

## CLASSROOM ACTIVITY

# Storing CO<sub>2</sub> to Protect the Climate

What are humans to do with the billions of tons of carbon dioxide we release into the atmosphere? Since 1996, an experiment in the North Sea has been injecting millions of tons of excess carbon dioxide captured from natural gas drilling back into the Earth for safe storage. The technology is gaining ground as a viable innovation to help combat climate change.

## CLASS DISCUSSION

### Establish Prior Knowledge

Discuss carbon dioxide with students. Elicit that carbon dioxide occurs naturally and is found deep underground in rocks and sediments. It is also found in oceans, in the atmosphere, and in living organisms. It is emitted when fossil fuel is burned. Call upon students to describe the carbon cycle. (Plants use sunlight and carbon dioxide to grow. Plants are eaten by animals. When the animals breathe they release carbon into the atmosphere. Decaying plant matter also produces carbon as does burning fossil fuels.) Ask:

- What happens when the carbon cycle is out of balance and more carbon dioxide is released than can be absorbed by plants? (*Answers may include: The carbon dioxide builds up in the atmosphere trapping heat and creating a greenhouse effect. This contributes to global warming.*)
- What are some of the steps being taken to reduce the emission of carbon dioxide? (*Answers may include: People are reducing their consumption of fossil fuels and looking to new sources of energy, such as solar energy and wind energy.*)

Explain to students that in the video they are about to see a company exploring for natural gas finds a way to prevent carbon dioxide from being released into the atmosphere.

### Exploration

Have students watch the video and take notes. Use the following questions to guide a class discussion.

- What problem did the company face? (*Answers will include: The natural gas they were extracting was mixed with carbon dioxide. They needed to remove the CO<sub>2</sub> before selling the gas, but they didn't want to release CO<sub>2</sub> into the atmosphere.*)
- What plan did the company come up with for sequestering the CO<sub>2</sub>? (*Answers may include: They separate the CO<sub>2</sub> from the natural gas and pump the CO<sub>2</sub> down a thousand meters below the ocean floor where it is injected at the bottom of the sand layer. There it collects between the sand grains. Eventually all the CO<sub>2</sub> will dissolve into the water between sand grains and then settle on the bottom of the sandstone layer.*)
- Scientists are looking at other areas around the world where CO<sub>2</sub> could be sequestered. What are scientists doing to determine whether these sites are suitable for CO<sub>2</sub> sequestration? (*Scientists are conducting experiments in which samples of sandstone are injected with artificial CO<sub>2</sub> and exposed to the same pressure and temperature of a CO<sub>2</sub> underground storage location.*) What have they found? (*Answer: Over time, the CO<sub>2</sub> injected into the sandstone turns into rock, trapping the CO<sub>2</sub>.*)

### Wrap-Up

Do you think that CO<sub>2</sub> sequestration on a large scale is a viable solution for the problem of CO<sub>2</sub>? Why or why not? (*Answers will vary*)

### Extend

Students who would like to read more about carbon capture and storage can visit this page on the AMNH Climate Change website: <http://www.amnh.org/exhibitions/past-exhibitions/climate-change/a-new-energy-future/fossil-fuels-carbon-capture-and-storage>