Student Recording Sheet -- Pollen and Paleoclimate Activity

Note: Full instructions, and background materials, for this activity can be found on the website listed above. The following are abbreviated instructions.

Instructions:
List your sample number here_____.

Be a climate detective: Count the pollen in the sample
Before you begin, your instructor will show you a model of a sediment core. The oldest layers in the core are the ones laid down first, and therefore, are on the bottom of the model. Your instructor will also give you the colors code for the various pollen types. You will need to fill this information into the key on the last page of this student worksheet.

Gather the following materials from your instructor: one sediment layer sample; paper plate or pie pan; tweezers; toothpicks; or forceps.

Note that each sample contains "pollen" from the species prevalent at the time of deposition. Record the number of your sample bag and then empty the contents of your sample into the paper plate or pie pan. When you have placed your sample on the pie plate, do the following:

- Sift through the sample to separate out the pollen from the sediment.
- Determine from the pollen color key, below, what species of plants are represented in your sample.
- Record your pollen count on your worksheet.
- Determine what percentage of the total pollen comes from each species in your sample. Use the data and your key to determine the climate at the time the layer was deposited.

Data Table: Plant Species for Battle Ground Lake, Washington

Use the table below to record the number of each type of pollen that you find in the sample. Then, calculate the percentage of total for each type of pollen. Circle which sample number you are working on.

Plant Species	Sediment Layer									
	1		2		3		4		5	
	#	%	#	%	#	%	#	%	#	%
Western Hemlock										
Douglas fir										
Grasses & sedges										
Alder										
Grand fir										
Engelmann spruce										
Western cedar										
Lodgepole pine										
Mixed meadow species										
Oak										
Alpine sagebrush										

Analyze the data: Tell a climate story

If more than one pair of students worked on any sediment layer, share the data between teams. Any teams with the same sample should come to a consensus on what plants they have found and the relative abundances (percentage). The table in the student worksheet can be used to keep track of the percentage of plants found in each layer. Based on your data, decide what the climate must have been like at the time of deposition. Answer the first two **Stop and Think** questions listed below.

After you have analyzed your sample, report your conclusions to the class. Then, as a class, build a consensus on the pattern of climate change represented by this sediment column. To get a fuller picture of the climate history in the sediment core, complete your data table with data provided by those students studying different sediment layers.

Stop and Think:

1. Based on the climatic preferences for the plant species in your sample, what type of climate do you think occurred during the time your sediment was deposited?

2. Compare your sample with the others in your class that had same sample number. Did you come to the same conclusions about the climate?

3. Share your findings about your sample with other teams. Record their data, remember the core at the bottom of the core (sample #5) is the oldest of the samples.

4. After you have recorded the climate descriptions for the rest of the class samples, write a paragraph describing the climatic changes in this area for the past 20,000 years. Hypothesize what you think contributed to the changes in climate during this time period.

Pollen Key and Climatic Characteristics of the Vegetation

Before beginning the activity, fill in the color code for the pollen as given by your instructor.

Color Code	Plant Species	Climatic Characteristics
	Western Hemlock	Principal dominant tree of many lowland, temperate sites. Requires very moist, temperate conditions for growth.
	Douglas Fir	Broadly distributed throughout the Pacific Northwest from moderately cool to warm sites. Grows best under temperate, somewhat moist conditions.
	Grasses & 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.
	Alder	Widespread throughout the Pacific Northwest, often colonizing gravel bars or other poor soils, prefers abundant water and can grow in cool climates.
	Grand Fir	Found at mid-elevations in the Cascade mountains. Grows in cool climates, but not as cold tolerant as trees found at higher altitudes.
	Engelmann Spruce	Found in cold, usually sub-alpine sites.
	Western Cedar	Found only in temperate, very moist climates.
	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.
	Mixed Meadow Species	This pollen is typical of a mixture of herbaceous plants common to warm - temperate meadowlands, such as may be found in the Willamette Valley in Oregon. Typically, these species grow in areas of warm summer temperatures and summer drought.
	Oak	Found in warm - temperate sites characterized by dry, warm summers such as can be found from Oregon's Willamette Valley south into California.
	Alpine Sagebrush	Woody, low-growing shrub related to the sagebrush of eastern Washington and Oregon. Found only at high-altitude, cold sites.