

Science in the Natural World

Objective: Explain the goal of science is knowledge about the natural world

Introduction: Although many gases in the atmosphere have little effect on weather patterns there are some that have a significant effect on the weather that we experience. Carbon dioxide is one of the gases that do affect weather. This gas has the unique characteristic of absorbing the heat sent to the Earth from the Sun. This helps keeps the Earth warm for life to exist. Carbon dioxide occurs naturally causing the greenhouse effect. The problem starts when humans artificially add higher amounts of carbon dioxide and other greenhouse gases into the atmosphere than is needed to maintain a natural balance. This happens through the burning of fossil fuels (or greenhouse gases), and is causing the Earth's temperature to rise in an enhanced greenhouse effect.

Quick Fact: The Greenhouse gases (GHGs) include water vapor (H₂O), carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), halocarbons (HC), ozone (O₃). Source climatechangeconnection.org

Curriculum Connections:

Students will describe examples of natural phenomena and processes such as weather that illustrate the properties of gases.

Supplies / Materials:

- Properties of Gases video
- Erlenmeyer 250 mL flasks
- Balloons
- Ice water
- Hot plate



SCIENCE FOCUS

Lesson Subject

Chemistry 20

Topic

Gases

Location

Classroom

Length

50 minutes



Hook: As a class go online and look up the weather of your community on different sites such as *The Weather Network* and *Environment Canada*. What can you gather from this data collection?

Intro Activity: In the computer lab, or on laptops access the "properties of gases video" watch through and take notes. After watching the video complete the quiz.

Link: <http://study.com/academy/lesson/the-kinetic-molecular-theory-properties-of-gases.html>

Main Activity: Balloon and Flask Experiment

Key concept: When the temperature of a gas is increased, its volume will increase.

Place 10 mLs of water in an Erlenmeyer flask. Stretch an un-inflated balloon over the mouth of the flask (250 mL flask). Place the flask next to a hot plate with a thermal oven glove so that students can move the flask easily from the hot plate to the ice water. Students will see how an increase in temperature can cause an increase in the volume of a gas.

Place the flask on a hot plate and let the water boil.

Conclusion / Review:

- 1) What happens to the balloon? Why?
- 2) What happens to the balloon when you put the flask in a beaker of ice and let it cool? Why?

Homework: In your science lab journal review our experiment. How does a temperature increase in a hot air balloon relate to increased temperature in our community?

Resources:

- 1) <http://study.com/academy/lesson/the-kinetic-molecular-theory-properties-of-gases.html>
- 2) <http://www.arborsci.com/cool/chemistry-gas-laws-smorgasborg>
- 3) Environment Canada https://weather.gc.ca/city/pages/nt-8_metric_e.html
- 4) The weather network <https://www.theweathernetwork.com/ca>