15 History of Earth's Atmosphere

INVESTIGATION

Today, Earth's atmosphere is a mixture of gases that includes nitrogen, oxygen, and water vapor. But Earth is more than 4.5 billion years old, and a lot of changes have happened in that time.

Atmospheric scientists and climatologists sometimes drill deep into Earth's surface to collect layers of ice and rock, as shown in the photo below. These layers provide information about what Earth's atmosphere was like hundreds of thousands of years ago.

GUIDING QUESTION

Has Earth's atmosphere always been the same as it is today?

MATERIALS

For each pair of students

1 set of 8 Atmosphere Cards

PROCEDURE

1. With your partner, carefully read the information on each Atmosphere Card.
2. Work with your partner to place each card in order from oldest to most recent.
3. Compare how you ordered your cards with the way the other half of your group ordered them. Discuss similarities and differences in your arrangements.
4. With your group, work with one set of cards to place the cards in an order you all agree on, from oldest to most recent.

   Remember to listen to and consider the explanations and ideas of other members of your group. If you disagree with others, explain why you disagree.
5. In your science notebook, create a table like the "Earth's Atmosphere Through Time" table below, and record your final order for the Atmosphere Cards. Complete the table by writing down information about the gases in the atmosphere and important events during that time.

Earth's Atmosphere Through Time

Card	*Gases present in the atmosphere (and percentage, if listed)*	*Important date and event*

ANALYSIS

1. Look carefully at your completed table.
   a. How has the amount of carbon dioxide gas in the atmosphere changed over Earth's history?
   b. How has the amount of oxygen gas in the atmosphere changed over Earth's history?
2. **Revisit the issue:** What effect have living organisms (including people) had on the composition of Earth's atmosphere? Support your answer with examples from this activity.
3. **Revisit the issue:** Do you think that the atmosphere will have different amounts of oxygen and carbon dioxide in the future? Explain your reasoning.