

Lab #11: Meteorology 2 (Chapter 7)

Ice Cores

INTRODUCTION:

The objective of this lab is to help students visualize and consider the implications of an ice core.

MATERIALS

- A Pringle's® can
- 100 mL measuring cylinder
- Cold water
- Cold water with approximately 1/4 cups of cocoa and sugar dissolved in it
- Chocolate chips
- Gummy worms/insects/bears/fruit
- Freezer

METHODS

1. Add 110 mL of cocoa water to the Pringle's can. Allow the water to completely freeze, and mark on the outside of the can the height of the ice.
2. Add 60 mL of water. Allow the water to freeze, and mark its height on the outside of the can. [NOTE: If you find that the previous layer was not completely frozen before creating your second layer, continue the experiment, anyway.]
3. Add 60 mL of cocoa water and add chocolate chips. Allow the layer to freeze, and mark its height on the outside of the can.
4. Make six more layers of frozen liquid with varying levels of cocoa water (60-110 mL each). Also vary which layers have chocolate chips and/or frozen candies. Freeze and mark each layer. [Again: If you find that the previous layer was not completely frozen before creating your second layer, continue the experiment, anyway.]
5. Once the final layer is frozen, peel off from the "ice core" the Pringle's can to examine the "ice core."

RESULTS

1. Take a picture of your ice core.
2. Draw a diagram of the ice core or copy/paste a digital image of your ice core onto a Word document. Beside the ice core picture, sketch what you "find" in each layer, and label your findings beside your diagram. Label your findings based on what they represent in reality.



CONCLUSIONS/DISCUSSION

1. Is the top layer the youngest or oldest layer?
2. Why might the second layer be “uncontaminated” in nature?
3. What does a single layer in the ice core represent?
4. What do the differences in layer thicknesses represent?
5. What does the cocoa water likely represent? What would the climate/environmental conditions possibly be like to explain such layers?
6. What do the chocolate chips and frozen candies represent? What conditions would be necessary to cause layers to form with rocks, animals, and plants (keeping in mind that not all ice core layers necessarily contain such things)?
7. Given your answers to numbers 1-6, discuss what you can learn about the “climate” conditions that likely would have been in effect to form the specific layers found in your ice core (e.g., their thicknesses and content).
8. Why would layers in an ice core be so visually distinct from one another? What conditions would cause such distinctive layers to form?
9. What might cause less distinctive layers to form (e.g., two layers that blend into one)? Did your ice core exhibit less distinctive layers? If so, what caused them?
10. Are there conditions you could envision that would cause multiple sub-annual ice core layers to form?
11. How might added weight from upper layers in a glacier affect the lowest layers of the glacier and, therefore, an ice core?

[Lab inspired by “Polar Science Experiment: How to Make Edible Ice Cores,” <https://www.sea.museum/explore/apps-and-games/kids-craft/arts-and-crafts/polar-science-experiment-how-to-make-edible-ice-cores.>]

