

WHAT'S GOING ON WITH OUR AIR?

AIR POLLUTION

Sunshine State Standards: SC.G.2.4.4
SC.D.2.4.1

Background

The atmosphere plays a major role in life on Earth. Without it, there would be no life, as we know it. The abiotic atmosphere and the plants and animals on the planet all have an important role in maintaining that life.

Materials

1. Atmospheric map
2. Environmental Quiz (Day 3)

Procedure

These activities can be extended over a 5-day or longer time period.

DAY 1: WHAT IS AIR POLLUTION?

Activity

1. Students will listen to a lecture on the atmosphere. What it is and what it does for you.
2. Discussion will follow. See attached page for general format.

Assessment

Observation of students.

AIR POLLUTION

Section 1 (45 mins.) What is Air Pollution?

<u>Objective</u>	<u>Concept</u>	<u>Activity</u>
<p>A. The Atmosphere, what it is and what it does for your.</p> <p>Material Needed. A map indicating the layers of the atmosphere</p> <p>1. Students will understand the structure of the atmosphere and the roles it plays in our lives.</p>	<p>Structure and role of the atmosphere</p>	<p>1. Discuss the ways in which the atmosphere affects people personally: temperature and weather control (temperature, wind, clouds, rain, etc.), protection from solar radiation and particles from space (skin cancer, small meteors), etc. 2. Discuss composition of the atmosphere in its layers.</p>
<p>2. Students will recognize the role that plants, cyanobacteria and ocean play in the maintenance of oxygen levels on earth.</p>	<p>Oxygen Cycle</p>	<p>1. Discuss the oxygen cycle relative to the students' environment or have students draw a diagram of the oxygen cycle. 2. Introduce Students to Cyanobacteria, or blue-green algae, which was responsible for increasing Oxygen content of the atmosphere from 1% to 20% at the beginning of the Proterozoic period. 3. Focus on the importance of trees and the amount of canopy coverage (40% that is necessary for a healthy environment).</p>

ATMOSPHERIC LAYERS – insert colored diagram into notebook

DAY 2: TYPES AND SOURCES OF AIR POLLUTION

Activity

1. Students will generate a list of types of air pollution
2. Students will recognize the difference between primary and secondary air pollution
3. Watch a demonstration of incomplete combustion and write a lab report on the demonstration
4. Set up dust collectors around school for collection the following week

Assessment

Generated list and lab report.

AIR POLLUTION

Section 1 continued.

<u>Objective</u>	<u>Concept</u>	<u>Activity</u>
B. Types and sources of Air Pollution. Material Needed. Bunsen Burner and piece of glass Dust Collectors (handout)		
1. Student will be familiar with different types of air pollution: hydrocarbons, sulfur oxides, nitrous oxides, photochemicals, particulate matter (dust), radioactive materials, carbon dioxide, ammonia, carbon monoxide, pesticides.	Air Pollution	1. Define air pollution 2. Have the class describe the evidence of air pollution that they see in their environment and discuss the local causes of air pollution.
2. Student should be able to recognize the difference between primary and secondary air pollution.		
3. Acquaint students with major sources of air pollution, such as: Incomplete combustion (carbon monoxide and nitrous oxide) chemical industry (fertilizers, hydrocarbons, etc.) combustion (photochemicals, carbon dioxide)	Air Pollution sources	1. Demonstrate incomplete combustion by adjusting a Bunsen burner from blue to yellow flame and showing the deposition of products on a glass plate. 2. Have the class list the sources of air pollution that they see in their environment. 3. Provide Students with the Dust Collector Instructions and Template. Instruct them to construct and hang the collectors, then report back with what they found on the collectors after 5 to 7 days.

DUST COLLECTOR

(Student Handout)

What you need:

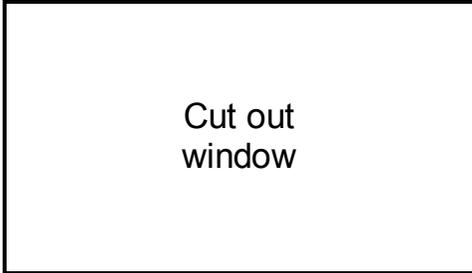
1. An 8" x 10" (205 x 255 millimeters or mm) piece of shoebox cardboard or stiff paper from a file folder.
2. Six pieces of sticky stuff. Sticky labels or transparent tape work fine. Each piece should be about 1-1/2' x 3-1/2" (40 mm x 90 mm).
3. One light string per collector, 12" (300 mm) long.
4. Tape to hang the collector strings.
5. A magnifying glass (if you have one).

What to do:

1. Print out the pattern page.
2. Cut out six collectors, using the pattern from the page.
3. Fold each collector and cut out the inside window. Then flatten the collector.
4. Write the location and starting date and time on each collector.
5. Hang the collectors wherever you are curious about the air. Or use these suggested locations:
 - a. Above your bed, near where you breathe.
 - b. On the inside or outside of a window.
 - c. Near a heating vent.
 - d. Above the cooking stove.
 - e. On a wall near the floor or ceiling.
 - f. On your main entry door.
 - g. Under a tree.
6. Cover the window on the collector with the sticky label or tape. Put the sticky side up or out.
7. Wait a couple of days and take the collectors down. Write the ending time and date on each. Don't touch the sticky stuff!

Now let's look at what you found!

DUST COLLECTOR PATTERN

	Location: Starting date: Time:	 <p>Cut out window</p>	Ending date: Time:
	Location: Starting date: Time:	 <p>Cut out window</p>	Ending date: Time:
	Location: Starting date: Time:	 <p>Cut out window</p>	Ending date: Time:

DAY 3: WHERE AIR POLLUTION COMES FROM AND WHAT IT DOES

Activity

1. Students will group yesterday's list of air pollutants into four categories:
Point, Mobile, Biogenic and Area
2. Students will take Environmental Quiz
3. Class will go over answers and understand why their answers were right or wrong.

Assessment

Grade Quiz

AIR POLLUTION

Section 2 (45 mins.) Where air pollution comes from, what it does

<u>Objective</u>	<u>Concept</u>	<u>Activity</u>
C. Producers of Air Pollution	Production of air pollution	1. Use the “Environmental Quiz” to informally test the students’ knowledge of pollutants, sources of pollution and the state of air.
Material Needed.		
Environmental Quiz		
1. Students will recognize the producers of air pollution in their environment. These have been grouped into four categories; point (factories or power plants), mobile (cars, trucks, lawn equipment), Biogenic (vegetation, gas seeps, volcanoes) and area (dry cleaners, service stations).		
2. Students will relate air pollution producers with the pollution that is created.		1. Discuss the elements of the environment that produce air pollution and have the class speculate on what percentage of air pollution can be attributed to certain sources.

WHAT'S GOING ON WITH OUR AIR?
THE ENVIRONMENTAL QUIZ
(Teachers Edition)

1. Which pollutants come from mobile sources?

- a. Hydrocarbons (Paraffins, Olefins, Naphthenes, Aromatics)
- b. Nitrogen Oxides (NO, NO_x, NO₂)
- c. Carbon Dioxide (CO₂)
- d. Carbon Monoxide (CO)
- e. Particulates (any material collected on a filtering medium after exhaust dilution)
- f. Air Toxics (???)
- g. None of the Above
- h. All of the Above

Answer: All of the Above

Right! All of these mobile source emissions can lead to air pollution. However, the near-complete switch to unleaded gasoline in this country has nearly eliminated lead as an ambient air quality problem in the United States.

2. The combination of nitrogen oxides and hydrocarbons in the presence of sunlight causes:

- a. Global Warming
- b. Smog (ozone)
- c. Stratospheric Ozone Depletion
- d. Acid Rain

Answer: Smog

Ground-level ozone, otherwise known as urban smog. This is one of the most difficult air pollution problems to correct.

3. Ozone is beneficial to our environment at high altitudes, yet harmful at low altitudes?

- a. TRUE
- b. FALSE

Answer: This statement is True

At high altitudes, ozone acts as a shield against harmful ultraviolet radiation from the sun. At ground level, ozone can cause respiratory ailments in people and adverse effects on plant life.

4. During the last 20 years, average ambient air levels of ozone, carbon monoxide and lead have:

- a. Gone up 10 percent
- b. Gone up 50 percent
- c. Not changed
- d. Gone down

Answer: They've gone down

- Levels of lead have gone down more than 90%!
- The phase-down of lead from gasoline has resulted in near elimination of lead emissions.
- Improvements in vehicle and emission control technology have also greatly reduced emissions of carbon monoxide, as well as ozone forming nitrogen oxides and hydrocarbons.

5. Which mobile source pollutant cannot be controlled by emission control technology?

- a. Ozone forming hydrocarbons (C_nH_{2n+2})
- b. Carbon Monoxide (CO)
- c. Carbon Dioxide (CO₂)
- d. Air Toxics
- e. Particulate Matter (solid emissions)

Answer: Carbon Dioxide (CO₂)

CO₂ is the ultimate result of perfect combustion of any carbon-based fuel. The only ways to reduce CO₂ emissions are:

- To make vehicles more fuel efficient and/or drive less
- To use a non-carbon fuel such as hydrogen
- To use a "green" fuel such as ethanol which is produced from crops that absorb CO₂ as they grow.

The Greenhouse Effect is caused by Carbon Dioxide and other gases absorbing infrared radiation in the atmosphere and warming the earth.

6. Tailpipe exhaust is not always the greatest source of vehicle emissions?

- a. TRUE
- b. FALSE

Answer: True

Vapors from evaporating gasoline, or “evaporative emissions”, can account for two-thirds of the hydrocarbon emissions from gasoline-fueled vehicles on hot summer days. Evaporative emissions occur during vehicle refueling, vehicle operation and even when the vehicle is parked,

7. Which of these vehicle fuels causes the least pollution?

- a. Electricity
- b. Reformulated Gasoline
- c. Natural Gas
- d. Alcohol
- e. Hydrogen
- f. Beer

Answer: Hydrogen

- While all of these fuels are cleaner than today’s gasolines, hydrogen is the only one with the potential to be pollution-free, emitting only water vapor.
- However, hydrogen technology is decades away from being commercially viable.
- Batter-powered electric vehicles have the potential to emit zero pollution, but the power plants that generate electricity to charge the batteries do pollute.

8. What region of the US has experienced the worst effects from acid rain?

- a. North West
- b. North East
- c. South West
- d. South East

Answer: North East

The most serious effects of acid rain have thus far been observed in the North East.

9. Which of the following is the biggest polluter of our air?

- a. City buses
- b. Passenger Cars and Light Trucks
- c. Over-the-Road Trucks
- d. Power Plants

Answer: Passenger Cars and Light Trucks

- There are over 200 million passenger cars and light trucks on American roads!
- These vehicles drive almost 2 trillion miles every year.
- Motor vehicles account for about 50% of air pollution nationwide.
- The vehicle contribution to pollution is usually even higher in polluted cities.

10. Estuaries suffer some of the worst effects of water and air pollution. What is an Estuary?

- a. The area where fresh water and salt water meet
- b. A large inland body of water
- c. An ancient river bed
- d. None of the above

Answer: Yes! Estuaries are the areas where fresh and salt water meet.

Some well-known examples of estuaries are:

- Chesapeake Bay
- Puget Sound
- San Francisco Bay

Air pollution is a major source of water pollution.

11. The largest contributor of NEW toxic pollution to the upper Great Lakes is:

- a. Air Pollutants
- b. Sewage Treatment Plants
- c. Factories

Answer: The correct answer is Air Pollutants.

- Research indicated that atmospheric sources are the single largest contributor of new toxic pollution to the upper Great Lakes and a significant source, perhaps 20% in the lower Great Lakes.
- Acid rain threatens the Common Loon, duck populations and other species of fish-eating birds.
- Research has implicated airborne sulfates in at least 50,000 premature deaths each year – as many lives as are lost in automobile accidents.

12. Which of the following is the source of Radon in homes?

- a. Ultraviolet Radiation
- b. Defective Heating Systems
- c. Uranium in Rock Formations
- d. None of the above

Answer: Uranium in Rock Formations

Radon is formed by the radioactive decay of uranium in naturally occurring rock formations, which could be located under your home.

13. Where is there most potential for future gains in reducing motor vehicle emissions?

- a. Better control of emissions from vehicles in actual use
- b. Use of clean transportation alternatives such as mass transit
- c. Use of cleaner fuels
- d. All of the above

Answer: All of the above

You can do your part by making sure your vehicle is maintained properly, by choosing the most fuel efficient model that meets your needs and using more efficient alternative transportation whenever possible, such as bike, carpool or mass transit.

WHAT'S GOING ON WITH OUR AIR?
THE ENVIRONMENTAL QUIZ

(Student Copy)

1. **Which pollutants come from mobile sources?**
 - a. Hydrocarbons (Paraffins, Olefins, Naphthenes, Aromatics)
 - b. Nitrogen Oxides (NO, NO_x, NO₂)
 - c. Carbon Dioxide (CO₂)
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 - e. Particulates (any material collected on a filtering medium after exhaust dilution)
 - f. Air Toxics (???)
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2. **The combination of nitrogen oxides and hydrocarbons in the presence of sunlight causes:**
 - a. Global Warming
 - b. Smog (ozone)
 - c. Stratospheric Ozone Depletion
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3. **Ozone is beneficial to our environment at high altitudes, yet harmful at low altitudes?**
 - a. TRUE
 - b. FALSE

4. **During the last 20 years, average ambient air levels of ozone, carbon monoxide and lead have:**
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 - e. Particulate Matter (solid emissions)

- 6. Tailpipe exhaust is not always the greatest source of vehicle emissions?**
- a. TRUE
 - b. FALSE
- 7. Which of these vehicle fuels causes the least pollution?**
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 - b. Reformulated Gasoline
 - c. Natural Gas
 - d. Alcohol
 - e. Hydrogen
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 - d. Power Plants
- 10. Estuaries suffer some of the worst effects of water and air pollution. What is an Estuary?**
- a. The area where fresh water and salt water meet
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 - c. An ancient river bed
 - d. None of the above
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- c. Use of cleaner fuels
- d. All of the above

DAY 4: HOW AIR POLLUTION AFFECTS OUR LIVES

Activity

1. Discuss global warming, ozone depletion and changes in weather patterns
2. Students will document signs of damage caused to their physical environment by air pollution
3. Demonstrate the effects of sulfuric acid on marble
4. Write up a lab report on #3

Assessment

Grade lab report. Grade documentation acquired of damage.

AIR POLLUTION

Section 3 (45 mins.) How Air Pollution Effects Our Lives

<u>Objective</u>	<u>Concept</u>	<u>Activity</u>
D. Effects of Air Pollution Material Needed. “Finding Sources of Air Pollution” handout Sulfuric Acid, Pyrex beaker, marble and safety equipment		
1. Students will learn how air pollution affects the planet and their environment.	Reasons for concern	<ol style="list-style-type: none">1. Discuss global warming, particulate matter, ozone depletion, low level atmospheric ozone and changes in weather patterns.2. Have the students document instances of damage caused to their physical environment by air pollution (metals corrode faster, rubber plastic and wood products deteriorate quickly, stone or mineral based objects discolor or dissolve). Use in conjunction with handout in the following section.3. Demonstrate the effects of sulfuric acid (acid rain) on marble. (Place a small chip of marble in sulfuric acid)

Section 3 continued

2. Students will be introduced to the ways in which air pollution can affect their bodies.

1. See “Finding Sources of Air Pollution”, Before distributing the handout, ask students to list the ways that they think air pollution can harm them, have them specify what activities can be limited by air pollution.

2. Discuss asthma, ask the students if they or someone they know has asthma and what in their environment (indoor or outdoor) can trigger asthmatic attacks (dust mites, mold, cigarette smoke, pollen, ozone and fine particulate matter).

FINDING SOURCES OF AIR POLLUTION Major Man-Made Air Pollutants

<u>POLLUTANT</u>	<u>DESCRIPTION</u>	<u>SOURCES</u>	<u>SIGNS/EFFECTS</u>
Carbon monoxide (CO)	<ul style="list-style-type: none"> ❑ Colorless, odorless gas 	<ul style="list-style-type: none"> ❑ Vehicles burning gasoline ❑ Indoor sources, including kerosene, wood-burning, natural gas, coal or wood-burning stoves and heaters 	<ul style="list-style-type: none"> ❑ Headaches, reduced mental alertness, death ❑ Heart damage
Lead (Pb)	<ul style="list-style-type: none"> ❑ Metallic element 	<ul style="list-style-type: none"> ❑ Vehicles burning leaded gasoline ❑ Metal refineries 	<ul style="list-style-type: none"> ❑ Brain and kidney damage ❑ Contaminated crops and livestock
Nitrogen oxides (NO _x)	<ul style="list-style-type: none"> ❑ Gaseous compounds made up of nitrogen and oxygen 	<ul style="list-style-type: none"> ❑ Vehicles ❑ Power plants burning fossil fuels ❑ Coal-burning stoves 	<ul style="list-style-type: none"> ❑ Lung disorder ❑ React in atmosphere to form acid rain ❑ Combines to deteriorate buildings and statues ❑ Adds to forest damage ❑ Form ozone & other pollutants (smog)
Ozone (O ₂)	<ul style="list-style-type: none"> ❑ Gaseous pollutant 	<ul style="list-style-type: none"> ❑ Vehicle exhaust and certain other fumes ❑ Formed from other air pollutants in the presence of sunlight 	<ul style="list-style-type: none"> ❑ Lung disorder ❑ Eye irritation ❑ Respiratory tract problems ❑ Damages vegetation ❑ Smog
Particulate matter	<ul style="list-style-type: none"> ❑ Very small particles of soot, dust or other matter, including tiny droplets of liquids 	<ul style="list-style-type: none"> ❑ Diesel engines ❑ Power plants ❑ Industries ❑ Windblown dust ❑ Wood stoves 	<ul style="list-style-type: none"> ❑ Lung disorder ❑ Eye irritation ❑ Damages crops ❑ Reduces visibility ❑ Discolors buildings and statues
Sulphur dioxide (SO ₂)	<ul style="list-style-type: none"> ❑ Gaseous compound made up of sulphur and oxygen 	<ul style="list-style-type: none"> ❑ Coal-burning power plants and industries ❑ Coal-burning stoves ❑ Refineries 	<ul style="list-style-type: none"> ❑ Eye irritation ❑ Lung damage ❑ Kills aquatic life ❑ Reacts in atmosphere to form acid rain ❑ Damages forests ❑ Deteriorates buildings and statues

DAY 5: WHAT WE CAN DO ABOUT AIR POLLUTION

Materials:

Handouts on reducing pollution

Activity

- Part A: Teacher will lead a discussion of activism. Students will discuss ways they can reduce air pollution using attached handout.
- Part B: Students can organize a “Clear the Air” day. Prepare a presentation on air pollution for peers or general public. Notify the media and invite them as well as local officials to attend.
- Part C: Write a letter to the State and Federal congresspersons advocating the promotion of measures to improve air quality.
- Part D: Discuss the ways in which students might encourage others to be environmentally responsible.

AIR POLLUTION

Section 4 (45 mins.) What we can do about air pollution

<u>Objective</u>	<u>Concept</u>	<u>Activity</u>
E. How can we reduce air pollution:		
Material Needed. Name and Contact Information for State and Federal Congressional Representatives and Senators		
Tip Sheet		
1. Introduce students to what they can do at home <ol style="list-style-type: none">In the homeCarReduce Consumption	Responsibility	1. Discuss attached tip sheet. 2. Have each student list they ways that they can personally help reduce air pollution.
2. Introduce students to activism	Activism	1. Organize a "Clear the Air" Day. Have students prepare a presentation on air pollution for peers or the public. Encourage them to contact the media or local officials to attend. 2. For consideration as an extra credit assignment, have students write a letter to their congresspersons advocating the promotion of measures to improve air quality. 3. Discuss ways in which they might encourage others to be environmentally responsible.

HOW TO REDUCE AIR POLLUTION

(Student Handout)

How you drive and care for your car IS important. Since automobiles are a major source of air pollution in most areas, your driving habits and your car maintenance can either add to the problem or help to solve it.

Driving Tips

- ✓ Plan ahead. Organize your trips. Driving fewer miles will help reduce air pollution. Combine several errands into one trip. Avoid driving during peak traffic periods when stop-and-go traffic is at its worst. This will not only save you gas but will also reduce the wear and tear on your car. Try walking or bicycling for short errands and leisure activities.
- ✓ Ride share. Carpools and public transportation reduce the number of cars on the road and miles driven. If you own or manage a business, create incentives that encourage employees to carpool. As an employee, form a carpool with others at work or in your neighborhood. Consider taking public transportation as an alternative to driving.
- ✓ Drive at a medium speed. In normal traffic conditions, most cars operate most efficiently between 35 and 45 miles per hour; lower or higher speeds are less efficient. If you drive 55 miles per hour rather than 65 miles per hour on the highway, you can increase your gas mileage by as much as 15 percent, depending on your car.
- ✓ Drive at a steady speed. It is more fuel efficient to drive at an even speed than it is to keep speeding up and slowing down. This is true in heavy traffic as well as on the open road.
- ✓ Stop and start evenly. Gently accelerating reduces gas consumption. Coasting to a stop lets the car's momentum, not its fuel, get you where you want to go.
- ✓ Don't idle the engine unnecessarily. Contrary to popular belief, turning off and starting an engine uses less gasoline than letting the engine idle for 30 seconds. Stop the engine if it is idling at a drive-up window or in traffic jams. Limit engine warm-ups in winter.
- ✓ Travel light. The more weight your car carries, the less fuel-efficient it becomes. Take unnecessary items out of the trunk.
- ✓ Follow your owner's manual. The owner's manual that comes with your car will recommend which grade of gasoline to use, how to shift gears and other ways you can keep your engine running at maximum environmental and economic efficiency.

Maintain Your Car

- ✓ Don't remove or tamper with pollution controls. The pollution control equipment on cars helps limit the pollutant emissions at the tailpipe. Removing or tampering with these controls puts more pollution into the air.
- ✓ Don't overfill or "top off" your car's gas tank. Even if you don't spill gasoline, fumes can escape. They react with nitrogen oxides and sunlight and create smog.
- ✓ Avoid releasing gas vapors. Gas vapors can harm your health as well as the environment. Many service stations are installing vapor controls on their pumps to help reduce air pollution. While many of the nozzles have what look like elephant trunks, others look more conventional.
- ✓ Get regular engine tune-ups and car maintenance checks. Tune-ups improve your gas mileage and car performance. The spark plugs are especially important, because a worn spark plug will cause poor starting, rough idling and poor gas mileage.
- ✓ Make sure your tires are properly inflated and your wheels aligned. Doing this can prevent excessive drag and improve fuel economy up to one mile per gallon.
- ✓ Keep car filters and catalytic converters clean. Dirty air filters increase fuel consumption; and your car's pollution control devices need to be in good working order to be effective. Follow the car manufacturers' guidelines.
- ✓ Use your car air conditioner wisely. Air conditioning is a drag on your car's engine, reducing gas mileage by as much as 20 percent. On not-so-hot days or while in stop-and-go traffic, roll down your window instead. Have leaks in your car air conditioner fixed by a certified technician using required CFC recycling equipment.
- ✓ Consider buying fuel-efficient cars. When buying a car – new or used – check its posed fuel efficiency and seek the most fuel-efficient, "clean" car in the size category that meets your needs.

Reducing Pollution And Conserving Resources At Home And At Work

- ✓ Conserve electricity. Electricity generation can be a major source of air pollution. New home and office-oriented technology can help. At home or work you can save electricity by using energy-efficient lighting wherever possible. Replacing a common incandescent light bulb with an energy-efficient compact fluorescent bulb saves 45 watts and 157-kilowatt hours. Make sure that lights and appliances are turned off when not in use. In addition, you should raise the temperature level on your air conditioner a few degrees in summer, and turn down your heat a few degrees in

winter. Purchasing energy-efficient appliances will also aid in conserving energy use. Conserving electricity reduces air pollution caused by power plants.

- ✓ Participate in your local utility's energy conservation programs. Ask your local utility about its customer energy conservation program. If they have one, join up. If they don't encourage them to start one.
- ✓ Buy fuel-efficient motorized equipment. If you are buying a power mower or other motorized garden tools, construction or farm equipment, or outboard motors, seek out those that are designed to minimize emissions to reduce spillage when being refueled.
- ✓ Avoid spilling gas. Take special care to avoid spills and the release of fumes into the air when refueling gasoline-powered lawn, garden, farm and construction equipment and boats.
- ✓ Properly dispose of household paints, solvents and pesticides. Do not pour these chemicals down the drain, into the ground or put them into the garbage. Call your local environmental agency for information on proper disposal of these products.
- ✓ Seal containers tightly. Make sure that containers of household cleaners, workshop chemicals and solvents and garden chemicals are tightly sealed to prevent volatile chemicals from evaporating into the air. Don't leave containers standing open when not in use.
- ✓ Reduce waste. When you make purchases, consider using products that are durable, reusable or use less packaging. Repair broken items rather than buying new ones. Recycle and compost potential wastes before they become part of the waste stream. Such actions help reduce the pollutants that might reach the air during the manufacturing process or during the collection and processing of wastes for incineration or landfill disposal. If there is not local recycling program in your community, start one with the help of your neighbors and the local trash collection company.
- ✓ Use wood stoves and fireplaces wisely and sparingly. If you have a wood stove, learn how to burn cleanly and more efficiently. Remember to burn dry, well-seasoned wood and build efficient fires that burn hot and clean. Check your stack, clean your chimney and inspect your catalyst annually. A well maintained and operated stove produces less pollution and is better for the environment. Adhere to local or state regulations about when and where wood stove use is permitted.
- ✓ Properly dispose of refrigeration and air conditioning equipment. The Clean Air Act prohibits the release into the atmosphere of refrigerants from automobiles and home appliances during the disposal of this equipment. Contact your local government or trash pickup service to find out what procedures are being implemented in your area to ensure the safe disposal of cars and home appliances. In some areas,

municipalities arrange for periodic pickups of home appliances that contain refrigerant. In others, it is required that homeowners have the refrigerant removed by a qualified service technician before the appliance can be picked up.

- ✓ Recycle refrigerant. As of July 1, 1992, individuals are prohibited from knowingly venting refrigerant into the atmosphere while maintaining, servicing, repairing or disposing of air conditioning or refrigeration equipment. Make sure that the technician who services, repairs or maintains your refrigerator or air conditioner has recovery equipment to capture any refrigerant that may be released. This refrigerant can later be recycled. Also, when possible, don't just refill leaky air conditioning or refrigeration systems – repair them.

Get Involved In Local Efforts To Reduce Air Pollution

- ✓ Let people know you care. One of the driving forces behind reducing air pollution is citizen concern and involvement (as in Denver, for example). As an individual or as a representative of a concerned group, speak up at hearings and let your local public officials know how you feel about air pollution problems in your community. Your state and local environmental agencies can tell you when hearings are held and what agency is responsible for clean air.
- ✓ Learn about local efforts and issues. Talk to your state environmental agency to find out what it is doing in your area.
- ✓ Work with a local group. Join a community group that is working to improve air quality.
- ✓ Report problems. If you think you see an air pollution problem, advise your local or state agency, or the EPA regional office near you.

You Can Make A Difference

When environmental scientists talk about air pollution, they talk in terms of millions of tons of pollutants. It is not easy to relate such figures to the smoke that comes out of your chimney or the exhaust coming out of your car. However, even small sources of pollution, when added to hundreds or thousands of other small sources, do harm the environment and are dangerous to your health.

If we all do our share to reduce air pollution, the benefits will be tremendous:

- If 190,000 car owners started to get regular tune-ups, they will keep some 90 million pounds of carbon dioxide out of the atmosphere.
- If each commuter car carries one more passenger, 600,000 gallons of gasoline will be saved and 12 million pounds of carbon dioxide will be kept out of the air.
- If consumers set their air conditioners six degrees higher, it will save 190,000 barrels of oil a day – and eliminate all those pollutants that come from burning the oil to produce the electricity involved.