoregion – such as the other side of the state from where you live. Complete the same steps 2-4 for this other county.

6. Answer the following question:

   How would you describe the changes in annual temperature and precipitation for the past 30 years where you live?

   _____

   _____

   _____

   How much different are the patterns in precipitation and temperature between the two counties you compared?

   _____

   _____

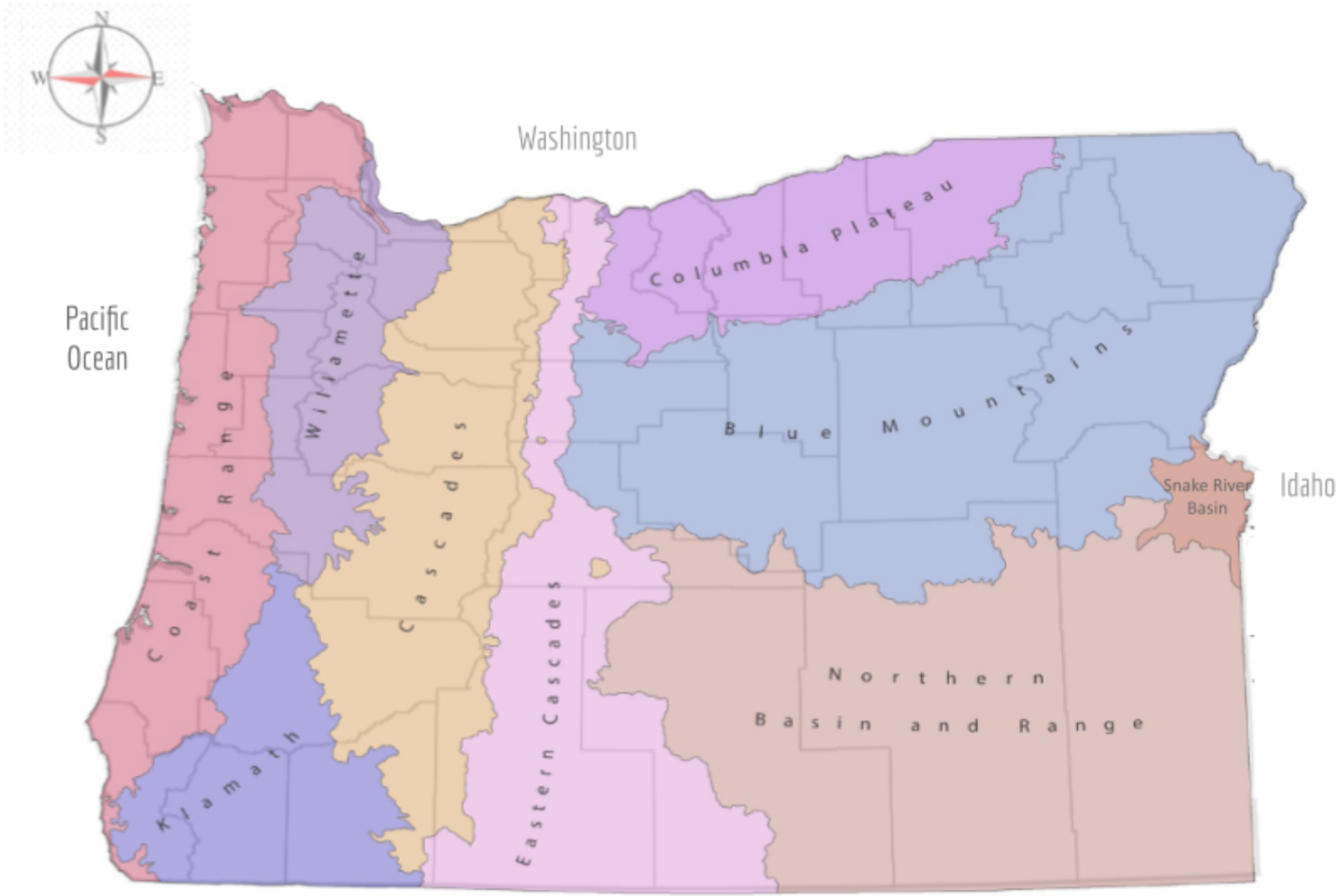
   _____

   How can you explain any differences you described in the other two questions?

   _____

   _____

   _____



Oregon's Ecoregions

Interview Guide
Changes close to home

1. How long have you lived in this area? _____
2. What is your occupation? _____
3. In a regular week how much time do you spend outdoors?

   _____
4. What do you do outdoors? _____
5. Compared with the past, have winters changed in this area? How?

   _____

   _____
6. Compared with the past, have summers changed in this area? How?

   _____

   _____
7. Tell me about your experiences with unpredictable weather in this area (like droughts, wildfires, flooding, hurricanes)

   _____

   _____
8. How is your life today affected by changes in the climate?

   _____

   _____
9. What other changes in this area have you seen in the last 20 years?

   _____

   _____

Climate Problems in your Community

LaCuKnoS Investigation Summary

1. Each student who was able to complete **Part 1 -Stories about Climate Change** of the activity should share one or two things they learned from the person they interviewed.

2. Review what your club learned during **Part 2 -Changes close to home** of the activity from the data collected by NOAA scientists (changes in annual temperature and precipitation for the past 30 years where you live).

3. Compare and contrast what you learned in part 1 and part 2 of the activity. What similarities and what differences do you notice between the data collected by NOAA and the experiences of the people that you interviewed?

   _____

   _____

   _____

4. Is it important to understand both of these kinds of data if we want to understand the influences of climate change? Why or why not?

   _____

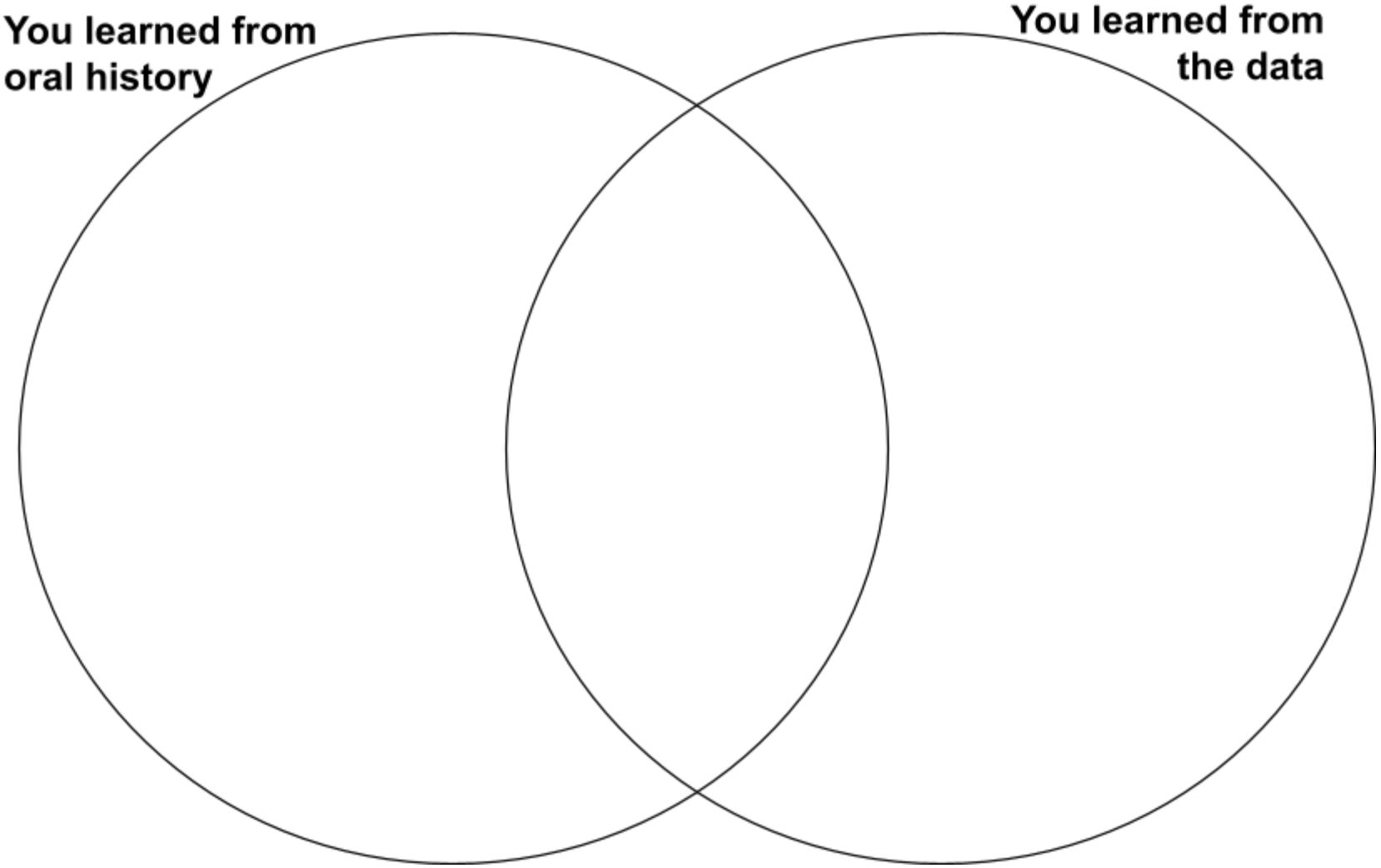
   _____

5. Do their observations match up with your temperature and precipitation data?

   _____

   _____

   _____

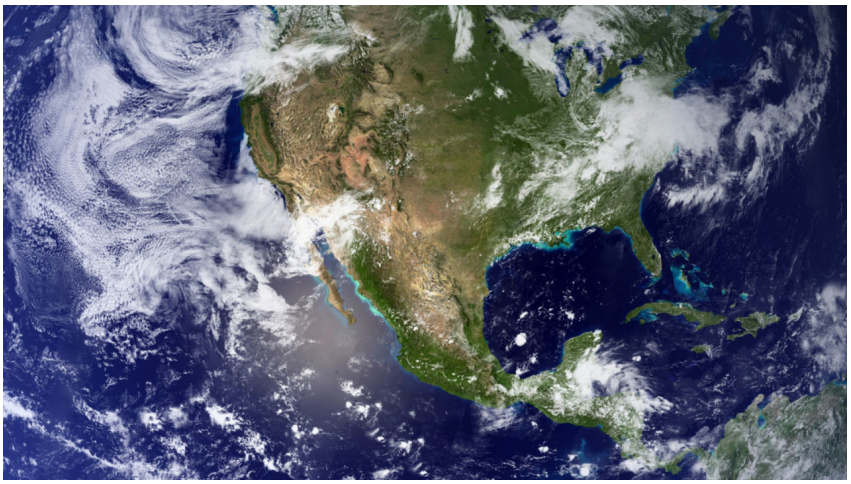

You learned from oral history
You learned from the data

Climate Problems in your Community
LaCuKnoS Concept Cards

Climate/Clima

Climate is the average weather conditions -precipitation, temperature, humidity and winds- in a place over a long period of time (30 years or more).

El clima son las condiciones meteorológicas -precipitación, temperatura, humedad y vientos- promedio en un lugar durante un largo período de tiempo (30 años o más).



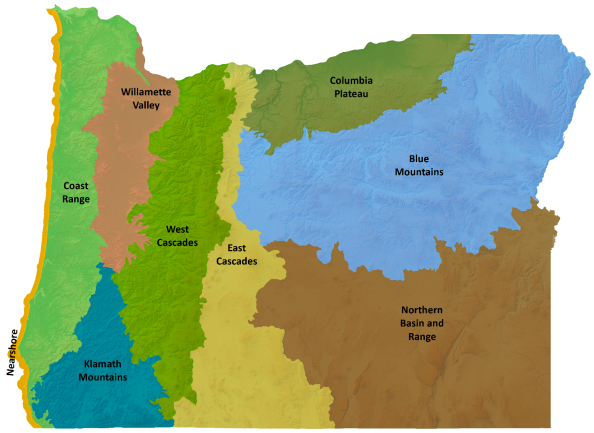
Oregon's climate varies widely from the eastern to western regions of the state

Concept Card

Ecoregion/Ecorregión

An ecoregion is an area of land in which similar climate, flora (plants) and fauna (animals) interact to create an environment distinct from other areas.

Una ecorregión es un área de tierra en la que el clima, la flora (plantas) y la fauna (animales) similares interactúan para crear un entorno distinto de otras áreas.



Oregon has different ecoregions like the moist, cool Cascade Range

Concept Card

Climate change/
Cambio climático

Climate change describes a change in the average conditions — such as temperature and rainfall — in a region over a long period of time, usually at least 30 years.

El cambio climático describe un cambio en las condiciones promedio, como la temperatura y la lluvia, en una región durante un largo período de tiempo, por lo general al menos 30 años.

Climate change is real!

Concept Card

Precipitation/
Precipitación

It is when a cloud becomes full of liquid water, and it falls from the sky as rain or snow.

Es cuando una nube se llena de agua líquida y cae del cielo en forma de lluvia o nieve.

Portions of the Coast Range receive more than 100 inches of precipitation annually

Concept Card

Average/
Promedio

A number expressing the central or typical value in a set of data, which is calculated by dividing the sum of the values in the set by their number.

Número que expresa el valor central o típico de un conjunto de datos, que se calcula dividiendo la suma de los valores del conjunto por su número.

$$\bar{X} = \frac{15+33+28}{3}$$

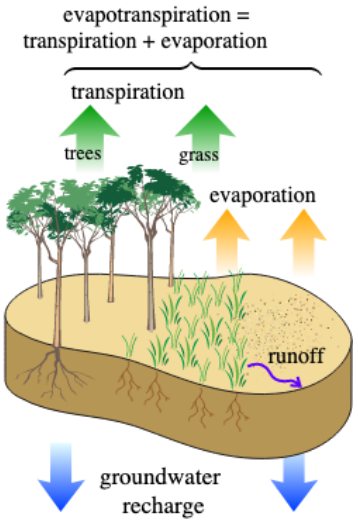
My grades are above average

Concept Card

Evapotranspiration/ Evapotranspiración

Evapotranspiration is the movement of water from the Earth's surface to the atmosphere by evaporation from the soil and other surfaces and transpiration from plants.

La evapotranspiración es el movimiento del agua desde la superficie de la Tierra hacia la atmósfera por la evaporación del suelo y otras superficies y la transpiración de las plantas.



The warmer it gets, the more fire we get due to increased evaporation and evapotranspiration

Concept Card

Drought/Sequía

It is a prolonged period of abnormally low precipitation, either rain or snow, that can cause reduced soil moisture or groundwater, diminished stream flow, crop damage, and a general water shortage.

Es un período prolongado de precipitación anormalmente baja, ya sea lluvia o nieve, que puede causar una reducción de la humedad del suelo o de las aguas subterráneas, una disminución del flujo de agua, daños a los cultivos y una escasez general de agua.

Drought is a serious environmental threat across the United States.

Concept Card

Firs / Abetos

Firs are evergreen trees of the pine family. They are valued for their wood and are popular as Christmas trees.

Los abetos son árboles de hoja perenne de la familia de los pinos. Son valorados por su madera y son populares como árboles de Navidad.

Scientists have discovered a record number of dead fir trees in Oregon

Concept Card

Wildfire/
Incendio forestal

A fire that burns rapidly and uncontrollably over a large area of wildland vegetation.

Un fuego que arde rápida e incontrolablemente sobre una gran área de vegetación silvestre.

Wildfires have become an increasing threat to people in Oregon

Concept Card

Weather/
Clima

Weather is a specific event—like a rainstorm or hot day—that happens over a few hours, days or weeks.

El clima es un evento específico, como una tormenta o un día caluroso, que ocurre en unas pocas horas, días o semanas.

Keeping an eye on changing weather can help us plan ahead

Concept Card

Oral history/
Historia oral

Oral history is a method of conducting historical research through recorded interviews with people having personal knowledge of past events.

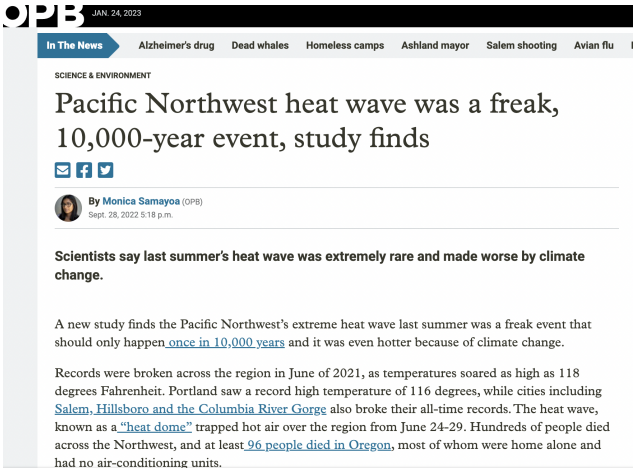
La historia oral es un método para realizar investigaciones históricas a través de entrevistas grabadas con personas que tienen conocimiento personal de eventos pasados.

Oral history can provide firsthand detail on particular events

Concept Card

Resources

- During summer 2021, in some cities of the Willamette Valley we experienced a extremely rare heat wave. Read the news here: [Scientists say last summer's heat wave was extremely rare and made worse by climate change.]



JAN. 24, 2023

In The News | Alzheimer's drug | Dead whales | Homeless camps | Ashland mayor | Salem shooting | Avian flu

SCIENCE & ENVIRONMENT

Pacific Northwest heat wave was a freak, 10,000-year event, study finds

By Monica Samayoa (OPB)
Sept. 28, 2022 5:18 p.m.

Scientists say last summer's heat wave was extremely rare and made worse by climate change.

A new study finds the Pacific Northwest's extreme heat wave last summer was a freak event that should only happen once in 10,000 years and it was even hotter because of climate change.

Records were broken across the region in June of 2021, as temperatures soared as high as 118 degrees Fahrenheit. Portland saw a record high temperature of 116 degrees, while cities including Salem, Hillsboro and the Columbia River Gorge also broke their all-time records. The heat wave, known as a "heat dome" trapped hot air over the region from June 24-29. Hundreds of people died across the Northwest, and at least 96 people died in Oregon, most of whom were home alone and had no air-conditioning units.

Other Resources

- **NASA Climate Kids**
- **The Story of Climate Change**
- **Climate Change Educator Resources**
- **How to talk to kids about climate change**
- **Voices of the Confederated Tribes of Warm Springs**

You can find the lesson here!

Oregon State University

LaCuKnoS