Cool Science! Ice core data and climate change.

Objective
Students will measure and analyze ice core photos
Students will read an infographic to extract information
Students will participate in group discussion
Students will write a reflection in response to question prompts

Materials
iPads with ice core photos or actual simulated ice cores
Millimeter rulers or digital calipers
Chart paper or white board
Markers

Engage
Ask students what they think of when they think of the coldest places on earth.(possible answers include, the North and South poles, glaciers, winter, mountaintops, Greenland, Iceland, Siberia, a freezer)
Make students' thinking visible by writing their answers on chart paper or whiteboard with colorful markers.
Ask students how they think scientists might study ice and snow in those places. (Keep the conversation brief and respect their answers, however naive)

Explore

Briefly explain the concept of ice cores as you show the photos uploaded to the iPads.

What do students notice about the layers? (they are different colors, different widths)

Invite student groups to use the rulers or digital calipers to measure the layers of the ice cores.

Each layer represents a season of snowfall.

Point out the layer with the bubbles. Briefly explain that air gets trapped in the snow and ice that preserves information about the atmosphere at the time the snow fell.

Scientists can extract and analyze this air to learn about the gasses in the atmosphere, like oxygen and carbon dioxide. This can help them understand the climate in the past.

By understanding past climate, scientists can try to understand how present conditions might change in the future.

Words you can use
Ice core: a sample extracted using a special drill. Layers represent seasons

Cryosphere: all the ice on Earth

Proxy Data: data collected from ancient deposits like sediments or ice cores that can give us information about the past even though we weren't there to observe directly.

NGSS Standards Alignment
https://www.nextgenscience.org/pe/5-ess2-1-earths-systems

Extend

Here is a link to an article with a nice infographic that teachers can use for close reading after the event.

http://www.compoundchem.com/2017/08/15/ice-cores/

Here is a link to a video teachers can use to introduce or wrap up

https://www.youtube.com/watch?v=teoxnHkcULA

Here is a list of question prompts for teachers to use with the follow up activities:

What is proxy data?

How do scientists use proxy data from ice cores?

What kinds of analysis can scientists do on the air trapped in ice cores and how can they use what they find?

What kinds of predictions can scientists make using climate data from the past? How might they generate these predictions?

What are some other kinds of proxy data scientists might use? Could they use other data to support the data from ice cores?

Here is the link to the lesson as it looks published on my blog for my subscribers

https://www.patreon.com/posts/17642270
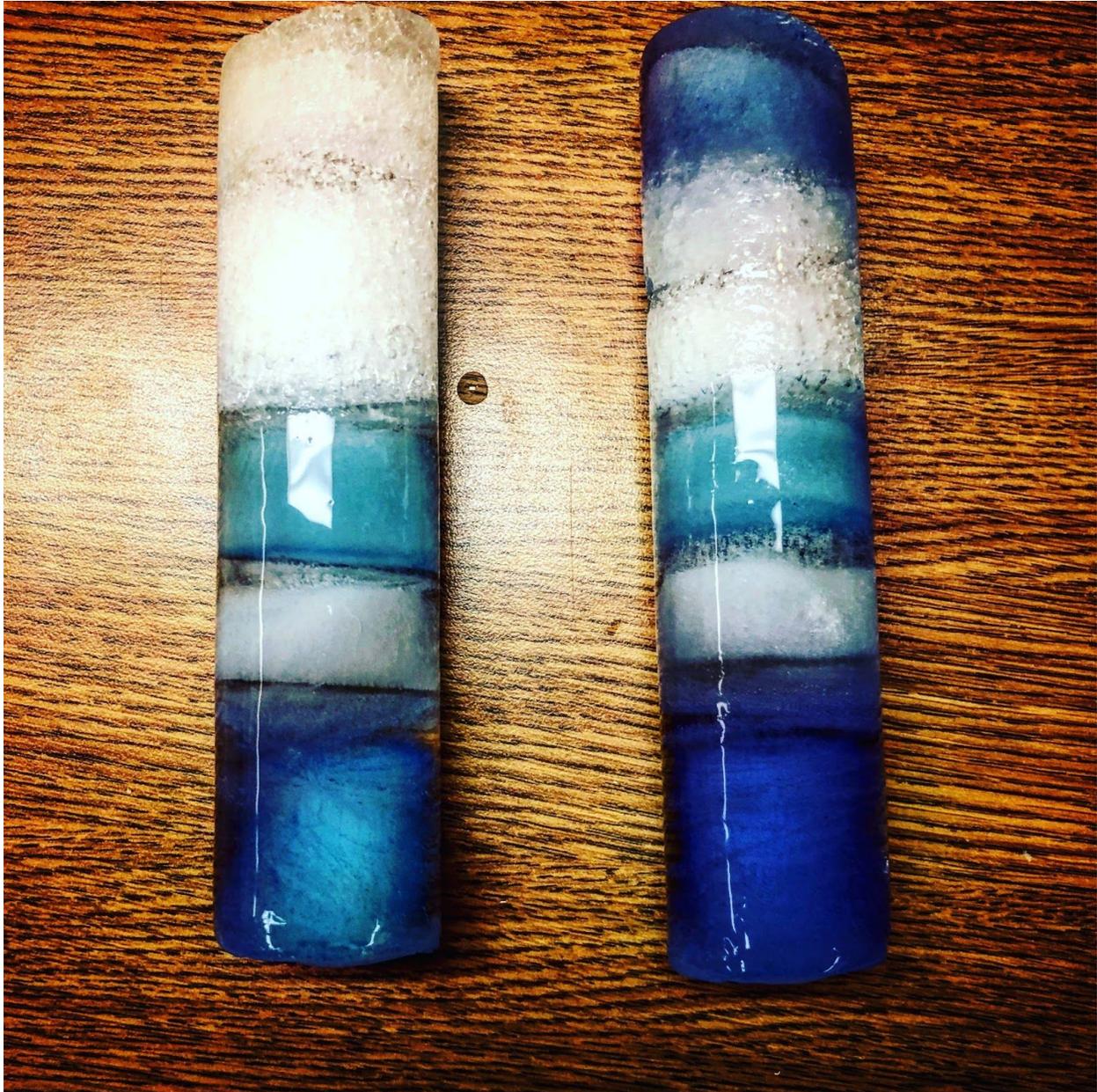
Here are the ice cores we made

Image Credits in order of appearance:

https://bpcrc.osu.edu/sites/bpcrc.osu.edu/files/styles/full_width/public/20150504_142104_0.jpg?itok=3mdInNdW