Education on Climate Archives

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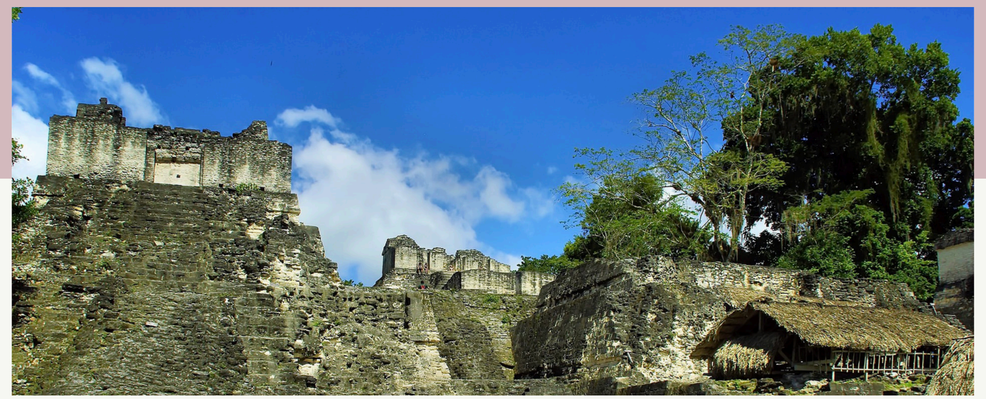
Background Information

- Goal: teach k-12 students about climate change and computational thinking synergistically
- This activity teaches kids about climate archives
  - Records which scientists look at to understand the past climate
- Students do a case study on speleothems, which are found in caves and are used to show precipitation levels
  - Case study is of the precipitation levels at the end of the Maya classic period

- Learned: important to think of creative, interdisciplinary ways to teach students and present information
- Challenges: coding the game, making the website instructions clear to student and in an order that makes sense
- Went well: creating the design for the website and game



01.

ARCHIVE INTRODUCTION

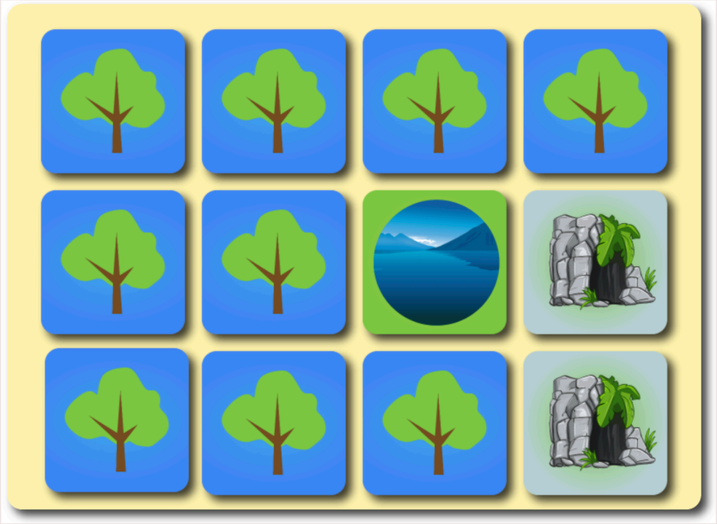
Introduction to Climate Archives

We will be using climate archives here to investigate what the climate was like for the Maya at the end of the Classic period. Why the Maya Classic period ended has been debated a lot by archaeologists and earth scienctists. To introduce yourself to climate archives and learn more about what they are and what types of questions they can help scientists answer, click the button below and play the climate game. Following playing the game, answer the questions below.

CLIMATE ARCHIVE GAME

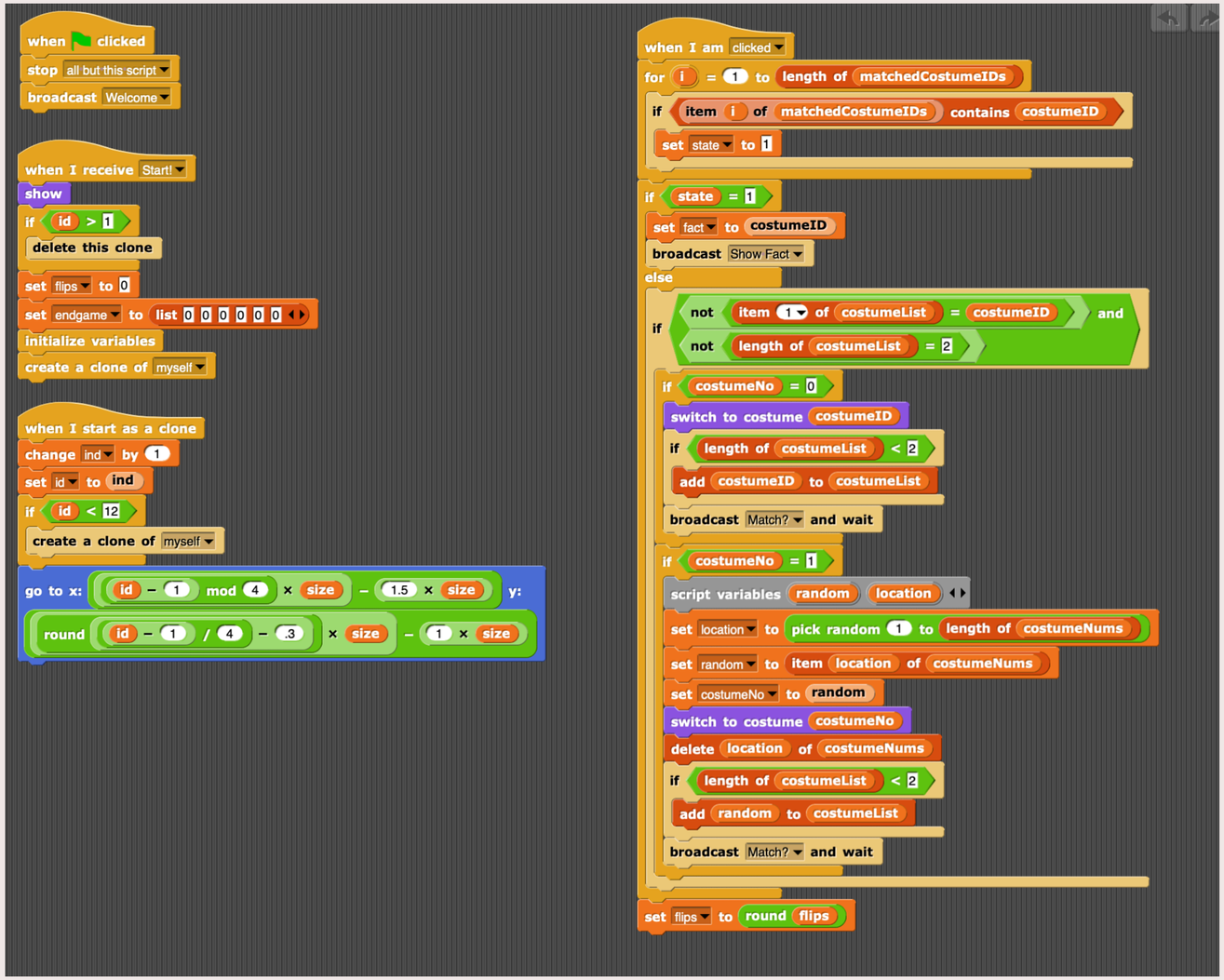
Discussion Questions:

1. What are climate archives?
2. What is a speleothem and how do they grow?
3. What are two other examples of climate archives and how do they work?
4. Optional: Make a flow chart of the code for the coding game by analyzing how you think it works.



1. Climate Archive Matching Game

- Students are introduced to the concept of climate archives
- Matching game contains information on some of the most common archives
- Students answer questions following the game and can also choose to make a flow chart of the game code



Code of the Game

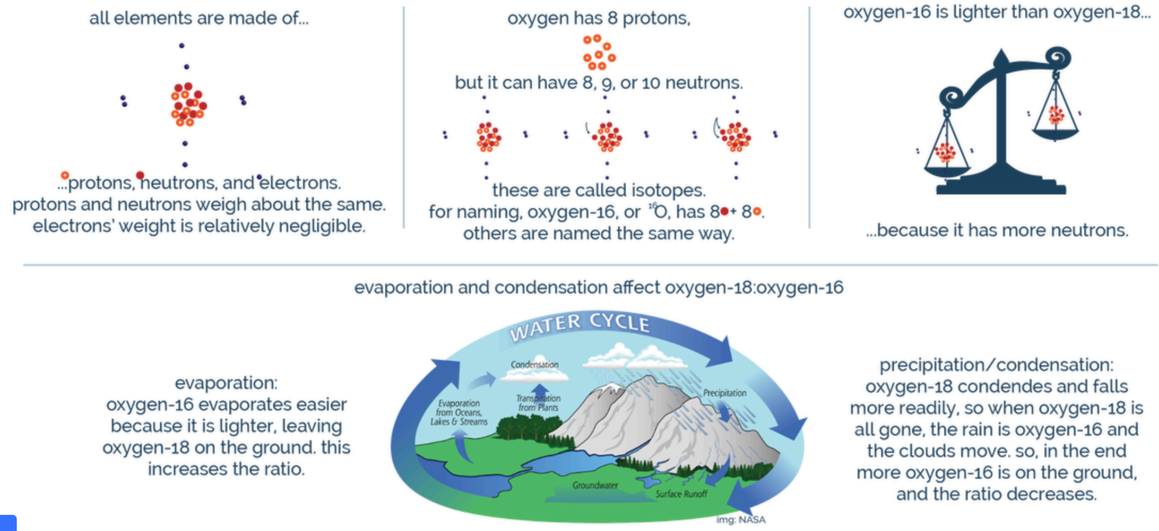
- Game was made in NetsBlox with block-based coding
- Each tile is cloned then assigned a number which determines its state as it goes through
  - i.e. been flipped over once, never flipped, already matched
- Each tile also has a number indicating what its identity is
- The background changing is what shows and reveals facts

2. Students graph and analyze

- The students start out by reading background information
- They go through an activity where they graph data from a past study in excel
- In groups or individually they answer discussion questions

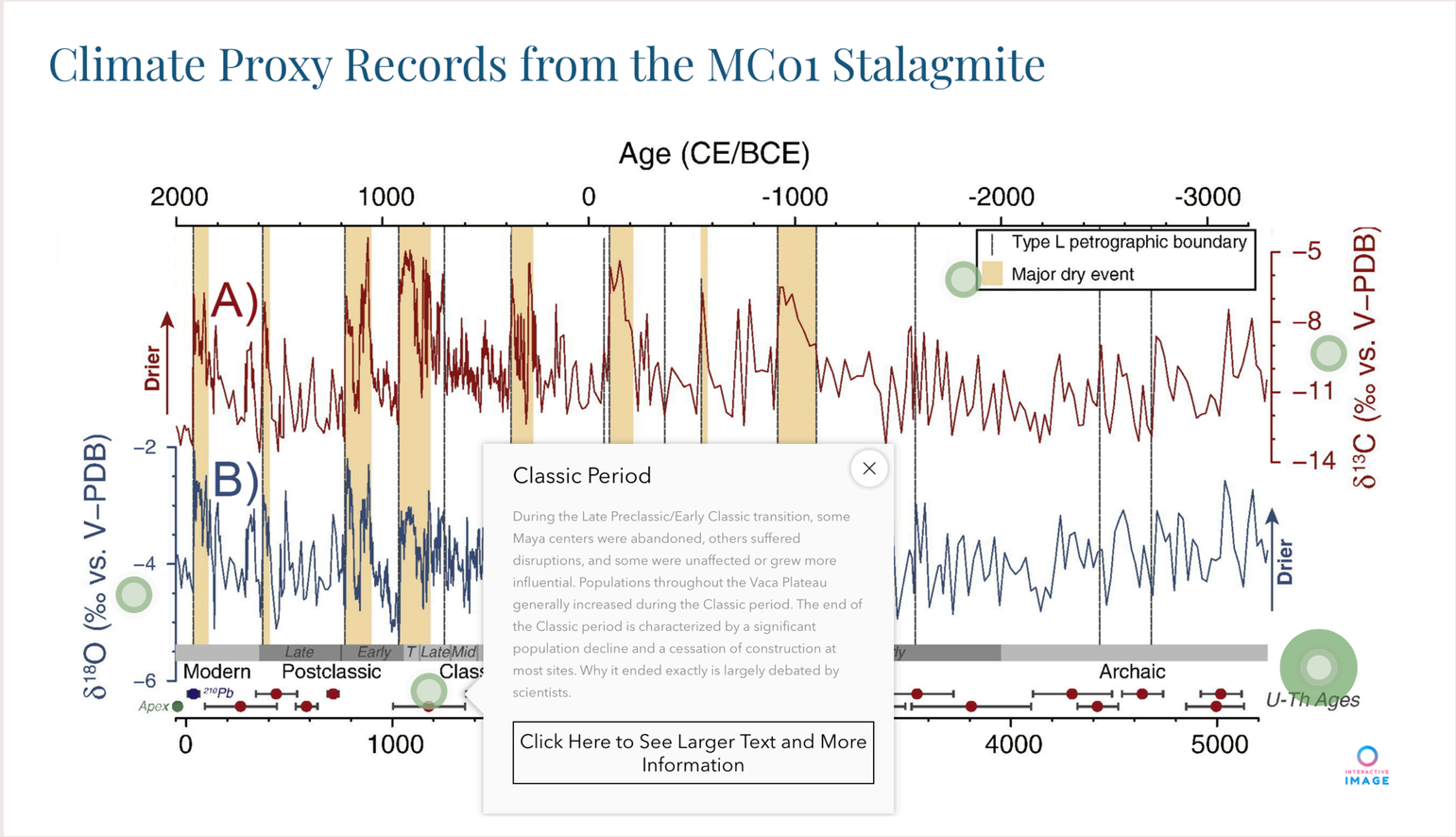
What is an oxygen isotope and why do they matter?

The two stable oxygen isotopes found in water are 18O and 16O. What this means is that they have 18 and 16 neutrons, respectively. Neutrons are relatively heavy in an atom, so the 18O isotope is heavier than the 16O isotope. It takes energy to energize water molecules to convert them from the liquid state to the vapor sate. Because the 18O isotopes are heavier, it takes more energy to convert them to the vapor state. So, when the 18O/16O ratio is high, there is more 18O. This means that the precipitation is relatively higher because more 16O would have gone away easier. See the graphic below for further explanation.



3. Students compare to “another scientist”

- Begin by examining a graph from another study by reading annotations
- Students then graph both the data from their study and this one to examine for overlap
- Discussion questions from this section include ones leading to applications of how archives can be used to identify other climate events



questions?