CLEAN AIR PARTNERS™



AirSmart


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A BRIEF HISTORY OF AIR POLLUTION CONTROL

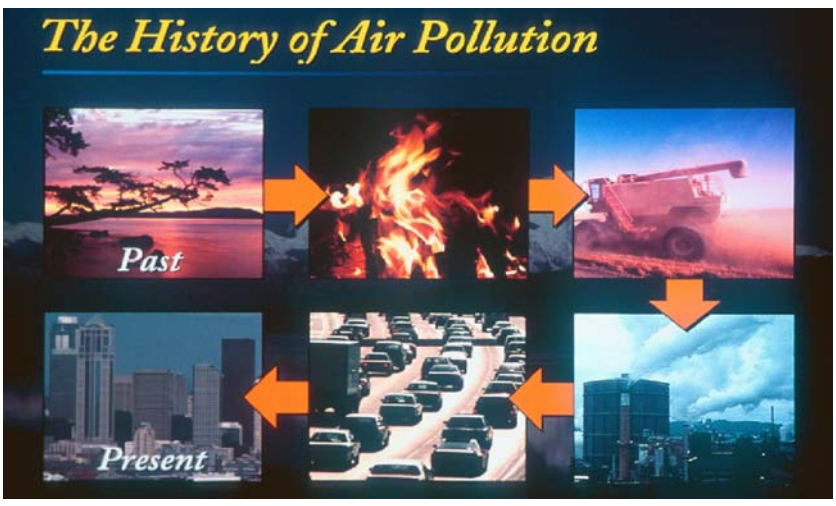
Look at the picture of the Earth below. From space we can see how fragile it is, and how all the parts of the Earth are a part of what has been called "The Big Blue Marble." For thousands of years we did not understand how our activities were polluting our air. In fact, it was not until the middle of the 20th century that we started to realize that air pollution was a global problem. Until then, we treated air pollution as a local problem and did not make the connection that when we pollute the air where we live, that "dirty" air is carried to other parts of the Earth.

When you look at the earth from space it is hard to tell that air pollution is a real problem. From space, the earth looks fresh and clean. Nevertheless, ask yourself these questions:

Have you ever seen:

- A volcano erupting
- Dark smoke coming from a factory smokestack
- An exhaust cloud from a bus
- A traffic jam

If you have, then you know what air pollution looks like.



AirSmart

Air pollution has been around for millions of years. Our early ancestors created small amounts of air pollution when they made fire in their caves. However, as the population of the earth has increased and as we became more reliant on the use of coal and other fossil fuels, we have increased tremendously the amount of **pollutants** we are spewing into our atmosphere.

The federal government made some attempts to control air pollution in the early 20th century, but it was not until a deadly air pollution episode killed 20 people in Donora, Pennsylvania in October 1948 that the federal government started to seriously look at the problems of air pollution in the United States. Even then, air pollution was still viewed and treated as strictly a local problem.

It was not until the time that John Kennedy was President that we began to recognize air pollutions as a national problem. Because of President Kennedy's efforts, the 1963 Clean Air Act was passed. It is believed that Kennedy was motivated, in part, by killer smog episodes in London and New York. While the 1963 Act recognized air pollution as a national problem, it did little to establish or enforce national air quality standards.

The Environmental Protection Agency (EPA) was established by Executive Order on December 2, 1970. President Nixon signed the Clean Air Act of 1970 into law on December 31, 1970. Under this authority, EPA has set national air quality standards for **ground level ozone** (**smog**), **particulate matter** (soot), **carbon monoxide**, **lead**, **sulfur dioxide**, and **nitrogen dioxide**. The Act also directs the EPA to review the standards for each of these pollutants every five years. In simple terms this means that the federal government, in cooperation with the States, sets air quality standards that are supposed to help reduce air pollution and clean the air for all of our citizens. This is important because we now know that bad air can make us sick.

The United States Congress has made changes to the Clean Air Act over the years in an effort to make air pollution control activities by the States and the federal government more effective. Concerns were raised in the 1980s about **acid rain**, **smog**, and air borne **pollutants**, and this resulted in passage of the Clean Air Act of 1990. The 1990 act is now the major controlling legislation affecting clean air issues in the United States.

In other lessons on air pollution, you will learn more about smog, acid rain, ozone, and other air pollutants. The purpose of this lesson was to give you some brief history of air pollution and to let you know what your government is doing to help make sure you have air that is clean and healthy to breathe.

If we all do our part, both by making sure the anti-pollution laws of our local governments and the United States are enforced and taking actions as individuals to make sure we are not contributing to pollution – instead of having air that looks like this:

We can have air that looks like this:

Local Government

In every state, there is the Department of the Environment and many other agencies that work to ensure that the air is healthy to breathe and that local potential sources of pollution are being controlled. There are state programs to control tailpipe **emissions** from mobile sources (automobiles and trucks) and smokestack emissions from factories, power plants, and small businesses (dry cleaners and some restaurants).

The Departments of Environment also monitor the outdoor air by measuring how much and what type of pollution is in the air. Our region meets the health standards for all but one of the six **criteria pollutants**. The pollutant that is a serious problem in much of our area is ground level ozone and occurs during the warmer months of the year when the sunlight is more intense. When ozone is expected to reach unhealthy levels, local environmental agencies issue messages to the affected communities and advise people to take action to protect their health.

Businesses

Many businesses are required to control pollution and use two approaches to prevent air pollution. One approach is to use devices, or **add-on controls**, that capture pollution before it gets into the air. Another approach is to prevent pollution without add-on controls.

Add-on controls capture gases and solids in the air stream of a heating or industrial process before the air is emitted through the stack. Add-on controls either collect and deposit the pollutant as waste material or send it back into the fuel stream to completely **combust**.

Preventing pollution without add-ons can include a process or fuel change, improved operating practices, shutting off equipment, or shutting down the plant. An example of a process change might be the conversion from a power source using fossil fuel to a power source using **hydroelectric**. An example of a fuel change would be to use coal with a low sulfur content rather than coal with a high sulfur content.

Individuals

Factories and power plants are tightly regulated to prevent pollution and as a result, are often not the major source of air pollution in a particular region. Often the major contributors to air pollution are common human activities – driving our vehicles, heating and cooling our homes, and using household appliances. There are things households and individuals can do to prevent pollution.

Many household appliances require electricity to operate. Houses require fuel to heat them. A significant amount of electricity is generated by burning fossil fuel resources such as coal, oil, or natural gas. When fossil fuels are burned, byproducts are produced such as soot, nitrogen oxides, sulfur oxides, and carbon dioxide. These byproducts pollute the air. A way to prevent pollution is to conserve and use less of these resources. Turn off appliances like televisions, lamps, and computers when you are not using them. Houses that are properly insulated retain heat and use less fuel.

Tailpipe emissions from passenger vehicles are a significant source of air pollutants. There are many ways for people to control the amount of pollution from vehicles. When people ride together or use public transportation, fewer vehicles are driven and less emissions are produced. Well-maintained vehicles use less fuel. Have your family consider buying a low emissions

vehicle when it is time to replace the family car. When you only have to travel a short distance, consider riding a bicycle or walking.

Curriculum Overview

Air Smart is a curriculum oriented towards informing third grade students about ozone and health problems we face with ground level ozone and the implications for human health as well as plants and animals. The curriculum provides opportunities for students to learn what each of us can do to protect our planet from ground level ozone.

Air Smart has two goals:

- The first is to convey an understanding of the impact of air pollution on human health.
- The second is to motivate students to take personal actions to prevent ground level ozone in order to improve human health and the environment.

The curriculum offers a broad approach to issues related to air pollution, health, touching upon issues of the environmental component; air. The interrelationship between human behavior and air pollution is stressed, i.e. how air pollution impacts on lakes, streams, plants, and animals. The responsibility each person must take for preserving the environment and other steps each can take to make that happen are recurring themes.

- Instructionally, the lessons are designed to utilize large and small group activities to help students gain the knowledge and skills that will help them make decisions and take action to improve the environment. The recommended activities are planned to engage students in an interactive process to accomplish the objectives of these lessons. Instructional activities focus on methodologies and strategies that may be used by teachers to integrate context, processes, and skills in reading, writing, social studies, science, fine arts, and health. Since these content areas are integral to performance across all content, every effort has been made to show natural and appropriate connections between these disciplines.

Air Smart Curriculum

Content Correlation Chart

Learning Outcomes:

1. Understanding of health promotion and disease prevention concept to establish a foundation for leading a healthy productive life.
2. Access, analyze, and evaluate health information.
3. Identify and practice health enhancing behaviors to reduce health risks
4. Effective use and communication skills to enhance personal, family, and community health.
5. Demonstrate the ability to use goal setting and decision making skill to address issues related to personal family, community health

Social Studies:

Geography Skills & processes, valuing self and other.

Science:

Concepts of science, nature of science habits of mind, processes of services, application of science

Reading:

Reading for information

Health Education Outcome/Indicator Lesson Match

Lesson	Outcomes	Indicator
1. What is Ground Level Ozone	Asses, analyze and evaluate health information.	Locate resource at home, school and community that provide valid health information.
2. The Color of Air	Understanding of health promotion and disease prevention concepts to establish a foundation for leading healthy productive lives.	Identify rules that promote health . Identify appropriate and responsible health behaviors
3. Ground Level Ozone: Your Health and the Environment	Understanding of health promotion and disease prevention concepts to establish a foundation for leading healthy productive lives.	Predict outcomes of health decision.
4. Doing My Part for cleaner air	Demonstrate the ability to identify a practice health enhancing behaviors and reduce risks for safer, healthier lives. Use goal setting and decision making skills to address issues related to family and community health.	Demonstrate the ability to apply a decision making process to health issues and problem. Set a personal health goal and track progress toward its achievement

Table of Contents

Lessons

Organization of the Lessons

Air Smart has four lessons. While the average lesson spans on to two class periods, this will vary greatly depending on the ability of the students. All four lessons in the curriculum have the same format:

1. Objectives - Performance expected

2. Time - Class periods to cover the lessons

3. Integration - Making connection between content areas; science, health, social studies, art, etc.

4. Overview - Explains the focus of the lesson.

5. Background Information - Provides facts about the content to be covered in the lesson.

6. Vocabulary - Introduces new terms that 'will be used in the lesson.

7. Teacher Materials and Preparation - Teaching aids, i.e. handouts, preparation needed for instructing students.

8. Procedure - Steps to accomplish objectives

9. Evaluation - To determine if objectives of the lessons were accomplished by the students.

10. Homework - Assignments that should be done at home with the involvement of parents.

The **Teacher Resource Section** of the curriculum contains the materials that will help support instruction, i.e. student handouts, fact sheets, transparencies, references, or other materials. It is important for the teacher to review these materials several days prior to teaching the lessons. This will allow the teacher time to prepare the appropriate materials to help execute each lesson.

Lesson 1. Ozone: Good Up High, Bad Nearby

Objectives:

- Students will be able to define ozone.
- Students will be able to illustrate why we need air.

Time: One Class Period.

Integration: Health, Science, Art,

Overview:

This lesson is designed to introduce students to concepts and information about pollution. A major focus of the lesson will be on defining **ozone** pollution and problems associated with ground level ozone. Students will be engaged in activities that will help them to identify many problems related to ground level ozone and to recognize the impact that pollution has on humans, plants, and animals.

Background Information:

Why do we need air? Humans take 23,000 breaths every day. We need to breathe in order to get oxygen from the air into our lungs, heart, and blood in order to survive. When air is dirty, it can make it hard to breathe and sometimes it can cause sickness. Plants and animals also need air because they breathe too. It becomes a problem for people, plants, and animals when the air is dirty. Dirty air comes from **pollution.** Pollution is formed from human made sources such as cars, trucks, and smokestacks. Some pollution comes from natural sources such as wildfires and volcanic eruptions. When we speak of pollution, we also need to be concerned about **ozone.** Ozone is a gas that can be either good or bad. In the upper atmosphere (above the clouds), ozone is good. This kind of ozone forms a layer that protects us from harmful rays of the sun (like a sunscreen).

Near the ground, ozone is bad. This kind of ozone forms when certain types of pollution mix with sunlight and get trapped near the ground. This type of ozone is called **ground level ozone.** Ground level ozone is bad for humans and the environment. It can cause headaches and can cause problems breathing, especially for people with respiratory problems such as asthma.

The Maryland Department of the Environment and the Metropolitan Washington Council of Governments give reports on air quality levels everyday. When these agencies issue a **code red** report, that means that the air quality is unhealthy. On code red days, children should limit outdoor playtime and find things to do inside. When the air quality is **code green,** that means it is okay to play outside.

Vocabulary Development:

- Air
- Pollution
- Ozone
- Smog
- Particulate matter

Teacher Materials and Preparation:

- Paper for collages, one piece for each group of three or four students.
- Old magazines for students to cut pictures from.
- Art supplies (crayons or markers).
- Scissors and glue for students.
- Two jars, one with a lid and one without, cotton, and slide projector (optional).
- Handout sheets (ozone web).

Prepare:

- Toy car, toy truck, picture of gas powered lawn mower, and a picture or model of a factory with a tall smokestack to demonstrate air pollution.
- Copies of **ozone web** for students to complete.

Procedure:

- Write the term **pollution, air, ozone, smog, and particulate matter.** Help students develop a working definition of these words by using the enclosed "Glossary of Terms."
- Ask students to read the background information orally or silently to gain knowledge about the topic (ozone).
- After reading the background information, ask the students the following questions:

1. Why do we need air?
2. Why is pollution unhealthy?
3. Why is it important to learn about ozone?
4. How is ground level formed and how does it affect our health?
5. Where is ozone from and how does it affect out health?

- Discuss the difference between "Good Up High, Bad Nearby" as it relates to "High and Low". Explain that "high" means up in the atmosphere where rockets travel and ground level ozone means near us or where birds fly around, airplanes, or other flying objects can be seen in the air around us.
- Explain that usually when people speak of pollution, they usually mean pollution that affects a city, country, or the whole world. But pollution can occur anywhere.
- Explain that there are several types of pollution. In today's class we will focus on one; air pollution and ozone.
- Show students four objects associated with air pollution; toy truck, car, factory, and lawn mower. Ask students to identify these objects. Ask students to define **car exhaust.**
- Explain that cars, trucks, and lawn mowers need gasoline to run. When gasoline is burned, it produces a dangerous gas called **carbon monoxide** that goes into the air.
- Explain that factories bum coal. Burning coal produces smoke and this smoke contains poisonous gases that pollute the air. When burning occurs it contributes to air pollution. When air is polluted, it causes difficulty for people with asthma and other respiratory problems.
- Have students complete the ozone web (Handout: Lesson 1).
- Have students tell whether they think the air they breathe is clean and clear. Explain that all environments have **particulates.** Particulates are dust or dirt in the environment. To demonstrate this concept, tell students they will have an opportunity to observe particulates in the air. Take two jars and **fill** them with cotton. Seal one jar with a lid while the other jar remains uncovered. Allow both jars to remain exposed to the air outside your classroom window. The jars are to remain in place for three days (try to keep the jars away from the rain and other inclement weather).
- Have the students observe the jars after they have been exposed to the environment outside the classroom. Have them describe their observations. Students will notice that the cotton in the uncovered jar has black specks on it. These specks represent particulates in the air. These are the same particulates that are in the air we breathe. The jar that has the lid on has no specks of dirt.

Have students conclude that the cotton in the jar was protected from the elements in the environment.

- Divide the class into three groups for the small group activity:

Group I-Will use the art material to make a collage showing objects that can cause pollution (using magazines, newspapers, etc.)

Group II-Will complete the clean air "Word Search" (see Word Search in Teacher Resource Section).

Group III-Will write a story to describe what ozone is.

Evaluation/Assessment:

Asses students work in the small group activity (collage, story, ozone web "Word Search") to determine their knowledge of ozone pollution.

Home Assignment:

Students are asked to take home a Parent Survey. Ask parent the questions on the survey and return the survey to the school the next day (see copy of the survey included in the Teacher Resource Section).

Lesson 2. The Color of Air

Objectives:

To be able to explain the relationship between color codes and the **Air Quality, Index** (AQI).
To be able to describe the relationship between ground level ozone and health risk factors.

Time: Two Class Periods.

Integration: Science, Health

Overview:

In this lesson, students will learn how the AQI and its relationship to ground level ozone will help us to understand why we need to be concerned about air quality and health and to determine good and bad levels of ozone. Throughout the lesson, students will be involved in activities that will help them recognize the importance of **clean air, color codes,** and **risk factors.**

Vocabulary Development:

- Air Quality Index Forecast Map
- Sensitive Group
- AQI
- Meteorologist
- Asthma

Background Information:

See enclosed information.

Teacher Materials and Preparation:

- Have: Copies of background information for each student
- Color Code Index and Ozone Map (See Teacher Resource Section)
- Copies of Air Quality (Pre/Post) Quiz (See Teacher Resource Section)

- Sample copies of weather section of newspapers which includes weather information.
- **Color Codes** Poster (See Teacher Resource Section)
- The Clean and Green Clubs for Kids
  Website: http:/www.worldkids.net/clubs/green/garnes.html - (See Teacher Resource Section)
- Overhead transparency of ozone color codes (see Teacher Resource Section)

Procedure:

- Introduce topic for today's lesson with pictures, posters, etc.
- Give students the AQI Pre-Test to complete.
- Introduce vocabulary terms for the lesson and overhead transparency sheet.
- In advance, prepare copies of handouts for each student.
- Have students read the Background Information and answer the following questions:

1. What season of the year would the sky be filled with haze from ground level ozone? **(Summer)**
2. What problems will **haze** cause? **(Making h hard to see things in the distance)**
3. When will **ground level ozone** be most likely to form? **(Hot summer days)**
4. Who measures pollution in the air? **(Government Environmental Agencies)**
5. How can the **Air Quality Index** be used? **(Tell us how healthy the air is)**
6. What do these colors tell us about air quality: **Green, Yellow, Orange,** and **Red?**
   (Green -good air quality; Yellow-moderate air quality, fine for most people; Orange-unhealthy for Sensitive Groups; Red-unhealthy)
7. Which group of people would need to limit their outdoor activities inside if the color code is **Red?**
   (Sensitive Groups-People with asthma, active kids, and the elderly)
8. What is the name of the weather person that tells us about the air quality? **(Meteorologist)**

9. Where can you can see or hear the meteorologist speak about air quality, temperature, and weather predictions?
   (on TV **or the radio)**
10. Where can you find information about air quality? **(Newspaper, Computer Internet/Website)**

- Display the Air Quality Colors and Map. Give each student a map to study colors on the map to be able to tell which states, especially the eastern part of the United States which have colors denoting air pollution problems. Have students discuss the colors in relationship to forecasting the ozone levels. Students may also use the computer to find the forecast map at wwwepa.gov(AIRNOW), then click on **Air Quality Forecast.**
- Tell students that we want to understand the meteorologist and the work that he/she does to help us. Have students volunteer to role-play being a meteorologist. Have students model a meteorologist that they have seen on TV. Make sure that the meteorologist include the following information in their presentation: weather report for today and tomorrow, including temperature; kind of weather, rainy, cloudy, sunny, etc; humidity, AQI). Allow students to observe the meteorologist's presentation and critique the information given.
- Give students sheets of construction paper (green, yellow, orange, and red). Have students create AQI and be able to explain the meaning of each color of the index.

Evaluation:

Give each student the Air Quality Index Post Quiz to complete.
Students are expected to attain at least a score of 70%.

Home Assignment:

Listen to the Evening Weather Report on TV. Write today's weather report and tomorrow's forecast to pass in as an assignment.

Follow-Up Extension:

Pine Cone Bird Feeder (see **MDE-ARMA, Clean Air Activities for Kids.**

Suggested Resource: MDE, ARMA's, Clean Air Guide for Kids

Lesson 3. Ground Level Ozone: Your Health and the Environment

Objectives:

- To identify the sources of ground level pollutants.
- To describe the affect that ground level ozone has on the health of **Sensitive Groups.**

Time: One Class Period

Integration: Health, Science, Fine Arts

Overview:

Students will be involved in activities that will help them recognize the impact that ground level ozone has on humans, animals, and plants. They will gain knowledge about air pollution and to see that bad ozone exists from ground level up to two miles above the Earth's surface and that it can have a negative effect on people with respiratory problems, animals, and plants. Students will also recognize sources of ground level pollution.

Vocabulary of terms:

- Carbon dioxide
- Photosynthesis
- Smokestacks
- Respiratory

Background Information:

Humans are hurt by air pollution but we are not the only ones. Animals such as butterflies, birds, and fish can be affected by air pollution. Dirty air can make it hard for plants to grow Buildings and statues can start to wear away. Dirty air can make it hard for children and adults with asthma and other respiratory problems to breathe. That is why when the weather report is a **Code Red** day, people with asthma should limit physical activities outside, especially during hot summer days.

Did you know that plants breathe too? Green plants use a process called **photosynthesis** (sounds like foto-sin-the-sis) to turn carbon dioxide and other gases that are bad for us to breathe into the oxygen that we need. By taking these gases out, plants like trees and bushes can help clean the air. That is the reason why it is important to protect these types of plants. But they need our help in keeping the air clean. Pollution is formed from human made sources such as cars, trucks, and smokestacks. Some pollution comes from natural sources such as wildfires and volcanic eruptions.

Effects of Air Pollution:

Air pollution has both visible and invisible effects on our community.
Some of these effects are:

- A thick yellow brown layer of haze hanging low in the sky.
- Bad smells, such as paint fumes and gasoline vapors.
- Damage to plants as well as stunted growth and a smaller yield in crops.
- Dirt deposited on surfaces such as metals, stone, and cement.
- Discolored paint on objects exposed to air.

Air pollution also affects human health, but different people may feel it in different ways. The following are some of the ways that air pollution affects human health.

- Irritated eyes
- Irritated and inflamed nose and throat
- Irritated and inflamed tissues of the lungs
- Aggravated symptoms for asthma, bronchitis, and emphysema sufferers
- III effects on the lungs of children and the elderly with respiratory problems.

Teacher Materials and Preparations:

- Have copies of background information for each student
- Duplicate copies of handout-ARMA, Crossword Puzzles for Kids
- Construction paper, paint brushes, poster paint, leaves
- Drinking straws,
- Copy of "What's Harming the Community" for each student (see Teacher Resource Section)

Procedure:

- Have students review vocabulary terms and define each **one.**
- Give each student a copy of the Background Information and select students to read he information orally, followed by a discussion of:

1. Affect that pollution has on people.
2. How ozone affects people with respiratory problems, animals, and plants.
3. Give students the handout, "What's Harming the Community."

- Give students ARMA Crossword Puzzle to complete and directions to complete the puzzle accurately. Gather leaves from trees and bushes that have fallen to the ground; see how many different kinds they can find.

- Give each student a sheet of construction paper (after students have gone outside to collect leaves for leaf painting activity). Give students the following directions:

  1. Using the paintbrush, paint on the front of a leaf until it is well coated.
  2. Press the leaf onto the piece of paper; when it is peeled back the student will see the imprint of the leaf. For best results, use lots of colors.

- If you don't want to use paints, on a hard surface, try placing leaf under a thin sheet of paper. Then rub over the paper with a crayon. The results? A colorful outline of the leaf and its parts. This activity will help the students to understand how important it is to protect plants.

- To show how breathing is affected by pollutants, especially with people who have asthma. Ask students to pinch their nostrils closed and then try to blow into a straw. Tell students to describ6 how it felt when they tried to blow into the straw with their nostrils closed. This experiment will demonstrate what it feels like when a person with asthma tries to breather when exposed to dirty air. Have students share their conclusions.

Extension Activity:

Develop a display based on the lesson for the school bulletin board.

Homework:

1. Students will ask parents to help them to identify pollutants that are in the home and the community.
2. Have students interview someone they know that has asthma. Have the person with asthma tell how it feels when he/she is exposed to dirty air and describe how it feels when it is hard to breathe.

Evaluation:

Have students write a paragraph about today's lesson. Students are expected to include information about how pollution affects the environment and sources of pollution, i.e., cars, trucks, smokestacks, gas-powered lawnmowers, etc.

Student Resources:

- MDE Web sites for Kids
- ARMA Crossword Puzzles for Kids

Lesson 4: Doing My Part for Cleaner Air

Objectives:

- Describe actions that can be taken to improve air quality.
- Identify groups/agencies that can help reduce air pollution.

Time: One class period.

Overview:

Lesson 4 is designed for students to understand the role that each person has in environmental health. Ultimately, the ability of each of us to live a healthy life depends on all of us working together to protect the sources of life-our land, air, and water. This lesson is intended to help students take action to prevent the ozone problem.

Integration: Health, Science, Social Studies, Language Arts

Vocabulary Development:

- Action
- Prevention

Background Information:

See enclosed materials

Teacher Materials and Preparation:

- Have: **Save Planet Polluto** CD for students to view during class period.
- Prepare Environmental Action Cards (3x5 index cards), crayons, glue, markers
- Poster paper for 4 groups to create ozone pollution prevention posters.

Procedure:

- Introduce the lesson by reviewing highlights from the previous three lessons: 1 -Good Up High, Bad Nearby. 2-The Color of Air. 3 -Ozone: It Can Harm.
- Review Vocabulary terms: action, prevention
- Direct students to read silently the background information for today's lesson and be able to answer the following questions:

  1. Why should we be concerned about ground level ozone?
  2. What action can each of us take to reduce ozone in our community and home?
  3. Who can we contact in the community or our state to help with ozone pollution problems?

- Install **Save Planet Polluto** CD into the classroom computer system. Tell students that they will use the CD to be able to tell what steps were taken to save Planet Polluto's environment. After viewing the CD, have students discuss action steps and have them discuss actions that can be taken in their community to prevent ozone pollution.
- Give each student an Environmental Action Card (see Teacher Resource Section). Ask students to complete the Environmental Action Cards. After completing the assignment, have students share their actions with the class.
- Divide the class into four teams:

  Team 1: Create a poster that illustrates action taken to prevent smog from power plants.

  Team 2: Create a poster that illustrates action taken to prevent pollution from transportation vehicles-cars, trucks, buses, etc.

  Team 3: Create-a poster to illustrate action taken to prevent ozone pollution in the home.

  Team 4: Create a poster that shows how trees, plants, and animals, can be protected from ozone pollution.

Evaluation:

- Assess student's actions taken on the Environmental Action Cards to prevent ozone pollution.

Things You Can Do for Cleaner Air

Are you tired of breathing dirty air? Well, you can help reduce air pollution.

Every time you drive to work or school, use your heater or air conditioner, clean your windows, or even style your hair, you make choices that can reduce or increase air pollution. When more people make clean air their business, we will all breathe easier.

Two big ways to reduce air pollution are to drive less, even a little less, and to drive smart. Fewer trips in your car or truck will help cut air pollution. Moreover, how you drive can reduce your car's air pollution contribution. Driving less does not mean you have to stay home. Try combining driving with other ways of getting where you want to go:

Carpool.
Walk or ride a bike.
Shop by phone or mail.
Ride public transit.
Telecommute.

Driving smart keeps pollution at a minimum:

Accelerate gradually.
Use cruise control on the highway.
Obey the speed limit.
Combine your errands into one trip.
Keep your car tuned and support the Smog Check Program.
Do not top off at the gas pump.
Replace your car's air filter on a regular basis.
Keep your tires properly inflated.

That is not all. When shopping for your next car...

Look for the most efficient, lowest polluting model or even a zero-polluting electric car.

And if you must drive on days with unhealthy air...

Drive your newest car. Newer cars generally pollute less than older models.

Many products you use in your home, in the yard, or at the office are made with smog-forming chemicals that escape into the air when you use them. Here are a few ways to put a lid on products that pollute:

Select products that are water-based or have low amounts of volatile organic compounds (VOCS).
Use water-based paints. Look for paints labeled zero-VOC.
Paint with a brush, not a sprayer.

Store solvents in airtight containers.
Use a push or electric lawn mower.
Start your barbecue briquettes with an electric probe. Alternatively, use a propane or natural gas barbecue.

Saving energy helps reduce air pollution. Whenever you bum a fossil fuel, you pollute the air. Use less gasoline, natural gas, and electricity (power plants bum fossil fuels to generate electricity):

Turn off the lights when you leave a room.
Replace energy-hungry incandescent lights with fluorescent lighting.
Check with your utility company for energy conservation tips.
Use a programmable thermostat that automatically turns off the air conditioner or heater when you do not need them.
Add insulation to your home.
Use a fan instead of air conditioning.
Use an EPA-approved wood burning stove or fireplace insert. Microwave small meals.
Insulate your water heater.
Install low-flow showerheads

It takes energy to make and sell the products we use. Here are ways to cut energy use, reduce air pollution, and save money.

Choose recycled products, and products with recyclable packaging. Reuse paper bags.
Recycle paper, plastics, and metals.
Print and photocopy on both sides of paper

When you breathe, very small particles such as dust, soot, and acid droplets can slip past your lung's natural defense system. These particles get stuck deep in your lungs and may cause problems such as increased asthma attacks, more bronchitis and other lung diseases, less resistance to infections, and even premature death for the elderly or people who are already ill. Here are a few things you can do to reduce particulate matter pollution and protect yourself-.

Do not use your wood stove or fireplace on days with unhealthy air.

Avoid using leaf blowers and other types of equipment that raise a lot of dust. Try using a rake or broom.
Drive slowly on unpaved roads.
Drive less, particularly on days with unhealthy air.
Avoid vigorous physical activity on days with unhealthy air.

Air pollution is a problem indoors and out. Most people spend at least 80 percent of their lives indoors. Here are some ways you can reduce pollution in your home, office, or school:

Do not smoke. If someone must smoke, send him or her outdoors.
Some products such as cleaning agents, paints, and glues contain dangerous chemicals.
Use them outdoors or with plenty of ventilation indoors.

Use safer products, such as baking soda instead of harsher cleaners.
Do not heat your home with a gas-cooking stove.
Have your gas appliances and heater regularly inspected and maintained.
Clean frequently to remove dust and molds.

Now that you have read these tips, you know more about reducing air pollution than most people. Try some of the ways described above. It will make a difference. Then, let other people know what you have found out.

Write to your local paper. Support action for healthy air.
Let your elected representatives know you support action for cleaner air.

(Adapted from the California Air Resources Board Pamphlet: 50 Things You Can Do For Cleaner Air)

Appendixes

Glossary of Terms

Acid -Rain: rain that is especially acidic - containing usually nitric and sulfuric acids.

Air: Invisible mixture of gases that surround the earth.

Air Pollution: A contamination of air that causes negative effects on life and health.

Atmosphere: The layer of gases that surround the earth.

Air Quality Index or AQI: The AQI uses words and colors to tell you how good or bad the air quality is outdoors.

Asthma: A disease that causes the inflation of the airway/lungs.

Environmental Protection Agency (EPA): the federal agency charged with the responsibility of enforcing the environmental laws and regulations of the United States

Environment: Everything around us - air, water, plants, trees, and all parts of nature.

Ground level ozone: A pollutant formed in the summer when chemicals coming out of cars, factories, paints, and lawn mowers are cooked by the hot sun.

Haze: Pollution, moisture, dust, smoke, and/or vapor that reduces visibility or how far you can see.

Lead: metallic element that is a particulate pollutant and toxic to humans.

Meteorologist: A person trained to predict weather patterns and analyze data, which determines air quality and other atmospheric conditions.

Nitrogen Dioxide: Light brown gas compound made up of nitrogen and oxygen.

Ozone: Is a gas that forms in the atmosphere when three atoms of oxygen are combined (03). It is not emitted directly 'into the air, but at ground level is created by a chemical reaction between oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of sunlight.

Ozone Action Days. Ozone action days occur when ozone levels are Code Orange, Red, or Purple. On these days, ozone levels exceed the standard, which is 0.08 parts per million averaged over an 8-hour period.

Ozone Formation: Cars, trucks, power plants, factories, and other sources emit air pollutants that form ozone as a secondary pollutant. Ground-level ozone forms when nitrogen oxides (Nox) react with volatile organic compounds (VOCS) in the presence of heat and sunlight.

Particulate Matter: Tiny particles in the air, i.e. smoke, toxic chemicals, dust, and dirt.

Photosynthesis: The process by which plants leaves use to convert carbon dioxide into oxygen.

Pollutants: Pollutants are what make the -air- dirty and cause pollution. Ozone is a pollutant that you can't see. Dust and soot are pollutants that you can see.

Pollution: Any change in air, water, soil, noise level, or temperature that has a negative effect on life and health.

Pollution Standard Index (PSI): Measure of air quality based on the sum of the level of different pollutants.

Respiratory: That system of the body, which controls the intake of oxygen and the discharge of carbon dioxide (breathing).

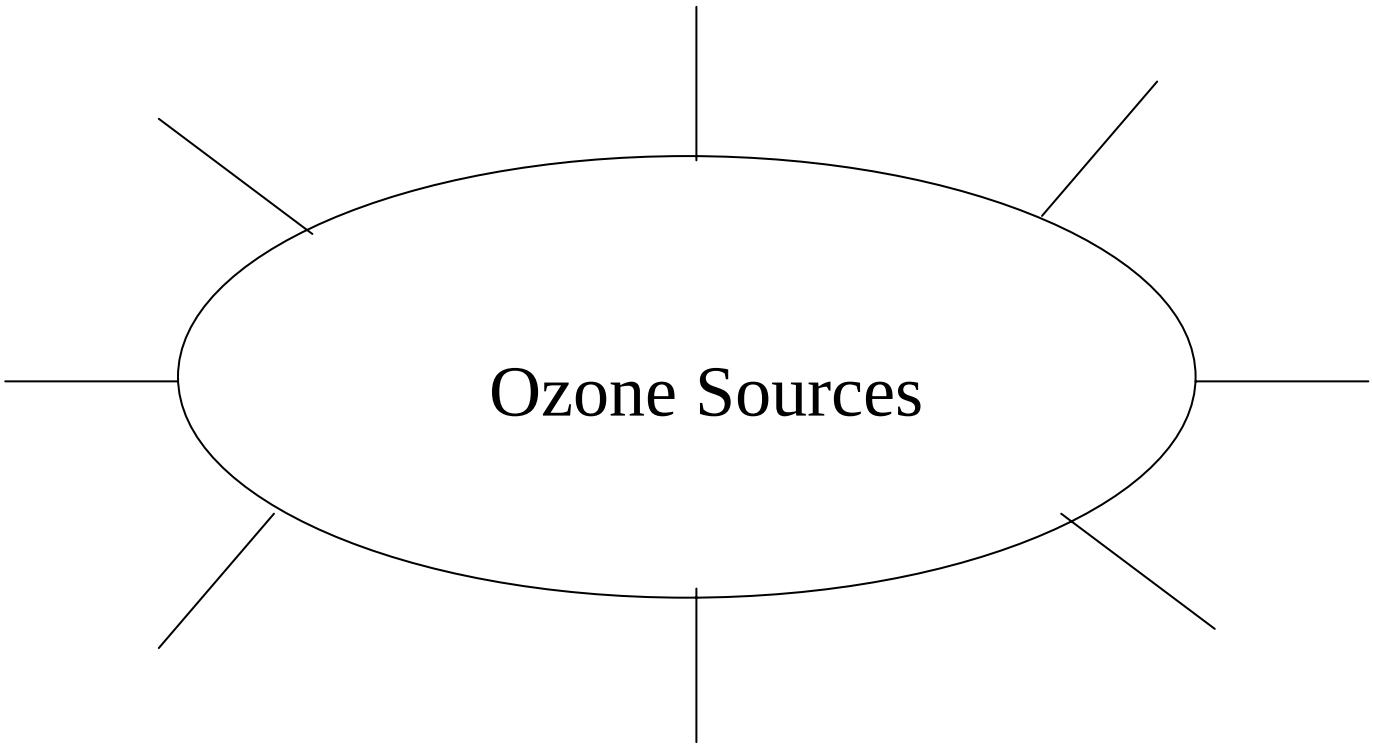
Sensitive Group: Persons with respiratory problems highly susceptible to the harmful effects associated with air pollution.

Smog: a combination of smoke and other particulates that results in a murky brown haze and causes harmful health effects.

Smokestack: Chimneys of factories that release pollutants into the atmosphere.

Ozone Web

1. Directions: Review facts about ground level ozone that you have read from the background information sheet. Use that information to write sources of ozone on the web below.



2. Write a sentence to tell why you think these ozone sources are harmful to our health.

Air Pollution and Health

One thing the AQI does is help you to understand what the air quality around you means to your health. Each of the AQI colors has a word or phrase to go with it that tells you something about the quality of the air. These are the colors and the health words that go with them.

AQI	Health Words
Green	Good
Yellow	Moderate
Orange	Unhealthy to Sensitive Groups
Red	Unhealthy
Purple	Very Unhealthy

Lesson Plan: The Color of Air

Background Information

Think of the sky on a typical summer day. What comes to mind? Clear blue skies, fluffy white clouds and a bright sun? Or maybe a sky filled with **haze** making things in the distance hard to see? Both of these weather events occur often during the summer in our area, and both can occur on days when our air quality is unhealthy. **Ground level ozone** and other **pollutants** can form on hot-summer days when the sky looks both hazy and healthy. That's why it is important to know your colors. Air quality colors, that is!

Government environmental agencies measure pollution in the air and report it to the public using the **Air Quality Index** or **AQI**. An index can be a quick way to tell people how good or bad something is. The AQI uses colors and words to tell you about the quality of the air.

AQI Colors

These are the AQI colors. Each day the AQI is one of these colors. The colors tell you how healthy the air is to breathe that day. The colors go from Green to Yellow to Orange to Red. Green is the best air quality. Each progressive color tells you that the air is less clean than the color before. Sometimes areas use the color Purple when air quality is Very Unhealthy, but those levels are rarely seen in our area.

GREEN | YELLOW | ORANGE | RED

We see a lot of Yellow, Orange and Red AQI colors in the summer when air quality often isn' t at its best. Red means that the air is unhealthy and you should try to stay indoors more and not play as hard when you are outside.

Air Pollution and Health

One thing the AQI does is help you understand what the air quality around you means to your health. Each of the AQI colors has a word or phrase to go with it that tells you something about health. These are the colors and words that go with them.

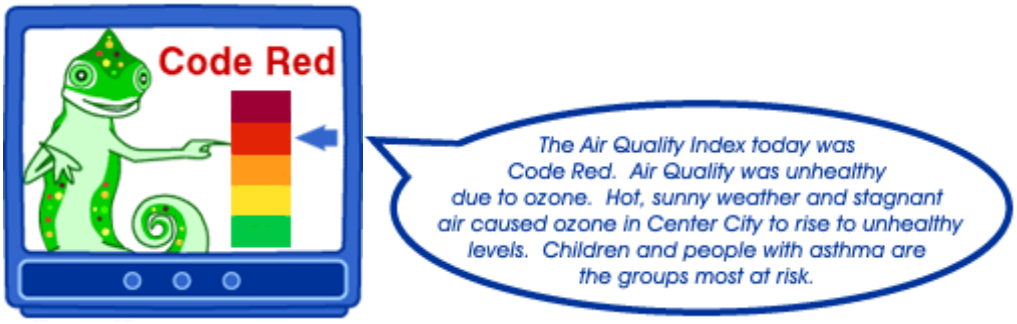
Three brochures explaining the health effects of ozone are available:

http://www.cleanairpartners.net/effects.htm
http://www.epa.gov/airnow/brochure.html
http://www.epa.gov/airnow/health/

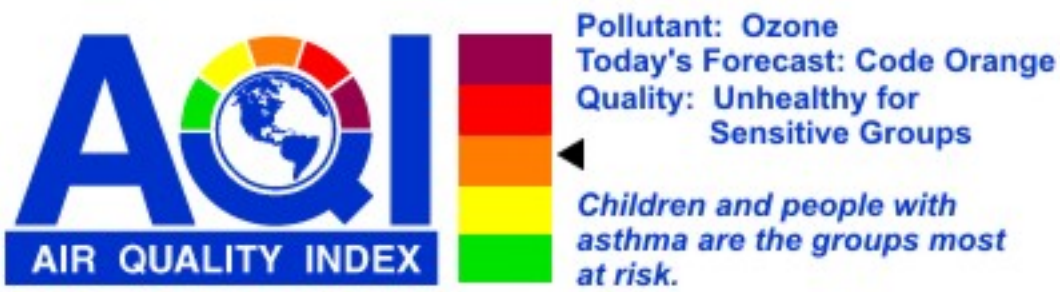
AQI Colors	Health Word(s)
Green	Good
Yellow	Moderate
Orange	Unhealthy for Sensitive Groups
Red	Unhealthy

Where is the AQI reported?

Sometimes the weatherperson on TV or the radio will talk about the AQI for today and may also tell you what tomorrow's AQI will be…

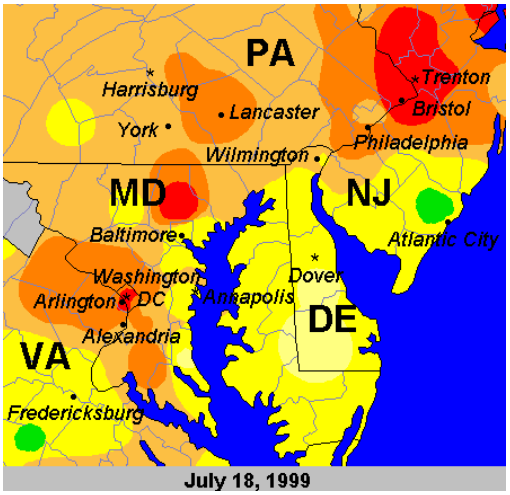


You can find the AQI in the newspaper, often the weather section. It might look something like this:



The AQI is posted in several areas on the Internet. If you have a computer connected to the Internet, go to www.cleanairpartners.net and check out the regional area forecasts. You can also view "real-time" air quality levels on the map of the Baltimore and Washington, D.C. metropolitan areas. Click with your mouse on the area where you live and you will see if the air in your area today is clean or not.

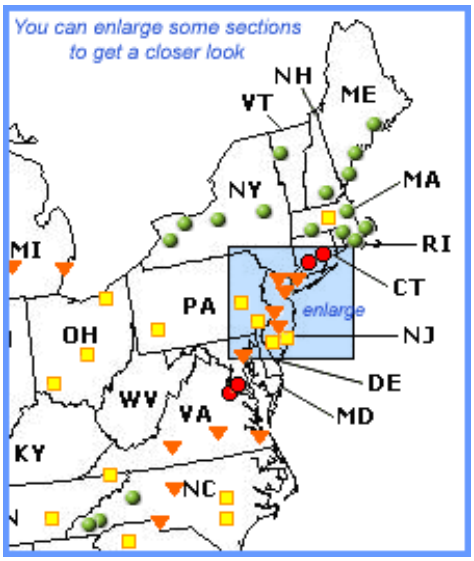
Air quality maps for Maryland are also posted at www.mde.state.md.us/arma. In fact, you can check on air quality levels anywhere in the country by visiting www.epa.gov/AIRNOW and visiting the "Where I Live" link. When you see the map of the United States, click on your state. Then you will see a chart with a list of cities. The AQI for many, but not all, large cities can be found there.



You can see an AQI Ozone Map for many areas in the United States. Here is an example. It looks like a weather map, except this shows ozone. This map shows the AQI colors for ozone going from **green (good)** to **red (unhealthy)** in the Baltimore and Washington metropolitan areas.

You can also see an AQI Forecast Map of the United States. Here is an example of the air quality forecast for the eastern part of the United States. The symbols on the map are color-coded to represent the forecasted ozone level for the cities.

If you would like to see an AQI Forecast Map for the United States, go to www.epa.gov/AIRNOW, then click on Air Quality Forecast.



So if the AQI is orange or red do I have to stay indoors all day?

No, you can go out and play. Outdoor exercise and play make your body stronger. It is just that when the AQI is orange or worse there is some risk that if you go outside and play, you may begin to cough or feel sick. Sometimes breathing can be very difficult and eyes and throats can become irritated. People with lung diseases, the elderly, and children are at special risk when ozone levels are high.

Below is a chart that can help you to determine what you should do when air quality is unhealthy outside.

Color & Health Word(s)	What to Do?
Green is Good	Just enjoy the clean air!
Yellow isModerate	Air quality is fine for most people, including children like you. However, if you know you are extra sensitive to pollution, you might want to limit the time you spend playing outside.
Orange is Unhealthy for Sensitive Groups	People with lung disease, such as asthma, and active kids and grown-ups should limit how long or how hard they play or are active outside. Remeber, it's important to think about how the air quality is making you feel! If you don't feel so great, take it a little easier.
Red is Unhealthy	People with lung disease, such as asthma, and active kids and grown-ups should not spend a long time playing or being active outdoors. Everybody else should limit how long they are active outside.

AQI for Ozone

Color & Health Word(s)

GREEN is Good.
Just enjoy the clean air!

YELLOW is Moderate.
Air quality is fine for most people, including Children like you. However, if you know you are extra sensitive to pollution, you might want to limit the time you spend playing outdoors.

ORANGE is Unhealthy for Sensitive Groups. People with lung disease, such as asthma, and active kids and grown-ups should limit how long or how hard they play or are active outside. Remember, it's important to think about how the air quality is making you feel! If you don't feel so great, take it a little easier.

RED is Unhealthy.
People with lung disease, such as asthma, and active kids and grown-ups should not spend a long time playing or being active outdoors. Everybody else should limit how long he or she are active outside.

Most Frequently Asked Questions About Ozone

What is risk?

Risk is the chance that something bad will happen, and it is a normal part of everyday life. There are bigger risks and smaller risks. If you were to play on a busy street, your risk of being injured would be big. We can compare the risk from air pollution to other kinds of risk you know about, such as eating "junk food." Junk food is bad for kids, too, but most kids won't be hurt eating a little bit of it once **in** a while. Likewise, even though dirty air is bad for kids, playing outside, once in a while won't hurt most kids, when the air is dirty.

Often, you can lower the risk by being smart, for example by wearing a bike helmet when you ride your bike. To lower your risk from air pollution, you can play outdoors at the times of day when air pollution levels are lower. In the summer, this is often in the morning or in the evening. Another good way to lower your risk is by taking it easier if you do play outdoors when air pollution levels are high. Also, if you do play outside when the AQI is orange, red, or worse, pay attention to how you feel. Does your chest feel strange? Is it hard to breathe? Do you feel tired? If you can answer "yes" to any of those questions, stop playing outside, and tell your parents or teachers.

Where is the AQI?

You can find the AQI in several places. If you have a computer connected to the Internet, go to www.epa.gov/AIRNOW, and click with your mouse on "Where I live." When you see the map of the United States, click on your state. Then you will see a chart with a list of cities. The AQI for many, but not all, large cities can be found there. Look for your city and you will see if the air in your city today is clean or not. The AQI for many, but not **all,** large cities can be found there. Look for your city and you will see if the air in your city today is clean or not.

You can also see an AQI Forecast Map of the United States. Here is an example of the air quality forecast for the eastern part of the United States. This shows the AQI forecast from green (good) to red (unhealthy) for many cities in the United States.

If you would like to see an AQI Forecast Map for the United States, go to www.epa.gov/AIRNOW, then click on Air Quality Forecast.

What is a Sensitive Group?

Some people are more sensitive to air pollution than other people. Different people can be sensitive to different air pollutants. For example, ozone might make you cough. Particulate matter may not bother you, but it may make your grandmother cough and need to rest. One sensitive group is people with asthma. Asthma is a disease that can make it hard to breathe. If people who has asthma are careful and do what the doctor tells them to do, they may never have trouble breathing.

How can I tell if air pollution is affecting me?

If you are playing hard outside when the AQI is orange or worse you may cough, feel some discomfort when you breathe, or your chest may feel tight. If you do, you should tell your parents or teachers. People with asthma may wheeze the day after pollution levels are high. If you have asthma, be sure to follow your doctor's advice when pollution levels are high.

So if the AQI is orange, red, or worse, do I have to stay in all day?

No, you can go out and play. Outdoor exercise and play make your body stronger. It is just that when the AQI is orange or worse there is some risk that if you go outside and play, you may have some of the health effects described here.

Air Quality Index (AOI) Quiz

1 What is the health word for a green day?

a. Good
b. Go
c. Terrific

2 Why is dirty air dangerous when you are playing hard?

a. You're more likely to sprain your ankle.
b. You breathe more dirty air into your lungs.
c. You can't see.

3 The AQI color red means the air outside is:

a. Beautiful
b. Red
c. Unhealthy

4 Dirty air can be most dangerous when?

a. You are playing outdoors.
b. You are asleep.
c. You are in school.

5 What time of day would ozone probably be lower?

a. Afternoon
b. Morning
c. 2:00 p.m.

6 You should limit the amount of time you play outdoors when the AQI is:

a. Yellow
b. Red
c. Green

7 Children are a sensitive group because their lungs are still:

a. Sleeping
b. Developing
c. On the Phone

8 What is the health word for a yellow day?

a. Head cold
b. Good
c. Moderate

9 Asthma makes it hard to:

a. Breathe
b. Fight crime
c. Read

10 If playing outside when the AQI is orange or red you find it hard to breathe you should...

a. Keep playing outside
b. Ride your bike
c. Stop and tell your parents or teacher.

11 Can you see dirty air?

a. Yes
b. No
c. Sometimes

12 If extra sensitive to air pollution, you limit your time outside when the AQI is:

a. Good
b. Pink
c. Yellow

13 Which one of these is a sensitive group?

a. Rocks
b. Lawyers
c. Children

14 If the AQI is orange or red, do you have to stay inside all day?

a. No, but use caution
b. Yes
c. No

15 If the health word for the day is "good", what color is the AQI?

a. Yellow
b. Green
c. Orange

16 The AQI color orange means:

a. Start your engines
b. Unhealthy for sensitive groups
c. Stay inside

Air Quality Index (AOI) Quiz

1 What is the health word for a green day.?

a. Good
b. Go
c. Terrific

2 Why is dirty air dangerous when you are playing hard?

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c. You can't see.

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b. Red
c. Unhealthy

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b. You are asleep.
c. You are 'm school.

5 What time of day would ozone probably be lower?

a. Afternoon
b. Morning
c. 2:00 p.m.

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a. Yellow
b. Red

c. Green

7 Children are a sensitive group because their lungs are still:

a. Sleeping
b. Developing
c. On the Phone

8 What is the health word for a yellow day?

a. Head cold
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c. Moderate

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b. Yes
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a. Yellow
b. Green
c. Orange

16 The AQI color orange means:

a. Start your engines
b. Unhealthy for sensitive groups
c. Stay inside

MDE

ARMA Crossword Puzzle for Kids

ACROSS

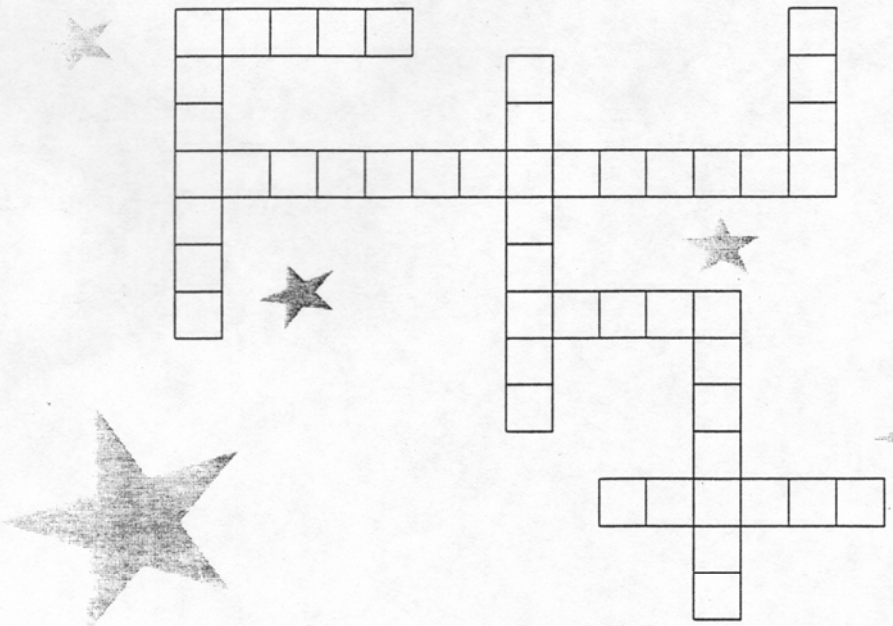
WORDS THAT FILL IN THE BLANKS: clean, photosynthesis, carbon, green

1. Plants use a process called P _____ to produce oxygen.
2. This process takes C _____ dioxide out of the a
3. It is safe to play outside when the Maryland Department of the Environment reports that it is a Code G _____ day.
4. Riding a bike helps keep the air C _____.

DOWN

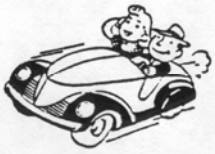
WORDS THAT FILL IN THE BLANKS: cars, natural, carpool, sunlight

4. You help keep the air clean when you C _____ ; give someone you know a ride.
5. Ozone in the upper atmosphere (above the clouds) keeps us from getting too much S _____.
6. C _____ and trucks cause pollution that makes the air dirty.
7. Some sources of air pollution are N _____ like volcanoes and wildfires.



What Can Be Harmful to the Environment?

1. **Directions:** Review the background information for lesson 3. Think of what things that can harm the environment and affect our health. Look at the pictures below and be able to tell which ones are harmful to the environment.






2. Write a sentence to tell how many of the items above can harm the environment.

Environmental Action Cards

Directions: Cut and paste the situations listed onto 3 x 5 index cards provided you by the teacher. Write the action you would take to improve the environment inside the box.

1 You need to go to the library, which is three **(3)** blocks away. How can you get there? Action:

2 You are playing outside with a friend who has asthma. The hot sun is beaming down on you and your friend. The air quality was reported to be a Code Orange or unhealthy for sensitive groups. What should you do? Action:

3 Your mother asked you and your brother to mow the lawn with a gas-powered lawn mower, even though it is a Code Orange day. 'What should you do? Action:

4 The weather person reported that the air quality is Code Red and you saw your neighbor painting chairs with an oil-based paint. What should you do? Action:

5 You want to report an oil spill in your community. Who should you call? Action:

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ARMA Clean Air Activities for Kids

Pine Cone Bird Feeder

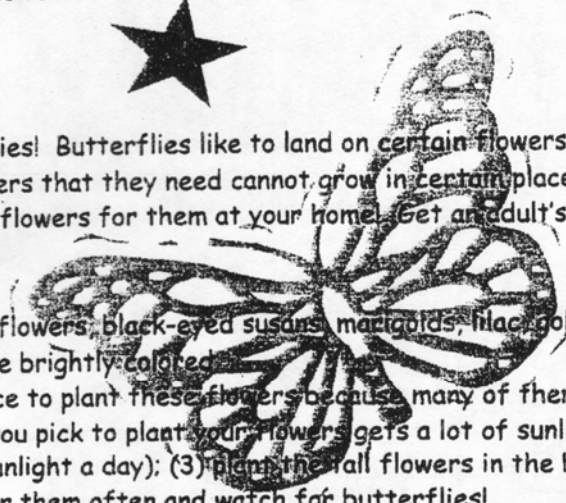
Dirty air doesn't just affect humans, it can affect birds too! Like us, birds need clean air to breathe. Dirty air can make it hard for trees and plants to grow, both of which birds need for food and a place to live. Do you have birds where you live? This feeder is easy to make and will attract all types of birds to your house. When you finish making it, hang it near a window so you can watch the birds while they eat! Younger kids may need an adult's help.

You'll Need: a pine cone, thin string or twine (never use fishing wire because it could hurt the birds!), peanut butter and some bird seed

Directions: (1) tie a loop of string or twine lengthwise around your pine cone leaving enough to tie at the end; (2) using a spoon, spread peanut butter all over the pine cone; (3) roll the pine cone in bird seed- the peanut butter should make it stick; (4) tie the end of your string or twine to a tree branch and wait for the birds to come!

Butterfly Garden

Air pollution can even affect butterflies! Butterflies like to land on certain flowers to gather nectar for food. The plants and flowers that they need cannot grow in certain places because the air is too dirty, but you can plant flowers for them at your home. Get an adult's help to do this project.



You'll Need: flowers like purple coneflowers, black-eyed susans, marigolds, lilac, goldenrod, hibiscus, day lilies and others that are brightly colored

Directions: (1) pick a fairly large space to plant these flowers because many of them are bushy; (2) make sure that the space where you pick to plant your flowers gets a lot of sunlight (most of these flowers require 6-8 hours of sunlight a day); (3) plant the tall flowers in the back and the smaller flowers in the front; (4) water them often and watch for butterflies!

MDE

ARMA Clean Air Activities for Kids

Colorful Painted Leaf Prints

Did you know that plants breathe too? Plants, like trees and bushes, take in carbon dioxide, which is bad for humans to breathe and which can pollute the air. They also give off oxygen that we need for our lungs, blood and heart in order to survive. This makes plants very important for keeping the air clean and keeping us healthy! You can use leaves to make a colorful design that will remind you of how important it is to protect plants.

You'll Need: fallen leaves that are still fresh, a paint brush, poster paints and a large sheet of paper

Directions: (1) gather leaves from trees and bushes that have already fallen on the ground; see how many different kinds you can find; (2) using your paintbrush, brush paint on the front of a leaf until it is well coated; (3) press the leaf onto your piece of paper; when you peel it back, you'll see the imprint of the leaf! For best results, use lots of colors!

Leaf Rubs

If you don't want to use paints, on a hard surface, try placing a leaf under a thin sheet of paper. Then rub over the paper with a crayon. The result? A colorful outline of the leaf and its parts!

Personal Treasure Box

Have you ever wondered where the garbage collector takes your trash? Some trash goes to landfills where it is piled up. The garbage then decomposes (or breaks down) so that more garbage can be added. The problem is that some garbaage can take hundreds of years to break down and landfills can give off gases that pollute the air! That's why it's important to recycle and cut down on waste. You can help do this by saving items you usually throw away and turning them into fun things! For example, you can turn an old box into a personal treasure box! Younger kids may need an adult's help.

You'll Need: an empty soap powder box with a lid, scissors, paste, colored paper

Directions: (1) use scissors to cut out shapes from the colored paper; (2) paste them onto the outside of the box; you can also use fabric, stickers and old photos to decorate the box; (3) when you finish decorating it, open it up and fill it with your favorite treasures like action figures or other toys! You can also make a scrunchie holder using an empty paper towel roll and the same method!

Parent Air Pollution Information Survey

Directions: Please complete the survey by placing a check or a response to each question:

I Do you think that air pollution is a problem in your community?

_____Yes _____ No

2. What kind of air pollution would you consider to be dangerous to the community? _____Cars _____Industrial plants
_____Gas powered lawn mower _____Other

3. Does air pollution exist in your home?
_____Yes _____No
If yes, identify the pollutant.

4. What steps do you @ should be taken to reduce air pollution?

5. If you had an air pollution problem which agency/organization would you contact for help?

Parent Signature _____

Date _____

Environmental Agencies & Organizations

- The Environmental Protection Agency (EPA)
- The Occupational Safety and Health Administration (OSHA)
- National Institute for Occupational Safety and Health (NIOSH)
- Maryland Occupational Safety and Health Administration (MOSHA)
- Maryland Department of the Environment (MDE)
- American Lung Association
- Clean Air Partners

In Virginia contact:

Jim Snyder, Director
Long Range Environmental Plan
Virginia Department of Environmental Quality
804-698-4425

In Washington, D.C.:

Sandra Handon or Keith Keemer
Tools for Schools
Air Quality Division, Washington D.C.
Department of Health
202-535-2255

Eight Acts to Regulate the Environment

* The **Clean Air Act** is a law that allows the EPA to set standards for major air pollutants. **Pollutants** are harmful substances in the environment.

* The **Comprehensive Environmental Response, Compensation and Liability Act** is a law that provides federal funding to clean up uncontrolled or hazardous waste sites and chemical spills.

* The **Clean Water Act** is a law that sets regulations on wastes going into water and on the operation of waste treatment plants and makes it illegal to release pollutants into the water.

* The **Safe Drinking Water Act** is a law that protects the quality of drinking water. It also sets standards for owners and operators of public water systems.

* The **Endangered Species Act** is a law that protects animal and plant species threatened, by extinction. **Extinction** is the death of all members of a species of animal or plant. The act makes it illegal to remove an endangered species from its natural habitat. A **habitat is** a place where an animal or plan normally lives.

* The **National Environmental Policy Act** is a law that requires all government agencies to consider environment before taking any action that might affect the environment.

* The **Toxic Substances Control Act** is a law that authorizes the EPA to set standards for the manufacturing, use, transportation, and disposal of toxic substances.

* The **Occupational Safety and Health Act** is a law that sets a series of minimum safety and health standards that all employers must meet.

RESOURCE MATERIALS

AUDIO VISUALS

Ozone Double Trouble. 16-minute streaming video. United States Environmental Protection Agency. www.epa.gov/oar/oaqps/ozvideo/

BOOKS AND PAMPHLETS

Air Quality Index, A Guide to Air Quality and Your Health. United States Environmental Protection Agency, Office of Air and Radiation. 202.564.7400. EPA454/R-00-005.

WEB SITES

Clean Air Partners
www.cleanairpartners.net

Environmental Protection Agency's AIRNOW
.epa.gov/AIRNOW

Maryland Department of the Environment www.mde.state.md.us/arma

Metropolitan Washington Council of Governments www.mwcog.org/dep/air/

Save Planet Polluto
www.planetpolluto.com

Smog City
www.smogcity.com

A/V Material

"Breathing Easy: Ozone Air Pollution and You." American Lung Association of Maryland, Inc. www.lunpusa.org Maryland Department of the Environment. www.mdestate.md.us (Senior High/Adult) - Video

"Charlie Brown Clears the Air" American Lung Association. 1999. Media Dimension (students) - Video

"The Road to Cleaner Air" Sponsored by Oxygenated Fuels Association. (Teachers/Adults) - Video

"For Every Breath You Take" The American Lung Association of California and Millennium Communications (Teacher/Adults). (510) 638-5864. Video

"Home Air Care: Indoor Air and Your Health" American Lung Association, 1995 (Teachers/Adults). - Video

"Winning Against Asthma" Schering Group, Kenilworth, New Jersey (Students). - Video

"Indoor Air Quality: Tools for Schools." Ventilation Basics. (Students) Video

"Indoor Air Quality." Indoor Air Service Incorporation, Educational Program (Adults) - Video

"Save Planet Polluto", Sacramento Metropolitan Air Quality Management District. www.planetpolluto.com - CD

Web Sites for Kids

(Adopted from the Maryland Department of the Environment)

Enviro-Kids from the Environmental Protection Agency
http://www.epa.gov/region07/kids

Explorer's Club for Kids
http://www.epa.gov/kids

Kids on the Web from the U.S. Department of the Interior
http://www.doi.gov/kids

Discovery for Kids
http://www.discoverykids.com/

The Clean and Green Club for Kids
http://www.worldkids.net/clubs/green/games.html

Ranger Rick and the National Wildlife Federation Web Site for Kids
http://www.nwf.org/nwf/kids/index.html

EEK-Environmental Education for Kids
http://www.dnr.state.wi.us/org/caer/ce/eek/index.htm

Captain Planet Foundation
http://www.turner.com/cpf/index/html

City Green
http://www.americanforests.org/global_ releaf

DNR Arbor Day
http://www.dnr.state.md.us/forests/education/arbordgy.html

Tree-mendous MD
http://www.dnr.state.md.us/forests/treemendous

Schoolyard Habitat Projects
http://education.cbf.org/educators/restoration/shoolyard.php3

Pamphlets, Brochures, and Booklets

"Protecting Our Natural Environment." Business and Legal Reports, Inc., Madison, CT 06443 (Booklet)

"Air Pollution and the Chesapeake Bay." Chesapeake Bay Program. 1-800-YOURBAY: www.chesapeakebay.net (Brochure)

"Things to Do Today for the Environment." Maryland Department of the Environment. 2500BroeningHighway, Baltimore, MD 21224. 410-631-3000. www.mde.state.md.us. (Brochure)

The following are brochures from the American Lung Association:

"Air Pollution: The Danger Continues"

"Clean Air is Up to You '

"Facts About Clean Indoor Air in Child Care"

"Facts about Dust Diseases"

"Facts About Radon"

"Health Effects of Outdoor Air Pollution"

"What You Can Do About Air Pollution"

Bibliography

1. "The Great Body Shop". Health Education Curriculum, Grade 3. The Children Health Market, Inc. P.O. Box 7294, Wilton Ct. 06897 or 800-782-7077.

2. "Actions for Health. Contemporary Health Series (Grade 3) ETR Associates, Santa Cruz, California, 1992.

3. "Comprehensive School Health Education." Totally Awesome Strategies for Teaching Health. Linda Meeks, Philip Heit, Randy Page. Everyday Leaming Corporation, P.O. Box 812960, Chicago, 11. 60810,1996.

4. "Health and Wellness." Meeks Heit Publishing Company. P.O. Box 121, Blacklick, 43004. (614)-759-7780, 1998.

5. RESA Environmental/Outdoor Education Resource and Curriculum Guide. Wayne County Regional Educational Service Agency, 33500 Van Bom Road. Wayne, MI 48184-2497 (313) 467-1300. http://www.wcresail12.mius.

6. Sky High: An Air Quality Curriculum for Ventura County. Ventura County Air Pollution Control District. 669 County Square Drive. Ventura, CA 93003-805/645-1400

- The above list of materials are not used in the curriculum, but can be used to expand the teacher's knowledge about air pollution as well as a review of samples of strategies to be used when delivering instruction related to environmental health education.

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Hare, Tony. The Greenhouse Effect. Glouchester Press: New York, 1990.
Hogan, Paula. Dying Oceans: Environmental Alert. Gareth Stevens Children's Books: Milwaukee, WI. 199 1.

McLeish, Evon. Protecting Our Planet: Keeping Water Clean. Raintree Steck Vaughn Publishers: Austin Texas: 1998.
Rogers, Lisa. Mary Rogers. Our Endangered Planet AIR. Lemer Publications Company: Minneapolis, 1995.

Woodburn, Judith. The Toxic Waste Time Bomb. Gareth Stevens Publishing: Milwaukee, 1992.