

ES11B Air Pollution

Name: _____

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Did you know?

- 1 In addition to gases in our atmosphere that are good for us to breathe, there are other things called pollutants that may hurt us (See Fig. 1).
- 2 Our atmosphere is a mixture of gases and small particles that are in a delicate balance. If we change the amounts of the gases, or change the amount of the particles in the air, it could cause serious harm to us or the environment. This is called air pollution.
- 3 There are four major types of air pollution - photochemical smog, acid rain, increased greenhouse gases, and ozone reduction.



Figure 1 - Smog over Santiago, Chile

So, why is it important to me?

- 4 Pollution is not always putting something into the air, sometimes pollution causes something to change. If we reduce the ozone levels in the atmosphere enough, the harmful ultraviolet (UV) radiation from the Sun can reach a dangerous level.
- 5 Some pollutants in the air happen naturally like volcanic ash in the air and forest fire smoke. People add other pollutants to the air we all breathe. Drive in a car, use something made in a factory, or plug in a TV set and you have caused some kind of increased pollution. We can't get away from polluting our atmosphere, but we can reduce the amount.

What are the big ideas I need to know?

- 6 Air pollution is the releasing into the air chemicals or small particles that cause harm or discomfort to humans or other animals. It doesn't have to kill you to be bad. Air pollution can simply make you sick. People with breathing issues, like asthma, are especially affected by air pollution.
- 7 Photochemical smog can form in almost any climate where industries or cities release large amounts of air pollution, such as smoke or gases. However, it is worse during periods of warmer, sunnier weather when the upper air doesn't allow the pollution to spread out and mix with clean air (See Fig. 2).



Figure 2 - Air pollution from World War II production

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8 The principal cause of acid rain is sulfur and nitrogen combining with water vapor in the air to form a slightly acidic rain. These chemicals come from human sources, such as electricity generating plants, factories, and the plain old automobile. Coal power plants that make electricity are some of the most polluting. The gases from these plants can be carried hundreds of miles in the atmosphere before they are converted to acid rain (See Fig. 3).

9 Acid rain has been shown to have adverse impacts on forests, fresh water areas and soils. The rain is only slightly acidic but over a long time can kill insects and water life as well as cause damage to buildings, statues and our general health.



Figure 3 - The results of acid rain on monuments

10 When sunlight heats Earth's surface, some of the heat bounces back into the air. This heat may be absorbed by gases in the atmosphere. This helps keep Earth warm. This is called the greenhouse effect (See Fig. 4). It occurs naturally. The greenhouse effect allows Earth to have temperatures that are balanced and can support life. When there is too much of the greenhouse gas, carbon dioxide (CO_2), there is more heat trapped and the entire planet could become warmer. This is called global warming.

11 The upper atmosphere contains a layer of ozone - a gas that consists of three oxygen atoms (O_3). This ozone layer absorbs ultra violet (UV) light protecting Earth's surface. UV light would harm living things without the ozone layer. Using chlorofluorocarbons (CFCs) like freon in air conditioners and propellants in spray cans decreases the ozone levels in the air. Surprisingly, a large contributor of ozone depleting gases comes from cows when they "pass gas" in the pasture.

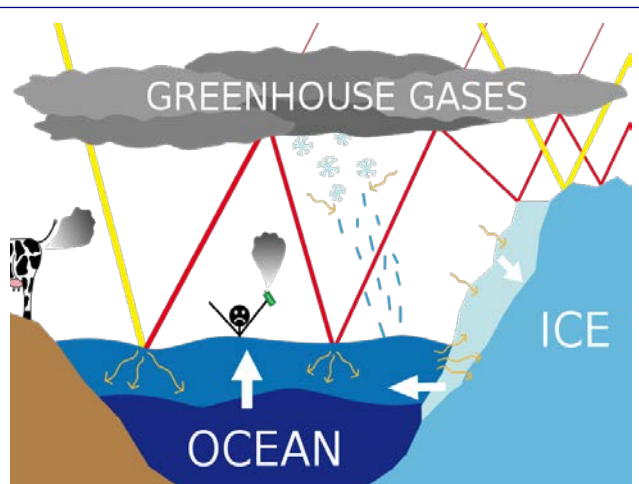


Figure 4 - Greenhouse gases have an effect on temperature.

What about?

12 Indoor air pollution is a relatively new term about pollutants that are inside homes, schools and offices. With today's air conditioning systems and highly insulated homes, there is much less fresh air mixing with the indoor air. Odors, gases and particles are staying inside - sometimes causing health issues. In some areas, radon gas escapes from the ground, seeps into homes, and must be vented outside.