"Trapped"

Purpose: This activity helps participants visualize how CO_2 becomes trapped in the atmosphere.

Materials Needed:

- 2 10" squares of hardware cloth with duct tape around edges
- Pipe cleaners

Procedure:

- Explain that the hardware cloth is a representation of CO_2 in the atmosphere. There is only a little bit of wire in the hardware cloth, which corresponds to the fact there is only a little bit of CO_2 mixed with other gases in the atmosphere.
- The pipe cleaner represents light coming from the sun. The light coming from the sun has a short wavelength, which is represented by the small, horizontal "fuzzies" on the pipe cleaner.
- With one volunteer holding the hardware cloth (the representation of CO_2) horizontally, pass the pipe cleaner through the cloth. It easily goes through.
- Explain:
  - Once the light travels through the atmosphere and hits the Earth, only some of it is reflected back up as light (with the corresponding short wavelength). The rest of it is absorbed by the Earth and radiated as heat. (Think about how hot the ground feels on a sunny day.)
  - This heat has a wavelength that is much longer than light's wavelength.
- Take a pipe cleaner and bend it into a zig zagging spring. These zig zags represent the longer wavelengths of heat.
- Keeping the hardware cloth (CO_2 in the atmosphere) horizontal, try to push the pipe cleaner spring through the cloth. The wavelength is much longer, so much of the heat gets trapped between the atmosphere and the ground.
- Discuss and experiment: If you add another piece of hardware cloth, is it easier or more difficult for the heat to escape? Why?
- What does this experiment show about the effects of extra CO_2 in the atmosphere?

Adapted from:

Hovorka, S., Hotinski, R., Friedmann, S. (Eds.). (2005). Proceedings from Fourth Annual Conference on Carbon Capture and Sequestration DOE/NETL: *Audience-Pleasing Physical Models to Support CO_2 Outreach*.

