

5.05 Air Pollution

Define anthropogenic pollution:

Video. Human Fingerprint on Global Air Quality

How is nitrogen dioxide emitted?

How does modern technology track nitrogen dioxide emissions?

Big picture: How does air pollution impact the environment and living things?

Sources of Pollution

Use the text and visuals to describe the different classifications of pollutants and emissions:

- Primary pollutants:
- Secondary pollutants:
- Mobile sources:
- Stationary sources:
- Natural sources:
- Area sources:

Air Pollutants

Complete the chart with a summary about pollutants. Summarize the information after reading about each one.

Pollutant name	Description	Health Effects	Environmental Effects
Carbon Monoxide (CO)			
Carbon Dioxide (CO ₂)			
Sulfur Oxides (SO ₂ , SO ₃)			
Nitrogen Oxides (NO, NO ₂)			
Volatile Organic Compounds (VOCs)			
Particulate Matter			
Ozone (O ₃)			
Lead (Pb)			

Think About it

What factors impact gases as they exit a smokestack?

Air Deposition

Define acid deposition and what makes wet different from dry:

What makes acid deposition possible?

Complete all information about how compounds form acid deposition:

From Carbon

How does carbon get into the atmosphere?

Describe the processes shown:

Carbon Dioxide	Carbon Monoxide	Acid Formation
$C + O_2 \rightarrow CO_2$	$2C + O_2 \rightarrow 2CO$	$H_2O + CO_2 \rightarrow H_2CO_3$

From Nitrogen

How does nitrogen get into the atmosphere?

Describe the processes shown:

Nitric Oxide	Nitrogen Dioxide	Acid Formation
$N_2 + O_2 \rightarrow 2NO$	$2NO + O_2 \rightarrow 2NO_2$	$3NO_2 + H_2O \rightarrow 2HNO_3 + NO$

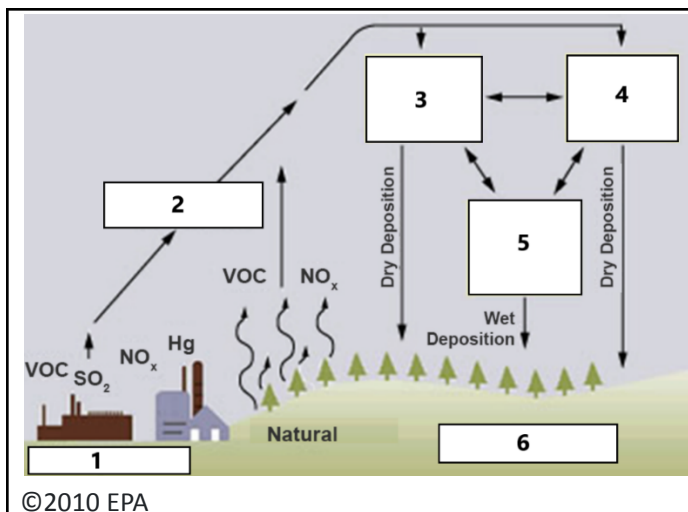
From Sulfur

How does carbon get into the atmosphere?

Describe the processes shown:

Sulfur Dioxide	Sulfur Trioxide	Acid Formation
$S + O_2 \rightarrow SO_2$	$2SO_2 + O_2 \rightarrow$	$2SO_3 + H_2O \rightarrow H_2SO_4$

Complete with the missing information in the graph:



- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

Describe and provide examples of **episodic acidification**:

Describe and provide examples of **chronic acidification**:

Impacts of Air Deposition

Describe each ecological effect of acid deposition:

- Depletion of base level of nutrients in an ecosystem:
- Release of aluminum into the ecosystem:
- Nitrogen saturation and eutrophication in an ecosystem:

List some ecological effects of **acid deposition** exposure:

Complete with information about impacts of acid deposition on specific environments:

Aquatic Ecosystems

Impacts on fish as the pH of water decreases:

Effects of eutrophication:

What may be the consequence even for animals with the highest pH tolerance?

Vegetation

How does the soil in Florida neutralize acid compared to the soil of New England?

How does acid deposition affect trees at different altitudes?

Chemical Weathering

Describe the effects of acid deposition on structures.

Ocean Acidification

Explain how acid deposition is a tragedy of the commons

Video. The Acid Test

What happens when carbon dioxide mixes with ocean water and acidity gets too high? Explain

What is the only way to stop acidification?

What strategies can help restore fish populations?

Photochemical Smog

What creates photochemical smog and where is it higher?

Describe the role of sunlight in the creation of photochemical smog.

Explain how photochemical smog concentration changes in the summer compared to the winter.

Describe how VOCs can cause photochemical smog.

List sources of VOCs:

Impacts of Photochemical Smog

What are some health impacts of photochemical smog?

What are some impacts of photochemical smog in our communities and oceans?

Simulation Data Analysis

Video. COVID-19: NASA Satellite Data Show Drop in Air Pollution Over U.S.

Why were the values of nitrogen dioxide and other airborne particulates less in March 2020 compared to March 2019?

Let's Practice

Complete the structure question practice.