



Carbon Dioxide Emissions

Grades 3-5

Lesson Summary

Students will illustrate the different amounts of CO₂ emission made by people all over the world. Students will also learn about what human activities cause the production of CO₂ in our atmosphere.

Prior Knowledge & Skills

- The CO₂ cycle
- Effects CO₂ has on our atmosphere

AAAS Science Benchmarks

The Mathematical World

Symbolic Relationships

Common Themes

Models

NSES Science Standards

Science as Inquiry

Abilities necessary to Do Scientific Inquiry

Science in Personal and Social Perspectives

Changes in environments

NCGE Geography Standards

Environment and Society

Standard 16

Teaching Time: 60-90 minutes

Materials

- 30 black balloons
- Engaging displays for different continents (e.g., flag, or travel posters, or symbols such as football helmet, beret, serepe)

Advanced Planning

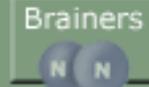
Preparation Time: ~10 minutes

1. Review the instructions
2. Gather the necessary supplies.

Recommended Reading:

- Green House Gas explanation sheet: See the Too Cool for School Greenhouse experiment.

This activity is provided courtesy of WestEd from the website <http://www.guidetoscience.net> associated with the book "Dr. Art's Guide to Science." You can also view an expanded, animated version of this activity at: http://www.guidetoscience.net/cs/drart/view/drart_res/34



Carbon Dioxide Emissions

Background: *Dr. Art's Guide to Planet Earth*, pages 106-111.

Purpose:

Many of the things that we do increase the emissions of carbon dioxide into the atmosphere. Whenever we burn a fossil fuel to drive our car, heat our homes, make hot water, or provide the electricity used by our television or other electrical devices, we take carbon that was previous locked out of today's carbon cycle and inject it into the atmosphere. Other industrial activities, such as manufacturing cement, emit significant amounts of carbon dioxide. This exercise dramatically illustrates the different amounts of carbon dioxide emission made by citizens in different countries.

Be sure to check out the animation of CO₂ emissions by population for the world on:

http://www.guidetoscience.net/cs/drart/view/drart_res/34

Equipment and Supplies:

A group of at least 19 people; 30 black balloons; Engaging displays for different continents (e.g., flags, or travel posters, or symbols such as football helmet, beret, serape)

Duration:

Demonstration Mode- 15 minutes

Procedures: Demonstration Mode

1. Explain that many societal activities result in the emission of carbon dioxide into the atmosphere. Distinguish between this industrial emission and the respiration/photosynthesis cycle. Elicit comments about whether different lifestyles would result in different amounts of carbon dioxide emissions.
2. Select 19 students to represent the entire world population. Divide the group into five sub-groups (see chart below).
3. Distribute 30 black balloons among the groups using the chart below.
4. Have participants discuss the results. If necessary, ask leading questions such as, "What would be the effect of everyone in Asia living like a North American?"

AREA	POP. %	#/19	BALLOONS
AFRICA	17%	3	1
EUROPE	12%	2	8
NORTH AMERICA	5%	1	8
CENTRAL + S. AMERICA	9%	2	2
ASIA	56%	11	11

Procedure: Inquiry Mode

Same as above except provide world population tables, carbon emission tables, and balloons. Have participants work in groups to decide how they will depict the information. Have the groups share their ideas. If necessary, include the damo mode as one way of representing information.