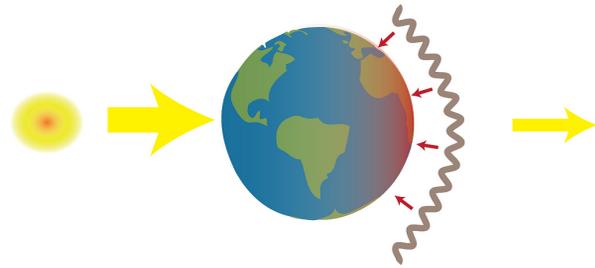




The Greenhouse Effect

Activity

Why is there currently life on Earth but not on Mars? One reason is the greenhouse effect. To maintain a livable temperature, some of the thermal energy released into the atmosphere needs to stay and some needs to transfer into space. Gases in Earth's atmosphere form a barrier to keep some thermal energy from transferring into space.



Procedure

1. Find the slit precut by your teacher to cut the top off of 2 plastic bottles.
2. Pour 150 mL of sand into each bottle.
3. Layer 3 green leaves into each bottle.
4. Pour 50 mL of water into each bottle.
5. Tape a thermometer to the inside of one bottle. Make sure the thermometer does not touch the leaves, water, or sand. Set that bottle aside.
6. Cover the top of the second bottle with the top that was previously cut off. Fold the edges in some. Secure with clear tape.
7. Place plastic wrap over the mouth of the bottle and secure it with a rubber band.
8. Poke a thermometer through the plastic wrap so that the bulb is inside the bottle but does not touch the leaves, water or sand. Use tape to hold it in place and to seal any air leaks around the thermometer.
9. Create a data table, and record the temperature of each thermometer.
10. Position the lamp to shine on the sides of the bottles. Place each bottle 20 cm from the lamp. Adjust the bulb so that it is shining equally on each bottle.
11. Turn on the lamp for 10 minutes.
12. After 10 minutes, record the temperature of each thermometer.



The Greenhouse Effect

Activity, continued

13. Answer the following.

- a. Compare the temperatures of the two bottles.
- b. Did the two bottles receive the same amount of thermal energy?
- c. Why was the temperature different?
- d. How is Earth's atmosphere similar to a greenhouse?
- e. What would Earth be like if the greenhouse effect did not exist?
- f. The gases that form the barrier are called greenhouse gases. Think about what is in the bottle. What are some of the greenhouse gases?
- g. Predict what would happen if the greenhouse gases caused too much thermal energy to remain in the atmosphere.
- h. Draw a diagram of the setup, and label the incoming sunlight and the thermal energy in each of the bottles.
- i. Draw and label a diagram showing how thermal energy that enters the atmosphere is transferred into space (reflected), absorbed, and trapped in the atmosphere.