



WHY STUDY AIR POLLUTION?

LESSON 1 ACTIVITY 2

WHAT'S YOUR AIR POLLUTION I.Q.?

DIRECTIONS: Circle true or false in each of the following questions. Then check your answers with your teacher to figure your Pollution I.Q.

- | | | |
|--|------|-------|
| 1. Air pollution is harmful only in cities. | True | False |
| 2. Air pollution is worse in big cities than small ones. | True | False |
| 3. Nationwide, automobiles are the major source of air pollution. | True | False |
| 4. Ozone smog is a problem only in Los Angeles. | True | False |
| 5. Inversions—in which air at ground level is trapped by warmer air above—come from air pollution. | True | False |
| 6. Chronic respiratory diseases are aggravated by air pollution. | True | False |
| 7. Air pollution affects only the respiratory system. | True | False |
| 8. Air pollution can kill. | True | False |
| 9. When the plume from a smokestack is white, no pollution is coming out. | True | False |
| 10. Air pollution is expensive. | True | False |
| 11. At any time our air may contain contaminants (air pollution) emitted by natural occurrences such as forest fires, volcanic eruptions, and decaying vegetation. | True | False |
| 12. Our atmosphere at one time was poisonous to breathe. | True | False |
| 13. Ozone is a pollutant in the lower atmosphere, but an essential component of the upper atmosphere. | True | False |
| 14. You could live nearly a month without food, and a few days without water, but deprived of air, you would survive for only a few minutes. | True | False |
| 15. Pollution control has not improved overall air quality. | True | False |
| 16. Most air pollution caused by human activity originates with combustion. | True | False |



17. In recent years, rain in industrialized nations has become less acidic.	True	False
18. Industrial activity is the main source of air pollution.	True	False
19. Destruction of material and crops by air pollution represents a significant economic loss for our nation.	True	False
20. Air pollution first occurred during the Industrial Revolution.	True	False
21. Clean, unpolluted air is a pure substance.	True	False
22. Two of the top 10 industrial chemicals are "mined" from the atmosphere.	True	False
23. The composition of the atmosphere varies widely at different locations on Earth.	True	False
24. The air closest to us is the part of the atmosphere known as the stratosphere.	True	False
25. Air is an unlimited resource that can be managed for health and environmental quality.	True	False

Sources: *American Lung Association 1992 and Delaware Environmental Science Summer Institute 1995*



High School and Middle School Air Quality Education Program

1

WHAT IS AIR?

LESSON 1 ACTIVITY 3

READING 1

Scientists believe that the earth is four and a half billion years old. Our atmosphere, the air, was very different when the earth was new. Many believe that it was formed from escaped gases from volcanoes, coming from deep within the earth. It was dangerous to breathe! For the first billion years, the atmosphere was probably mainly nitrogen, hydrogen, carbon dioxide, and water vapor. It contained no oxygen; none of today's plants and animals could have survived in that atmosphere.

Gradually, within the oceans, some of the organisms developed an ability to use the sun's energy to take the carbon dioxide and water and make food for themselves. This amazing process is called photosynthesis (to make with light), the same process that all green plants live by today.

Photosynthesis changes the earth's air through plants "exhaling" oxygen after taking in carbon dioxide. After time passed, there was enough oxygen in the atmosphere for animals to live. Green plants are still essential to our air cycle, by using carbon dioxide and then releasing oxygen. One mature tree consumes an average of 13 pounds of carbon dioxide per year that would otherwise be in the atmosphere and contribute to global warming. One acre of trees uses over two and a half tons of carbon dioxide a year.

The Earth's atmosphere is a constantly moving body of gases that encircle our planet. This body of gases known as air is a mixture—not a chemical combination—of a number of gases; that is, each gas retains its own characteristic properties. It consists of about 78 percent nitrogen; about 21 percent oxygen, and carries along with it water

vapor, clouds, dust, smoke, soot, and a variety of chemical compounds. The remaining one-percent contains all the other gases including carbon monoxide, carbon dioxide, ozone, methane, and ammonia that contribute to air pollution. And at any time air may contain contaminants emitted by such natural occurrences as volcanic eruptions, forest fires, and decaying vegetation. Only during the past 20 years or so have we begun to understand that air is a resource that is limited and can be managed for health and environmental quality.

Bound to the earth by forces of gravity, the atmosphere extends about 600 miles into space. On a clear day, the supply of air looks endless. But the air we breathe is taken from the troposphere, a tiny portion of that vast ocean of air. The troposphere is no more than seven to ten miles thick.

Although only the air in the troposphere is suitable for breathing, the upper atmospheric layers are also important for life on earth. The next layer of atmosphere above the troposphere is the stratosphere. In this layer, ozone filters out dangerous ultraviolet rays from the sun. This filtering helps control the earth's temperature and helps prevent skin cancer resulting from overexposure to the sun. Today humans so arrogantly misuse the atmosphere in their rush toward increased comforts that we are very close to suffocating ourselves and destroying all the life around us. That must not happen. We must prevent it. Before the sun is further dimmed, before more flowers wither and die, before more people suffocate in a rank and poisoned world, we must change our ways and learn to live within the laws of nature. We must learn the facts of life.

Source: *Kids For Clean Air*, Clean Air Program, Pima County Department of Environmental Quality, Tucson, Arizona



WHAT IS AIR?

Lesson 1 Activity 3 Reading 1 Student Worksheet

Name: _____ Date: _____

Class: _____ Period or Block: _____

1. How old is the earth according to scientists? _____

2. How do scientists believe our atmosphere was formed? _____

3. What was the composition of the original atmosphere? _____

4. What was missing from the original atmosphere that is necessary for life on earth? _____

5. Where did this missing ingredient in the atmosphere eventually come from? _____

6. What is the composition of the air we breathe today? _____

7. What is the troposphere? _____

8. What is the stratosphere and what is its importance? _____

9. Why are humans misusing the atmosphere today? _____



High School and Middle School Air Quality Education Program

1

WHAT IS AIR POLLUTION?

Lesson 1 Activity 3

READING 2

Webster's College Dictionary defines pollution as "the introduction of harmful substances into the environment." The American Medical Association defines air pollution as "the excessive concentration of foreign matter in the air which adversely affects the well-being of the individual or causes damage to property." Our air is polluted whenever certain gases or particulate matter in the air affect the health of humans, animals, or plants, and damage materials. These statements and definitions can be expanded into a working definition of air pollution: *gases and small particles put into the atmosphere by human activity that, by themselves or in combination with other compounds, contaminate, harm or alter the natural balance of ecosystems.* Air pollution then is the damage to the purity of the atmosphere by various noxious (harmful) chemicals and refuse materials. To pollute is to render unclean and cause harm in varying degrees depending on the concentration and type of pollutant.

It is a common statement among polluters opposed to reform that the air has never been pure. They are right. Long before man put his busy mind to work on the internal combustion machine, volcanoes were belching lava that blackened the skies, and decayed marshes were polluting the countryside. But in the past nature had time to make adjustments. It was able to evolve a self-cleansing atmosphere that, for eons before man, was certainly life supporting.

Humans started to pollute the air when they first learned to use fire. Air pollution didn't become a problem until the dawn of the Industrial Age when the greater use of fossil fuels and the products of combustion, began to foul the air.

Today nature is fighting a losing battle with man-made air pollution. Vast expanses of countryside smolder and stink. Dreamy fogs are accomplices to murder. Sunny, windless

days carry, like a disease, the threat of suffocation.

While this air pollution problem has existed for centuries, the present day industrial boom and population explosion have made it a critical one. Two centuries later we have finally become aware of the hazards that air pollution poses to our health and environment. With the help of technology, we have begun the costly and complex task of cleaning the air.

The first set of air pollution ordinances began in England in the 1300s. In 1306, King Edward's wife had bronchitis caused by air pollution. As a result of her illness, King Edward passed a set of environmental ordinances in an attempt to clean the air. In recent times, beginning with the Clean Air Act of 1963, a whole package of acts and amendments were passed which is sometimes referred to as the Clean Air Act of 1970.

Effective environmental action also materialized in recent times with the creation of the Environmental Protection Agency (EPA), which was established on December 2, 1970. EPA was vested with the authority to enforce the provisions of the Clean Air Act. Prior to the creation of EPA, diverse programs and organizations were dealing with the pollution problem. EPA pulled together these diverse environmental programs and organizations into a single, viable agency, whose recent budget is in the billions of dollars.

The levels of the major pollutants in the air have declined over the past two decades as a result of actions taken by the federal government and many state governments. But this improvement is only the beginning. If more improvements are not made by all of us, our future life could be in peril.

Source: *Clean Air And You: A Delaware Perspective*, Delaware Nature Society and The Department of Natural Resources and Environmental Control High School and Middle School Air Quality Education Program



WHAT IS AIR POLLUTION?

Lesson 1: Activity 3 Reading 2 Student Worksheet

Name: _____ Date: _____

Class: _____ Period or Block: _____

1. How does Webster's College Dictionary define pollution? _____

2. How does the American Medical Association define pollution? _____

3. Write a working definition of air pollution from these statements and definitions.

4. Explain why the air has never been pure: _____

5. When did humans first begin to pollute? _____
6. When did air pollution become a major problem for civilization? _____

7. Describe who is winning the battle of pollution: _____

8. When did the first set of air pollution ordinances pass? _____

9. Identify present day federal laws and agencies to deal with the pollution problem: _____

10. What will be the result of the pollution battle if more improvements are not made? _____

