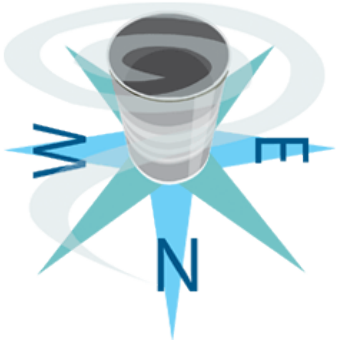
Catch the Pollution
Written by GEF Staff



Grades: PreK-2
Subject: Science, Social Studies, Language, Arts
Time: 30-45 minute lesson session and observation for one week

*** Standards:**
Science Standard 10: Understand force and motion.
Benchmark # 1: Know the effects of forces (e.g., wind) in nature.

Science Standard 12: Understand the nature of scientific inquiry.
Benchmark # 1: Know learning can come from careful observation and simple experiments.
Benchmark # 2: Know that tools (e.g., magnifiers) can be used to gather information and extend the senses.

Technology Standard 3: Understand the relationship among science, technology, society and the individual.
Benchmark # 3: Know that man-made materials, products and systems can have an adverse effect on the environment.

Geography Standard 1: Understand the characteristics and uses of maps, globes and other geographic tools (e.g., compass) and technologies.

Geography Standard 14: Understand how human actions modify the physical environment.
Benchmark # 1: Know how people affect the environment in negative (e.g., pollution) and positive (e.g., using alternative forms of energy) ways.

Language Arts Standard 1: Use the general skills and strategies of the writing process.
Benchmark # 8: Writes for different purposes (e.g., to communicate ideas).

Objectives: Students will be able to…
- Describe air as a mixture of invisible gases that surrounds us.
- Identify and describe air pollution as an environmental problem.
- Identify and describe particulate matter as one cause of air pollution.
- Identify the four cardinal directions (north, south, east, west).
- Record observations and interpret information using their own words and drawings.

Please click here to view both the creative artwork for this great lesson and the downloadable PDF.

Materials:
- Food can (make sure it has something in it to make it heavy, such as beans or peas. Or, if the can is empty, fill it with stones).
- Double-Sided Scotch tape
- Marker
- Magnifying lens
- Directional compass
- Science journal/ paper
- Pencil

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Overview: Air pollution is the release of substances or particles into the air and atmosphere that can cause harm to human beings and/or other living organisms such as plants and animals. While some of these airborne pollutants are caused by natural occurrences, such as volcanic eruptions releasing gases and ash into the air, or violent wind storms kicking up dust or sand, the more serious air pollutants are the ones caused and created by humans. The major sources of air pollution are: transportation, such as automobiles and jet airplanes; energy and heat generation, from individual oil heaters at home to the coal power plant; manufacturing industries, such as paper mills or plastics factories; and finally the burning of garbage and other waste products. These everyday occurrences, seemingly intrinsic to our economy and society, are having a severe, negative impact upon our environment as well as our individual health.

Air pollutants can affect humans in a variety of ways, the first of which is a direct impact in which a person or persons are immediately affected by airborne pollutants. An extreme example of such a direct impact from air pollution can be seen from the Great Smog of 1952 in London, England, which killed over 8,000 people in a matter of weeks. Since then, governments have come a long way in passing laws and regulations to control the types and volumes of pollutants being released into the air, from the emissions of industrial factories to the emissions released by automobiles. However, pollutants are still being released by cars, trucks, factories and power plants every day, and while the direct impact on humans is not as visible as it once was, these air pollutants are still being released into the same air which we breathe in every day.

There are other ways in which air pollutants can impact humans and other living organisms besides a direct attack on or respiration, and that is its impact once it reaches the atmosphere. Some pollutants tend to mix with the moisture in clouds and fall back onto our earth in the form of acid rain. This concentrated mixture of water and acid (sulfuric or nitric) can cause harm to crops, water life, as well as contaminate drinking water. Other pollutants released into the air are known to eat holes in our ozone layer, creating a dangerous exposure to ultraviolet radiation from the sun, harming plants and humans alike. This effect is caused, in large part, by the release of chlorofluorocarbons (CFC's) that come from aerosols, refrigerators, and air conditioners.

While the United States and other countries have made large steps to combat air pollution through laws and regulations, the ultimate goal is to find alternative power sources which do not rely upon the burning of fossil fuels. Wind and solar power are great examples of natural energy sources that are not only bountiful and renewable, but eliminate air pollution altogether. By cutting down and eventually eliminating harmful air pollution, we can protect both the planet's health as well as our own.

Kid's Speak: Air pollution is the release of substances and particles into the air that can harm humans and other natural living things. Cars, trucks, factories and power plants all release pollutants into the air that can affect the air we breathe, the rain and other precipitation that falls from the sky, as well as the amount of ultraviolet rays from the sun that reach the earth. One of the largest sources of air pollution in the world are the engines and machines that supply us with electricity and other forms of power, such as car engines and power plants. The main source of this energy is the burning of fossil fuels, mainly oil and coal, and while they are burned to make energy, they release chemicals and gases that pollute the air and harm the environment and effect the health of living things.

Eco-Fact: A plant in your home or office acts as a natural filter. It absorbs airborne pollutants and computer radiation while replenishing oxygen.

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Procedure:
Before Catching Air Pollution:
- Explain to the class that air is a mixture of gases that is all around them and that air pollution can threaten their health, the health of plants and animals and the health of water supplies and the ozone layer.
- Tell students that are going to conduct an experiment to catch pollution that is in the air outside their school.

Instructions for Catching Air Pollution:
1. Peel labels off cans.
2. Find a place outdoors where you can sit cans down without anyone touching them. Window ledges and fence-posts are great spots.
3. Have students use a marker to write *North, South, East, and West* around the middle of their cans, equally spaced apart, so when standing, direction names will point in four opposite directions.
4. Use a compass to tell where north is. Turn cans so that the North on the cans faces North.
5. Cover the sides of the can in double sided scotch tape. Try to touch the tape as little as possible.
6. Place cans in chosen location.
7. After a week, check and see what kinds of things are stuck to the tape. You may want to use a magnifying lens to have a closer look.
8. Have students record their observations in their science journals.

After Catching Air Pollution:
- Explain to students that the things stuck to the tape are pollutants.
- To describe the results of the experiment students will write a paragraph and/or draw a diagram in a Science journal.

Adaptations:
- Students can try placing the can in different environments to see different types and different levels of air pollution.
- Students can chart their results to see if there are air pollution trends in different areas.

Extensions:
- Discuss possible causes of air pollution in the environments where they placed their cans.

GEF Community: Students can share their results of the experiment with the GEF Community. Students can share how much or how little air pollution they were able to find in the environment where they placed their can. Also, students can share their ideas and opinions about how to reduce air pollution.

For technical assistance with printing any of the GEF lessons, please contact:
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