

Name: _____ Period: _____

Air

Section 1: What Causes Air Pollution?

Read this quote before we start:

“I thought I saw a blue jay this morning. But the smog was so bad that it turned out to be a cardinal holding its breath.” ~ Michael J. Cohen

Now come up with your own “humorous” quote by completing the following sentence:

“You know the air is polluted when...

”

EQ: What factors influence the quality of air?

- _____ is the contamination of the atmosphere by wastes from sources such as industrial burning and automobile exhausts.
 - Can be _____
- Most air pollution is the results from _____
- Some air pollution is natural
 - _____ from volcanic eruptions.

Primary and Secondary Pollutants

- A _____ is a pollutant that is put directly into the atmosphere by human or natural activity.
 - Ex: _____

- A _____ is a pollutant that forms in the atmosphere by chemical reactions with primary air pollutants, natural components in the air, or both.
 - Ex: _____

Sources of Primary Air Pollutants

- Primary pollutant sources:
 - _____
 - _____
 - Motor vehicles are sources of primary pollutants such as carbon monoxide, nitrogen oxide, sulfur dioxide, and chemicals called volatile organic compounds (VOCs).
- Primary pollutants:
 - _____
 - _____
 - _____
 - _____

Sources of Primary Air Pollutants

- _____ are the major sources of nitrogen oxide emissions.
- _____ contribute much of the sulfur dioxide emissions.
- _____ make up most of the human-made emissions of VOCs.

Sources of Primary Air Pollutants

- Particulate matter can also pollute the air
 - Divided into _____
- _____ enter the air from fuel burned by vehicles and coal-burning power plants.

- Sources of coarse particles

- _____
- _____
- _____
- _____
- _____

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*****CRITICAL THINKING REVIEW*****

Do you smoke? Are you concerned about the effects of smoking? List some of the possible effects of smoking below:

Some people breathe in air that is so polluted it is equivalent to smoking a pack of cigarettes or more a day. If cigarette manufacturers are being held accountable for the health effects from the use of their products, should industries be held accountable for the effects of the pollutants they discharge into the air?

Why or why not?

EQ: How does one generation's activities affect future generations?

The History of Air Pollution

- Air pollution is not a new phenomenon.
 - History Fact: 1273: King Edward I ordered that burning a particularly dirty kind of coal called _____ was illegal.
- The world's _____ problem is much worse today because modern industrial societies burn large amounts of fossil fuels.
- Most air pollution in urban areas comes from _____.

Motor Vehicle Emissions

- Almost _____ of our air pollution comes from gasoline burned by vehicles.
- According to the U.S. Department of Transportation, Americans drove their vehicles over _____ in 1998.
- Over _____ of that mileage was driven by passenger vehicles. The rest was driven by trucks and buses.

Controlling Vehicle Emissions

- The Clean Air Act, passed in 1970 and strengthened in 1990, gives the Environmental Protection Agency (EPA) the authority to _____ in the United States.
- The EPA required the gradual _____ of lead in gasoline, decreasing lead pollution by more than 90 percent in the United States.
- In addition, _____, required in all automobiles, clean exhaust gases of pollutants before pollutants are able to exit the tail pipe.

California Zero-Emission Vehicle Program

- In 1990, the California Air Resources Board established the zero-emission vehicle _____ program.

- Zero-emission vehicles are vehicles that have no
 - _____
 - _____
 - No _____ that deteriorate over time.
- By 2016, _____ of all vehicles sold in California are required to be zero-emission vehicles, including SUVs and trucks.

Industrial Air Pollution

- Many industries and power plants that generate our electricity must burn fuel, usually _____, to get the energy they need.
- Burning fossil fuels releases huge quantities of _____ into the air.
- Power plants that produce electricity emit at least _____ of all sulfur dioxide and more than one-third of all nitrogen oxides that pollute the air.

Industrial Air Pollution

- Some industries also produce VOCs, which are chemical compounds that form _____.
- Examples:
 - _____
 - _____
 - _____
 - _____
 - _____
- When people use some of the products that contain VOCs, even more VOCs are added to the air.

Regulating Air Pollution from Industry

- The Clean Air Act requires many industries to use _____ or other pollution-control devices.

- Scrubbers remove some of the more _____ that would otherwise pollute the air.
- A scrubber is a machine that _____ gases through a spray of water that dissolves many pollutants.
 - _____ is an example of a pollutant gas that can be removed from the air by a scrubber.

Regulating Air Pollution from Industry

- Electrostatic precipitators are machines used in cement factories and coal-burning power plants to _____ dust particles from smokestacks.
- In an electrostatic precipitator, gas containing dust particles is _____ through a chamber containing an electrical current.
- An _____ is transferred to the dust particles, causing them to stick together and to the sides of the chamber.

Electrostatic Precipitator

- The clean gas is released from the chamber and the _____ dust particles can then be collected and removed.
- Electrostatic precipitators remove _____ of ash generated by coal-burning power plants from the air each year in the United States.

EQs:

What is smog?

How can smog and temperature inversions influence people's lives?

Smog

- _____ is urban air pollution composed of a mixture of smoke and fog produced from industrial pollutants and burning fuels.
- Smog results from _____ that involve sunlight, air, automobile exhaust, and ozone.

Temperature Inversions

- The _____ of air in the atmosphere usually keeps air pollution from reaching dangerous levels.
 - During the day, the sun _____ the surface of the Earth and the air near the Earth.
 - A _____ is the atmospheric condition in which warm air traps cooler air near Earth's surface.
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