

Student Activity Sheet

Paleoclimates and Pollen of Washington

NAME: _____

How do paleobotanists use ancient pollen to find out about the earth's climatic past?

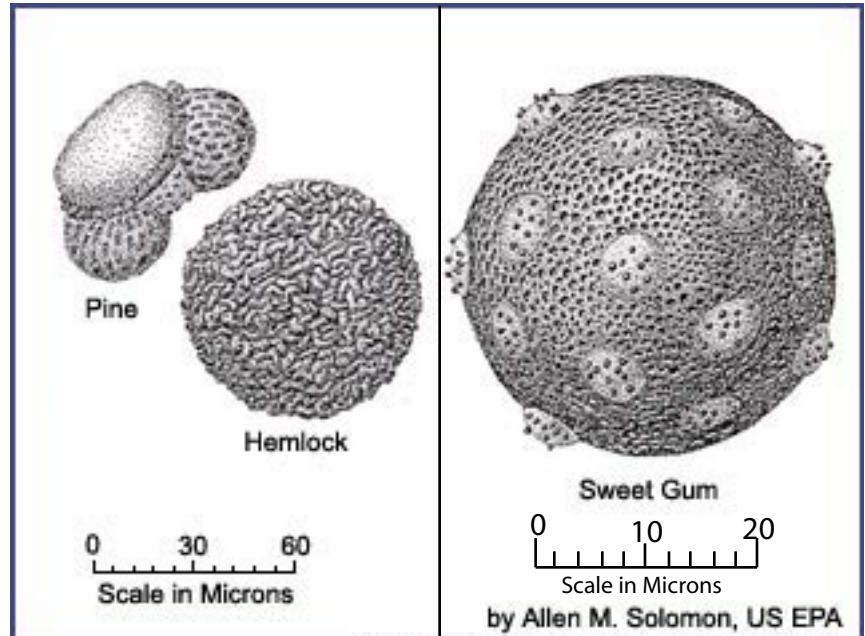
This activity is based on actual pollen data collected from a lake in southwest Washington State. You will analyze sediment samples with other material mixed in to represent pollen grains and determine the type and amount of the "pollen" in the samples. From this information, you will determine the type of vegetation and age of the samples and will present conclusions about the likely climate at the time the pollen was shed.

What You Need:

- Samples of sediment containing colored paper dots or shaped confetti to represent pollen
- Pie pan
- Tweezers or forceps

What You Do:

1. Your teacher will show a model sediment core containing five (or six) separate layers, each laid down at a different time in the past. Pay attention to the color and texture of each layer to help you identify the samples from the layers you will be working with.
2. Each pair of students will be given a sediment sample, pie pan, and tweezers. Each sample contains "pollen" (actually colored paper dots or confetti, with each color representing pollen from a different species of plant) from plants that grew in the area when the sediment was deposited.
3. You and your partner will separate out the pollen from the sediment. Empty the sediment into the pie pan. Sift and dig until you have found all of the pollen grains. Separate the pollen grains by color or shape.
4. Use the pollen key on the next page to determine what species of plants are represented in your sample and calculate what percentage of the total pollen comes from each species. Fill in the data table for the sediment layer you are working on.
5. Use the information given with each species description on the pollen key to figure out what the climate was like when your layer was deposited. Be sure to compare your sediment sample to those from other layers in the entire sediment core so that you know what level your sample is from and how old it is.



Observations and Questions:

1. Compare your conclusions with others in your class who were assigned the same sediment layer. Do you all find the same plant types? Do you all agree on the climate that probably existed at the time?
2. With your class, discuss the species of plants found in each layer and the climate that probably existed at the time. Fill in the rest of your table with the information provided by students who studied different sediment layers. Can you determine what the overall pattern of climate change was during these last 20,000 years? What might have caused the changes?

Pollen Key

Code	Color and Shape	Plant Species	Climatic Characteristics
A		Western Hemlock	Principal dominant tree of many lowland, temperate sites. Requires very moist, temperate conditions for growth.
B		Douglas Fir	Prefers moderately cool to warm sites. Grows best under temperate, somewhat moist conditions.
C		grasses and sedges	These grasses and sedges are typically found in very cool alpine/subalpine meadow sites characterized by very cool summers, harsh winters, and short growing seasons.
D		Alder	Widespread throughout the Pacific Northwest, prefers abundant water and can grow in cool climates.
E		Grand Fir	Grows in cool climates, but not as cold tolerant as trees found at higher altitudes.
F		Engelmann Spruce	Found in cold, usually sub-alpine sites.
G		Western Cedar	Found only in temperate, very moist climates.
H		Lodgepole Pine	Found in areas of very cool climates typically growing on poor soils, often at high altitudes (above 3,500 feet) under the present climate.
I		mixed meadow species	This pollen is from a mixture of plants common to warm meadowlands. Typically, these species grow in areas of warm summer temperatures and summer drought.
J		Oak	Found in warm - temperate sites characterized by dry, warm summers.
K		Alpine Sagebrush	Woody, low-growing shrub that's found only at high-altitude, cold sites.

Data Table

Plant species	Sediment Layer				
	1	2	3	4	5
Western Hemlock					
Douglas Fir					
grasses and sedges					
Alder					
Grand Fir					
Engelmann Spruce					
Western Cedar					
Lodgepole Pine					
mixed meadow species					
Oak					
Alpine Sagebrush					