Basic Environmental Conservation and Air - Member's Workbook
Michigan State University Cooperative Extension Service
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Robert George, Environmental Conservation Education
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"BASIC" Environmental Conservation and *Air* Member's Workbook

MICHIGAN STATE UNIVERSITY
Cooperative Extension Service • East Lansing

4-H-YOUTH PROGRAMS

THIS WORKBOOK BELONGS TO:

Name_____ Age_____

Address _____

Club _____

Leader's Name _____

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OBJECTIVE

The "Basic" Environmental Conservation and Air project is designed for all young people, whether on the farm or in the city, in a community club, project club, or school conservation club. This is an experience which we firmly believe will be helpful (and fun) in catching some of the real ideas and ideals of Environmental Conservation – the wise use of our environment.

The project is organized in seven activities to:

(1) Increase understanding and awareness of the importance of air.

(2) Develop a real concern for what we are doing to our air – air pollution.

(3) Motivate each of us to do something for "clean air" – to get involved in Environmental Conservation and Air.

ACKNOWLEDGMENT

Much of the text for this 4-H project was taken from the prototype publication, "Our Polluted Air," developed by the Pennsylvania Tuberculosis and Respiratory Disease Association. This 4-H Bulletin – members workbook – is an adaptation and expansion of their program and associated teacher's guide: "Air Pollution Mobile Workshop."

Supplementary materials in this leaders guide were made available by the Michigan Tuberculosis and Respiratory Disease Association, through the cooperation of their Program Director, Mr. Andrew Kovacs. Also, special thanks to Mr. Larry Payne, Michigan Department of Public Health, Air Pollution Control.

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Introduction

People, plants, and animals need air to live!

Q—Why do plants and animals and people need good clean air?

People and animals need the oxygen that is in the air to breathe—to live. A fish in an aquarium is getting oxygen from the air that is dissolved in the water. It breathes by taking the oxygen out of the water with its gills.

Q—What happens to fish when water becomes polluted and all the oxygen in the water is used up? Where can they get more oxygen? Can fish survive?

Animals have been using up oxygen from the air and from the water for millions and millions of years. Why hasn't all the oxygen been used up?

Plants and animals help each other!

•*Green plants give off oxygen* and need carbon dioxide for making food for themselves.
•*Animals,* including people, *give off carbon dioxide* when they breathe and need oxygen.

Read the booklet "Plants, How They Improve the Environment." This better environment booklet may be available locally, published by Soil Conservation Society of America, 7515 N. E. Ankeny Road, Ankeny, IA 50021.

Now, let's take a closer look at air—the atmosphere. Our outdoor air is often called "community air" because it belongs to no one, but to everyone.

Some of the things we do to our "community air" tends to spoil it. We put things into the atmosphere that contaminate it so that it is no longer the health supporting resource necessary for quality life and living.

The Air We Breathe

ACTIVITY 1

Five simple demonstrations that show what is in the air that plants, animals, and people "breathe."

Materials needed: clean glass bottle, steel wool, soup plate and water, two glass custard cups, small amount of lime water, flashlight, vacuum cleaner, facial tissues, deep cake pan, white paper, rock, glass slide smeared with vaseline, magnifying glass or hand lens.

1. *Air contains OXYGEN*—Push a wad of steel wool all the way down to the bottom of a bottle. Fill the bottle about half full of water and shake it well, until the steel wool is very wet. Pour off the water. Get a soup plate and add water one inch deep. Now put the bottle, mouth down, into the plate and let the bottle stand for one day and night. The water will rise up in the bottle. See how rusty the steel wool has become. The steel wool combined with oxygen in the air inside the bottle to form rust. The water then rose to take the place of the oxygen in the air that was used up by the steel wool.

2. *Air contains CARBON DIOXIDE*—Get a small amount of lime water from the drug store. Put it into two clear custard cups. Blow through a soda straw into the lime water in one cup. The carbon dioxide from your breath will make the lime water milky. Place the lime water in the second cup in the fresh air for a few hours. Watch what happens. Whenever carbon dioxide meets lime water, the lime water becomes milky.

3. *Air contains WATER VAPOR*—Get a tin can which has had the top removed smoothly. Remove the label and scrub the can with steel wool until it is bright and shiny. Fill it half full of cold water. Add two or three ice cubes. Soon, droplets of water will form on its sides. When warm air meets the cold sides of the can, the water vapor in the air changes back into droplets of water.
4. *Air contains DUST*—Pull down the shades in a room, switch off the lights, and turn on a flashlight or a slide projector light. Little specks of dust will be dancing in the beam of light. (You can often observe dust particles in a ray of sunlight coming through the window.) Take a tank-type vacuum cleaner, and tape a piece of facial tissue over the end of the hose. Hold the hose up in the air and turn on the machine. After several minutes, switch off the vacuum cleaner, remove tissue carefully, and look at it under a bright light with a magnifying glass or hand lens.
5. *Air contains SMOKE AND SOOT*—Cut out a piece of white paper so that it fits the bottom of a deep cake pan. Place paper in the cake pan, then put a rock on the paper to keep it down. Put the pan outside on the window sill so that the fresh air can get to it. After a day or two, see how much smoke and soot has collected.
   Smear a glass slide with a thick layer of vaseline, and put it outside on the window sill. Leave it for a few days, then take the slide in, put it on a piece of white paper, and study it under a bright light using a magnifying glass or hand lens.

CONCLUSIONS:

All air has oxygen, carbon dioxide, water vapor, dust particles, and smoke and soot.

When air has lots of smoke, soot, dust, and other gases, we say that air is being polluted. When the air is thick with smoke and soot and other gases and fog, we call this condition smog. What do you think causes polluted air or smog in your town—community?

LIST the different ways you think that air is being polluted in your town—community.

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_____

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Check the following:

—See if you can identify or learn of any air pollution damage in your community.
—Are your shoes causing air pollution?
—Is the dust on furniture air pollution?
—As bike or automobile tires wear, what happens to the part that is gone?

Importance of Air

ACTIVITY 2

Purpose: To demonstrate the importance of air and the effects of air pollution, its causes and sources.

What are the basic needs of all living things?

Man, like all living things (plants and animals), can live only if certain basic needs are met. The four basic environmental needs of all living things are: sun, soil, water, and air.

How does the body get the oxygen it needs?

The body's need for oxygen is satisfied by the lungs bringing in air.

What happens to the lungs when they bring in dirty air?

The lungs show the effect of the air they bring in. If one lung received only pure air and the other the polluted air which surrounds us more and more, the pair of lungs would look quite different. The normal, healthy, pinkish-red lung tissue breathing pure air would probably be retained. But, with air pollution, the other lung would be darkened by particles carried in from the atmosphere.

What does it mean when the lung is dark?

A black lung is not, by itself, proof of illness. A black lung proves only the presence in the tissue of particles inhaled from polluted air. The impure air that deposits this dirt in the lung tissue does have an injurious effect on health.

Where might we find the kind of air that can keep our lungs pink and healthy?

The country can provide untainted air that can keep the lungs clean, healthy, and pink.

Why does a rural area have air different from a city's?

The country can provide cleaner air because there are few people living and working close together. Polluted air which would produce the darkened lung is found wherever there are large numbers of people living and working together amid the factories and businesses necessary to fill people's needs and desires.

What are the major sources of pollution in a city?

There are five major sources of today's pollution. They are:

Industry—and, of the many industries, the major polluters are pulp and paper mills, iron and steel mills, petroleum refineries, and chemical manufacturers.

Space heating—that is, the heating of buildings.

Incineration—burning of industrial waste, trash, and garbage.

Transportation—automobiles, motorcycles, trucks, buses, coal and diesel trains, ships, and planes.

Power plants—which supply electrical energy for lights, air conditioning, appliances, machinery, and trains and subways run by electricity.

What have been the results of more people and more products?

As population and the things people use and can produce increase, pollution gets worse. We have not only polluted our air, we have polluted our water and our soil, often by the same pollutants and sources. We have destroyed the homes of birds and animals, and often, the creatures themselves.

BROADENING UNDERSTANDING
(Club Activity)

Enlarge on the importance of air not just to man, but to all living things.

Compare the way animals and plants live in a balanced relationship with their world to the way human beings are rapidly changing theirs, often destroying the four essentials to life.

Examine the ways alternatives to air pollution can produce other kinds of pollution: e.g. using dumps for solid waste instead of burning it can result in odors, germs, and aesthetic pollution. Nuclear instead of fossil fuel-burning power plants can heat neighboring waters, used by the plant for cooling, and thus change the eaters' ecology.

THINGS TO DO

Make a list of all human activities you can think of that contribute to pollution.

Collect news items and magazine stories on air pollution (very helpful for demonstrations and talks).

Find or draw pictures of air pollution sources.

Clean air is important. The quality of our air affects our lives – our total environment.

Air Pollutants

ACTIVITY 3

Purpose: To increase the understanding of air, what polluting chemicals are added to it, and how these chemicals get into the air.

"WHY DIRTY AIR?" What are the major pollutants in air? Where do they come from?

1. CARBON MONOXIDE: This poisonous gas from car exhaust drives out the oxygen in our bloodstream. A large amount can kill; a small amount can cause dizziness, headaches, fatigue—and slow our driving reactions. ESPECIALLY dangerous for people with heart disease, asthmas, anemia, etc.

2. SULFUR OXIDES: These poisonous gases come from factories and power plants burning coal or oil containing sulfur. This burning forms SULFUR DIOXIDE, a poison that irritates the eyes, nose and throat, damages the lungs, kills plants, rusts metals, and reduces visibility.

3. NITROGEN OXIDES: Also a result of burning fuels which convert nitrogen and oxygen to NITROGEN DIOXIDE—can cause a stinking brown haze that irritates the eyes and nose, shuts out sunlight, and destroys the view.

4. HYDROCARBONS: These are *unburned* chemicals in combustion, such as car exhaust, which react in air to produce smog. Hydrocarbons have produced cancer in animals. They may be the cancer-producing element in cigarette smoke.

5. PARTICLES: Smoke, fly ash, dust, etc., are the solid matter in the air. They may settle to the ground or stay suspended. They soil clothes, dirty window sills, scatter light, and carry poisonous gases to lungs. They come from autos, fuels, smelters, building materials, fertilizers, etc.

6. PHOTOCHEMICAL SMOG: "Photochemical smog" is a mixture of gases and particles *oxidized by the sun* from products of gasoline and other burning fuels. They irritate the eyes, nose and throat, make breathing difficult, and damage crops and materials.

How do these pollutants get into the air?

There are three processes by which pollutants are emitted into the air. *Burning*, or combustion is by far the most common. *Evaporation* occurs in a great many chemical processes. *Friction*, or attrition; whether purposeful, e.g. grinding stone; or accidental, e.g. wearing down tires is the third process.

In the United States we pollute our air with nearly 200,000,000 tons of "aerial garbage" each year!

BROADENING UNDERSTANDING
(Club Activity)

Enlarge discussion of pollutants to include others, such as lead, mercury, and beryllium. Newspapers and magazines often carry stories of pollutants that are currently in the public eye.

Develop in greater detail the concepts of the three pollution processes.

Discuss soil pollution as a by-product of air pollution.

THINGS TO DO

Investigate the growth and nature of industry and pollution in your own area. The Chamber of Commerce and your official air pollution control agency can help you. Take photographs. Prepare a report.

Hold a glass over a burning candle on a plate to demonstrate the use of oxygen and the formation of soot.

Collect samples of air pollution and record your findings:

1. On the roof of your garage or house, set either a wide-mouthed collection jar containing water or a vaseline-coated plate. Examine periodically.
2. Darken a room and observe the dust particles in a beam of light from a flashlight, a projector, or the sun.
3. Place a piece of filter paper, or one thickness of a facial tissue, over the hose of a tank-type vacuum cleaner. Let the cleaner run for several minutes with the hose held in mid-air.

Air Conditioning

ACTIVITY 4

Purpose: To make clear the role of weather in nature's "air conditioning."

We know how pollutants get into the air. But how do they get out?

Once pollutants are emitted, a number of things can happen to them.

In normal circumstances, pollutants are washed out of the air by rain or dispersed by wind.

Before the pollutant is washed out or blown away, what can happen?

Before enough time elapses for either of these to take place, the polluting chemical compounds may change into other, sometimes more harmful, combinations.

Before sufficient diluting by the wind, pollution can be a problem for areas in the wind's path.

When the pollution is washed out of the air by the rain, it is not necessarily destroyed.
(DDT is now known to kill fish that live in water into which pollution-filled rain flows.)

Suppose there is no wind or rain. Does that mean the pollutants remain stationary? What happens?

Even without a wind, the normal mixing of the air dilutes the pollutants to some degree.

Mixing occurs this way:

The sun's rays warm the earth, and the earth warms the air at its surface. The warmed air rises and expands. Under normal conditions, the air is cooler as the distance from the earth increases. As the warm air rises, the cooler air above sinks to take its place.

What is this air movement called?

This air movement is called convection.

In the convection process, the pollutants are mixed and diluted.
(Our cities and industrial areas produce pollutants too fast for convection to disperse.)

Is there a connection between the air movement of convection and the air movement of wind? What is it?

The wind itself is the product of convection. When the sun heats the whole of the earth that faces it, and the surface air rises, not only is there up-and-down mixing, but cool air moves in from areas that the sun does not reach.

The earth rotates continuously, so that the sun strikes ever-changing parts of it. The result is that the air currents are churned into a number of major winds.

These winds are further altered by the irregularities of the earth's surface.

Sometimes, even though our pollution-causing activities are the same, levels of air pollution rise. Why?

A layer of warm air sometimes lies above a layer of cool air at the earth's surface. This is known as an "inversion."

In an "inversion," the cool air cannot rise and the pollutants are trapped.

What might happen to some of us in an inversion?

Inversions lasting several days have been responsible for some famous air pollution disasters, in which many people, mostly old and suffering from a heart or respiratory disease, became ill, and even died.

BROADENING UNDERSTANDING

Develop the concept of inversions by the following demonstration.

Use four milk bottles or 16 oz. laboratory bottles. Place two in the refrigerator or outdoors on a cold day. Place the other two on a radiator, stove, or in a pan of hot water.

Hold a piece of paper in tongs. Light the paper with a match and let it burn inside one of the bottles containing warm air. When the bottle is filled with smoke, invert one of the cold bottles over it. The smoke will rise from the warm air to the cold air.

Next, burn a piece of paper in the remaining cold bottle. Invert the remaining warm bottle over it. The smoke will stay in the cold air.

Use weather maps to show how pollution might travel in your area.

Air in Soil and Water

ACTIVITY 5

Purpose: To learn about the air that is in our soil and in our water.

GREEN PLANTS are the key to the "air quality" in soil and in water. Small animals are the air quality "controllers" in soil and water.

Is there air in the soil? Is soil a solid?

Soil is a mixture of particles of sand, silt, clay, and organic matter (decaying plant material and dead animal remains) with varying amounts of "pore space" (openings between particles). "Soil pores" hold free air and water. Roots of plants tend to make new openings between particles; and, as the root dies and decomposes, this passageway is filled with air or water. The soil pore space is really the key to the "life in soil."

Is soil alive?

Soil particles are not alive, but the mixture with organic matter and the addition of air and water make a "living medium" upon which much life is dependent. Many small animals inhabit the "living soil" using water and air to assist in the growth and decomposition processes.

What about the CO_2 in the soil air? – the water?

As plants die and decompose, they increase the carbon in the soil and, in turn, increase the amount of CO_2 in the soil air. CO_2 is a major need of green plants! Soil tillage is an important consideration in the availability of CO_2 and the rate of decomposition. Even more important is the addition of CO_2 by falling rain, because it is also extremely soluble in water.

Is there really air in water?

The oxygen in our air is very solvent in water, and as water is stirred it becomes aerated – the oxygen in the air is dissolved in the water. This oxygen in water is the basis for most life in water – both plant life and animal life.

Plants give off oxygen (O) in the presence of sunlight – and use carbon dioxide (CO_2). The animals in the same environment are giving off carbon dioxide (CO_2) and using up the oxygen (O) supply. Note: During the night, plants in a water environment "switch around" and use up the oxygen supply in competition with the animals. This is why fish tend to suffer from lack of oxygen in certain waters that are heavily infested with plants and tend to be low in supply of dissolved oxygen.

How do they help plant growth? Nitrogen?

As they break down organic matter, certain minerals are released that, in turn, become available to another (growing) plant for plant food. Also, certain small animals called nitrogen-fixing bacteria increase the amount of nitrogen in the soil by taking it from the soil air. Legumes are the plants that develop small nodules (bumps) on their roots which serve as the home and "manufacturing plant" for nitrogen-fixing bacteria. The bacteria use the nitrogen from the soil air and fix it into a form that is available to plants for their "plant food."

BROADENING UNDERSTANDING
(Club Activity)

Build a Terrarium—A terrarium is probably the easiest habitat to set up and maintain. Yet each type is a micro-habitat in itself. It can be a community of small plants alone, or it can be set up as a natural home for some specific animal.

Plant Terrarium—Select a container that has a small top or provide a glass top that will *hold-in moisture*. Provide a base of coarse sand, chips, or pea gravel for drainage. Add some pieces of broken-up charcoal to this base. For soil, use a mixture of two parts of *sharp mason's sand* and one part peat moss or leaf humus. Landscape with rock, small driftwood, live moss, and low-growing woodland plants like partridge-berry, moneywort, or small ferns and liverwort on a piece of log. The plants may outgrow the container, so they may need to be thinned out or replaced occasionally.

Rotting Log Terrarium—Collect a piece of old, rotting log from the woods. Select a piece with bark that has some moss lichens or slime mold showing on it. Often you will find small ferns or other plants growing on it. Take some of the leaf humus or decayed log material found underneath it. Place the humus material and leaf mold over a layer of sand which has been placed in the bottom of the terrarium for drainage. Place the piece of log in a "natural" position over the humus and cover the top of the terrarium to conserve moisture. Water occasionally to keep the log damp. Your log may be the home of bark beetles, wood-boring beetles, spiders, ants, or a red-backed salamander. Watch the slime molds or other fungi grow on the log. This is a good way to show how micro-organisms break down the products of photosynthesis—"there must be death before there can be life."

Meadow Terrarium—A home for insects and spiders. The size of this type of terrarium will be decided by the animals to be kept in it. A battery jar or gallon-size, wide-mouth jar (from mayonnaise or pickles) can be used for insects like crickets, while orb spinning spiders would need a 10-gallon aquarium tank. Begin by placing gravel in the bottom for drainage. Cover this with sand, then a layer of soil. Plant the entire terrarium with field sod. Include some pieces with tall grasses or weed plants to be placed at one end. Provide a piece of log or driftwood for insects to climb onto or hide under. A small, shallow container of water should be sunk to ground level at one corner. Although this type of terrarium should be kept fairly dry, water should be sprinkled on the plants each day for insects that depend on dew for their water. If a snake is to be kept in the terrarium, it is very important that a rock or dry log be provided for the snake to climb on. Cover the terrarium with screening so there will be good ventiliation.

THINGS TO DO

Discuss: 1) Aerobic activity in soil—in water;
2) Anaerobic activity in soil—in water;
3) What animals do to soil air; and
4) What animals do to the air in water.

Read the booklet "PLANTS, How They Improve the Environment" (published by Soil Conservation Society of America).

Air and Health

ACTIVITY 6

Purpose: To examine the effects of air pollution on the human body.

MAN MUST BREATHE. He must breathe whether the air around him is polluted or not.

What symptoms might man develop if he breathes polluted air?

Air pollution can produce these symptoms: runny or stuffed-up nose, dizziness, cough, blurred vision, headache, fatigue, shortness of breath, burning, teary eyes, sore throat.

How does the body defend itself against polluted air?

Normally the respiratory system defends itself from foreign matter through narrowing of the breathing passages and by the cleansing action of the cilia and mucus.

What is mucus? What does it do?

Mucus is a sticky substance which lines the airways and traps dirt and germs as they enter the body.

What are the cilia? How do they work?

The hair-like cilia move like waves and brush the dirt-laden mucus up and out.

How else does the body defend itself against air pollution?

Teary eyes, runny nose, and cough also demonstrate the body's attempts to protect itself.

Sometimes the defenses do not work.

What symptoms might indicate that the defenses are not working perfectly?

Certain pollutants in certain quantities can get past the defenses and cause other symptoms like: dizziness, headache, blurred vision, sore throat, shortness of breath, and fatigue. After one lives in polluted air for a long time, permanent changes may take place within the body.

What might these changes be?

There may be a thickening or an increase of mucus. There may be changes in the cilia. The cilia may be slowed down or even completely paralyzed. Some of the cilia may be destroyed.

What might be the result of these changes within the body?

When the cilia are damaged or cannot function properly, the body is more susceptible to infection. The body's airways may become permanently constricted and obstructed, so that breathing is always difficult.

Air pollution is probably also connected with the enlargement and loss of resiliency of the alveoli.

This condition also makes breathing difficult.

Can air pollution actually cause disease?

Air pollution can cause respiratory disease. It is one of the causes of asthma in some people.

Can air pollution cause any other diseases than asthma?

Air pollution can contribute to respiratory disease. Though it is not the cause, air pollution contributes to such infectious respiratory diseases as the common cold, influenza, and pneumonia.

How does it contribute to diseases caused by germs?

Air pollution attacks the body's defenses and leave it more susceptible to the bacteria and viruses that cause infectious respiratory diseases.

Does air pollution affect any chronic diseases?

Although a single cause is hard to find, air pollution is considered a factor in some chronic diseases. The chronic respiratory diseases affected by air pollution are emphysema, chronic bronchitis, and lung cancer.

Air pollution is associated with heart disease. Constricted airways and damaged alveoli place a greater burden on the heart. The heart must work harder to get enough oxygen to the blood, since the lungs cannot bring in enough by themselves.

Can air pollution kill people?

Air pollution can, and has, caused death.

Investigators have concluded that 168 people suffering from a respiratory or heart disease died because of pollution in New York City a few years ago – during a period of heavy pollution, in an inversion.

Though air pollution has not yet been proven to be a cause of emphysema and lung cancer, deaths from these respiratory diseases are approximately twice as high in the city as in the country.

What is it that many people do that makes the effects of air pollution even worse?

Cigarette smoking is an especially dangerous form of air pollution.

Inhaled cigarette smoke affects the lungs even more than we ordinarily think of as air pollution. Cigarette smoking is considered to be a major cause of lung cancer, chronic bronchitis, and heart disease. Cigarette smoking also contributes to emphysema.

Scientists have found that people who smoke and breathe polluted air suffer from lung diseases and heart trouble much more than those who just smoke or who just live in dirty air.

BROADENING UNDERSTANDING
(Club Activity)

Discuss the famous air pollution disasters. Enlarge on the respiratory tract's defense system.

THINGS TO DO

Look up accounts of the famous air pollution disasters. Research one of the diseases related to air pollution.

Things to Do for Clean Air

ACTIVITY 7

Purpose: To examine the ways air pollution can be controlled or prevented and to determine the part played by industry, government, and individuals working alone and in citizen groups.

Can we get rid of air pollution? How?

Many pollutants can be removed from the air. Scientists and engineers have the knowledge to eliminate a good deal of air pollution now (although they continue to search for cheaper, better, and less wasteful methods). It can be done through technical changes.

What kinds of technical changes might be made?

Devices called electrostatic precipitators, filters, centrifuges, and scrubbers can remove almost all particulate matter. Scrubbers can also remove many of the gases. Gases can be removed, too, by burning and by absorption into such materials as charcoal.

Since every action we take has an effect on other things, might other problems be created in some of our solutions to air pollution? What might they be?

Some ways to end air pollution create other kinds of pollution. Even air pollution control equipment produces another kind of waste which must be disposed of. This waste is usually less dangerous and more easily handled however.

Getting rid of waste in sanitary landfill areas uses up land. (Today, many urban areas have to send their garbage miles away, by train, to find places to dump it.)

Dumping waste into a river or ocean causes water pollution.

Water pollution can kill fish. Water plants may multiply and then use up the oxygen as they decay. Drinking supplies can be contaminated.

We might use up non-polluting materials—like natural gas.

What can we do to prevent new problems at the same time we control air pollution?

We must re-use materials that are now considered waste. Elements—such as sulfur—that have value should be separated out. Newspapers, metals, and glass that are now part of trash should be used again. Ways should be found to use solid waste materials for heating, power, building, and other useful ends.

We must eliminate unnecessary consumption. No extra wrappings or containers should be used. No electric appliances should be manufactured for tasks that can be done easily by hand. No automobiles should be driven where public transportation can be made available.

We must see that presently-operating systems which produce air pollution either change their processes or install controls.

Do you think these changes will come about easily? Why not?

WHAT THE INDIVIDUAL CAN DO

The individual can help by not creating pollution himself.

He should: keep his car and furnace in good repair, refrain from racing his car's engine or from letting it idle when it is temporarily parked. Stop open burning of leaves or trash. Refrain from leaving lights on or electric appliances running when not in use. Use a fly swatter instead of an insecticide. Refrain from smoking, especially when others must inhale the smoke—some people are made sick by it. Use public transportation, a car pool, or a bicycle whenever possible, instead of a car.

One must be willing to pay for clean air—either by taxes or in increased costs of products made by industries with air pollution controls.

As long as so many people exist in crowded communities, we cannot recover that relatively clean country air. *But if* the necessary changes are made, *if* citizen groups continue to keep watch, and *if* YOU and every other person does his own task—WE CAN COME CLOSE TO BREATHING CLEAN AIR.

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