Looking Backwards, Looking Forward

**Driving question: What was the climate like in the Anacostia watershed over the past 12,500 years?**

Over the next few days, you will be acting as a paleoclimatologists (scientists who study past climate) to answer the driving question *What was the climate like in the Anacostia watershed over the past 12,500 years?* In order to answer this question, you will need to work collaboratively, learn some background information, collect data, and analyze and interpret the data. You will use everything you learn to write a scientific argument to answer this question.

**Observation and Inference**

1. Write down at least 3 observations about the cartoon.

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**Inferring past climates from the plants that were growing in an area?**

2. Jigsaw with research information.

1. Check the topic you are assigned in your research (expert) group

□ Pollen

□ Plant communities

□ Sediment cores

□ Proxy data

1. Record your notes in the appropriate section in the diagram on the next page.

1. Share what you have learned in your expert group with your group members in your sharing group. Take notes about each topic in the diagram on the next page.
2. As a group, answer the question in the middle of the paper “*How can we infer past climates from the plants that were growing in an area?”* Remember, you’ll need to use information from all the topics to fully answer this question.

**Driving Question: What was the climate like in the Anacostia Watershed over the past 12,500 years?**

### Collect your data

1. You will work with your “expert group” from yesterday to collect data from one-time period
	1. Check your time period below you are assigned. What does “ybp” mean? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 □ ~12,500 ybp □ ~3,000 ybp

 □ ~10,000 ybp □ ~340 ybp

* 1. On your whiteboard, create a table for the data you will be collecting from your sediment sample.

1. On your white board, create a table for the data you will be collecting from your sediment sample.
2. After collecting your data, use the Plant Characteristics Card to help you with identifying the type of plant each pollen grain comes from.
3. Calculate the percentage of each type of pollen you collected in your sample and record it on your data table.
4. Copy your data onto the class data table that will be shared with the whole class.

### Analyzing and interpreting data

1. Now that your group has graphs for each time period sampled, it is time to begin analyzing and interpreting the data. First, write the driving question that you are trying to answer below:

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1. Now, you will need to:

□ Look for patterns in the data. Do percentages of some types of pollen change over time? Do some disappear altogether? Do some appear?

□ Learn about the climate (temperature and moisture) that each pollen type requires by reading the information on the Plant Characteristics Table. Do you notice changes over time in what types of plants are represented?

### Construct a scientific argument

1. Using your data from the graph and the science ideas you have learned about, write a scientific explanation to answer the driving question: *What was this climate like in this region over the past 12,500 years?* Develop your scientific explanation by writing your Claim, Evidence, and Reasoning in the graphic organizer below.

|  |  |
| --- | --- |
| Claim:  |  |
| Evidence  | Reasoning:  |

### Peer review of scientific explanation

1. Share your scientific explanation with a partner from another group. Each of you will state your claim and explain your evidence and reasoning. Provide feedback on each other’s scientific explanation. You can use the rubric provided below to help you evaluate the explanation.

### Construct a scientific argument

1. After receiving feedback and modifying your scientific explanation, write your final scientific explanation in your science notebook.

Read the following passage and answer the discussion questions.

**Climate Change Past and Present**

Why is current Climate Change a Problem?

You have probably heard that our climate is changing. Maybe you talked about it in school or heard about it on the news or from your friends and family. And you just learned from your investigation that the climate in Maryland has changed over the past 12, 500 years. So, if Earth’s climate has changed before, why are we so worried about current changes to climate? There are several very important reasons. First, our climate is changing at an incredibly fast rate, much faster than has happened before. Secondly, people are the cause which means we can do something about it. Humans are releasing large amounts of CO2 into the atmosphere when we burn fossil fuels which we use to run our cars and to produce electricity to run our homes and factories. Since CO2 is a greenhouse gas more CO2 in the atmosphere means more heat is trapped, causing our planet to warm. Thirdly, we know that changing climates can have all sorts of consequences, including increases in extreme weather events, like hurricanes and tropical storms in addition to changing the types of plants in a forest if the change occurs very, very slowly. Changing climate can also affect how we produce food since plants grow best under certain conditions and climate change will alter the local conditions. For example, changes in climate can affect the presence of pollinators, such as bees, which can in turn affect the types of food that farmers can grow.

What can we all do about Climate Change?

Scientists all over the world are working to address issues of climate change and reducing the amount of carbon dioxide in the atmosphere. Some are studying ways to decrease the amount of carbon humans release into the air (by building hybrid and electric cars, or working to capture wind and solar power). Others are trying to find ways to reduce the amount of CO2 that is already in the atmosphere (by planting more trees that will absorb carbon dioxide).

You can do your part by reducing your carbon ‘footprint’. That is, you can reduce the amount of carbon dioxide you release into the air by saving energy all the time. You can ride your bike instead of asking someone to drive you, support alternative fuel sources such as solar and wind power, you can help recycle items rather than toss them into the trash, you can help plant trees near your home. You can also become a scientist and work with other scientists to solve the problems associated with our changing climate.

**Discussion Questions**

15. Why is our climate changing so quickly now?

16. What are the effects of the rapid rates of climate change we are currently experiencing?

17. How would you respond if you heard someone say *“I heard that the climate has changed before and this current climate change we are talking about is just like that. So, we don’t have to be worried. It’s the same thing.”*