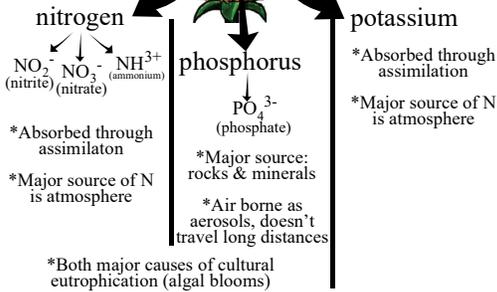
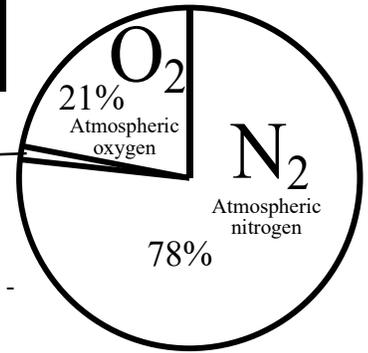


PLANT Nutrients



CHEMICAL cheat sheet

Atmospheric Gases



~1% argon
with small amounts of all other gases including
0.04% greenhouse gases

*H₂O is a variable gas that can make up between 0% - 4% of the atmosphere depending on location.

Air Pollutants

Outdoor Air Pollutants - Criteria Pollutants

SO₂ - sulfur dioxide

- *main source: coal burning
- *reacts with rain to create acid rain
- *part of industrial smog

CO - carbon monoxide

- *takes place of oxygen in blood and deprives body of oxygen
- *high concentrations cause death

NO₂ - nitrogen dioxide

- *main source: transportation - gasoline burning
- *poisonous gas on its own
- *creates acid rain when reacting with rain water
- *part of photochemical smog using UV radiation to produce ozone

Pb - lead

- *heavy metal poisoning
- *main source: lead smelting and industrial processes

O₃ - ozone

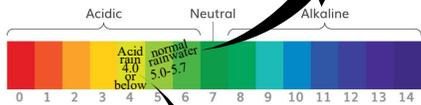
- *highly reactive gas
- *poisonous to breathe
- *burns respiratory tract
- *generated by photochemical smog at ground surface

PM - particulate matter

- *solid particles that get blown or burned into the air: soot, sediment, etc.

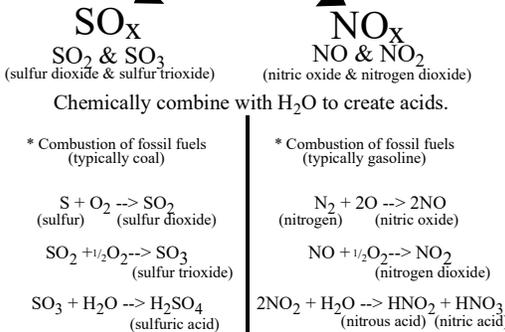
pH

Slightly acidic rain from carbonic acid (H₂CO₃) from carbon dioxide (CO₂) reacting with water.



*Measures hydrogen ions (hydronium ions) H⁺. More H⁺ ions the more acidic. The more hydroxyl ions OH⁻ the more basic/alkaline. pH 7 has a balance of H⁺ to OH⁻ ions.

ACID RAIN



ACID RAIN:

- Reduces photosynthesis
- Leaches toxic Al ions
- Leaches nutrients from soil
- prevents fish egg hatching (pH 5 or lower in water)
- high acid in pond cause fish kills

Heavy Metals

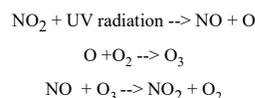
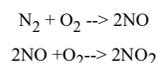
Hg (mercury)	Pb (lead)	As (arsenic)	Cd (cadmium)
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*Heavy metal poisoning: ingestion through food or water and inhaling

*Acute effects: nausea, vomiting, abdominal pain, diarrhea, tingling extremities, shortness of breath, shills, rash

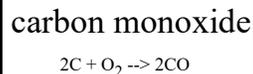
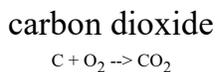
*Chronic: mood change, irritable, teeth and hair loss, slowed mental capacity, mental retardation/IQ drop and developmental delays in developing children/fetus, death

Photochemical Smog Reactions

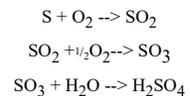


Industrial Smog Reactions

Components of industrial smog: carbon dioxide, carbon monoxide, sulfur dioxide, sulfur trioxide, sulfuric acid



sulfur compounds



Indoor Air Pollutants

Tobacco smoke - #1 cause of lung cancer

Radon-222 - #2 cause of lung cancer. Radioactive isotope from decaying uranium in rocks. Seeps into basements.

Asbestos - mineral to used for building materials. Cancerous. causes respiratory illnesses including mesothelioma (tumors of the lungs, abdomen, and heart) and asbestosis (scarring of lung tissue).

Lead - mainly in food and water, but can be from lead paint chips and dust.

CO - furnaces, gas stoves, gas driers; deprives body of O₂.

VOCs (volatile organic compound) - can be cancerous, in plastics, carpets, aerosol paints, cleaning products, air fresheners, moth balls

Biological threat - mold, dust mites, pet dander, can cause allergies; some molds toxic.

Wood burning - particulate mater, soot, CO.