

Gases in Glasses

Adapted from *Eco-Fun* by David Suzuki & Kathy Vanderlinden and the Nature Challenge for Kids
website: <http://www.davidsuzuki.org/kids/>

Purpose and Explanation:

Scientists believe that the Earth is getting warmer. This experiment compares how two jars (one sealed and one with air circulating) heat up, illustrating the greenhouse effect.

Hypothesis: Will one jar heat up faster than the other? Which one will heat up the most? Write your hypothesis in your notebook.

Materials (for each group):

- 2 large glass jars of the same size
- 2 pieces of dark paper or cloth
- 1 jar lid (you may need to create a small hole in it so the thermometer will fit in the closed jar)
- Oven mitts or paper towels to safely handle hot jars.
- 2 thermometers
- A notebook and pen/pencil

Procedure:

1. Lay the jars on their sides outdoors in the sun. Put a piece of paper or cloth inside each jar to cover the side of the jar on the ground.
2. Place a thermometer in each jar on top of the dark paper or cloth. This will help you read the thermometers through the glass.
3. Put the lid on one of the jars. Turn the jars so that their tops face away from the sun. Then read the temperatures in both jars and write them down in your notebook.
4. Watch the jars. Record the air temperature every minute in a table similar to the one on the next page. If one thermometer gets close to the top of the scale, take a final reading and take the jars out of the sun and remove the thermometer. Otherwise, the thermometer could break. If the fluid in the thermometer does not reach the top, keep recording the temperatures for 15 minutes.



Results

Table 1: A comparison of the temperature of a jar with a lid, and a jar without a lid at one-minute intervals.

Minute	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Temperature With Lid in °C																
Temperature No Lid in °C																

Discussion

- Create a results table for the entire class and have each group record their results on it. Calculate the average result for each jar at 5, 10 and 15 minutes.
- Which jar got hotter than the other? Why do you think it did?
- How much hotter did it get? How long did it take?
- Was there a difference between your results and others in your class and the class average? Why do you think that was? Would you make any changes in the experiment next time to avoid this?



Explanation

The jar with the lid on traps heat rays inside the jar. Light rays easily pass through the glass into the jar, but heat rays can't easily pass through the glass and get out. The layer of greenhouse gases, like carbon dioxide (CO₂), building up around the Earth acts much as glass does. The layer allows the light in but prevents the heat from leaving. Carbon dioxide from car exhaust, factories and power plants is accumulating in the earth's atmosphere and causing the greenhouse effect. This is changing the Earth's climate and also harms the air we all breathe.



Trees help remove carbon dioxide from our air, but we're cutting down too many forests. By walking or biking to school and other local destinations as well as planting more trees we can stop the build-up of carbon dioxide in our atmosphere.

Extensions:

Research what is in our air. Has it changed in the past 200 years because of greenhouse gases? **See who can build the best greenhouse!** Have a lunch box greenhouse building contest. Check <http://www.saferoutestoschool.ca/index.php?page=iwalkclub> for the lesson plan/lab handout.

Think Smart, Do your Part - Take the Nature Challenge The David Suzuki Foundation has come up with 10 of the easiest, most effective things ANYONE can do help conserve nature, reduce the greenhouse effect and improve our quality of life. See <http://www.davidsuzuki.org/kids/> for more information.

Learn more about Climate Change: See: <http://www.climatechange.gc.ca/onetonne/english/> You will find information about the science of climate change and about actions Canadians are taking on the issue. The site has reports, games, videos and a climate change calculator.