Life Cores

How do we know what we know about the science of ice cores?

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Life Cores

Photo Credit: Julia Dooley

Preview

By building a personal "life core," students are introduced to some of the techniques and vocabulary used by scientists as they study ice cores.

Background

Anything that is airborne in Earth's atmosphere- including dust, sea salts, volcanic ash, soot from forest fires, and radiation from nuclear bombs and tests can be deposited on the ice sheets in Greenland and Antarctica. Over hundreds of thousands of years, layers build up and trap those remnants plus air bubbles from past climates. Climate scientists can "read" the particles like a history book to understand the story of Earth's climate and atmosphere.

Ice cores are providing evidence of past climates and are helping scientists predict how fast and how much sea levels can rise when ice melts. This is significant because most of Earth's human population lives near coastlines.

Materials

1-2' x 2" clear plastic tube (stores selling home building materials have these for covering fluorescent light tubes)

2-2" PVC caps

Variety of materials chosen by the student like small toys, tickets, shells, fossils, rocks, etc.—anything representing important things in their everyday life

Paper or cloth pieces to make the layers

Key Concepts

1. Recent history is at the top of an ice core and deeper layers record older periods.
2. Scientists use tools like core logging sheets to record their observations.
3. Color, texture, deposition rates are some of the characteristics researchers use when making visual observations of ice cores.
4. Some layers are thicker than others because the deposition rate (how much snow is deposited) varies from season to season and year to year.
5. Repeated patterns in depositional layers can indicate cyclicity.

Activity Directions

1. Students will choose a time period to represent in their Life Core model. It could be the past week or month, or it could be their entire life. The most important thing to remember is that the top of the Life Core is the most recent time, and each deeper layer represents an earlier time in their life.

2. Materials should be gathered and organized to represent important times in the student's life.

3. Place one PVC cap on the bottom of the plastic tube.

4. Draw an arrow on the side of the plastic tube pointing toward the top and write the word "up" at the end of the point on the arrow. (Scientists carefully mark the direction the core was in the ground.)

5. Students will layer the materials in the plastic tube starting with the oldest layer first and adding each newer layer on top of the one before. (Students can also keep a journal of events represented in their Life Core just as scientists record notes while collecting data and making observations.)

6. When the Life Core is complete, place the second PVC cap on the top of the tube.

7. Students exchange Life Cores and use core logging sheets to make observations of each other's life cores noting layers, textures, recognizable objects and deposition rates. After making their observations, each student will write a paragraph about the other student's Life Core drawing conclusions from the evidence observed. They should compare their conclusions with other students who also observed the same Life Core. Would they need more information to feel that their conclusions were accurate? Scientists look at the evidence in ice cores from many different disciplines and from many different points of view. They meet together and discuss their results before they publish their conclusions.

Next Generation Science Standards (NGSS) Alignment

Science and Engineering Practices

- Developing and Using Models
- Analyzing and Interpreting Data
- Using Mathematical and Computational Thinking
- Constructing Explanations
- Engaging in Argument from Evidence

Crosscutting Concepts:

- Patterns, Similarity and Diversity
- Scale, Proportion and Quantity
- Stability and Change

Disciplinary Core Ideas:

- ESS1.C-history of planet Earth
- ESS2.A-Earth's materials and systems
- ESS2.B-Large-scale system interactions
- ESS2.C-Roles of water in Earth's surface processes
- ESS2.D-Weather and climate
- ESS3.C-Human impacts on Earth systems

Photo: Julia Dooley

Life Core Description

Observer's Name: _____

Age Scale

Directions:

1. Observe the Life Core carefully.
2. Make a graphic representation of the layers of the Life Core in the rectangle.
3. Note colors and repeated layers.
4. Create an "age scale" on the lines to the left of the Life Core graphic. What are the observable clues that help you create this scale?
5. Write a paragraph below describing what you have observed about this Life Core.
6. Compare your observations to those of others who observed the same one. Can you add to your description, graphic, and age scale after sharing ideas with your colleagues?

Life Core Description: