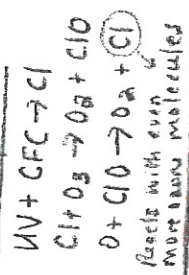


Greenhouse gases
 CO₂ - methane
 H₂O - water vapor
 NO₂ - nitrous oxide
 CO₂ - carbon dioxide
 CFC's

Stratospheric
 ozone depletion



VOC's - Volatile organic compounds
 Organic compounds that exist as gases in the atmosphere. Examples: hydrocarbons, methane, benzene, etc.

Photochemical smog - A mixture

VOC's, NO_x, + sunlight

react to form ground level ozone, photochemical oxidants,dehydes, etc.

Called brown-air smog

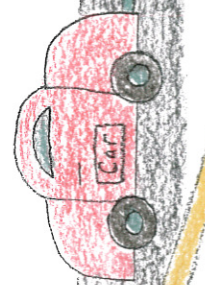
Common in developed & developing countries

Troposphere "bad" ozone

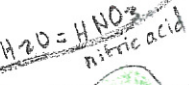


respiratory issues, inflammation of airways, etc.

Air Pollution Cheat Sheet

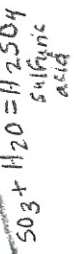


Acid deposition
 - Direct damage to forests & leaching of plant nutrients
 - Reduced photosynthesis of plants
 - Susceptibility to drought, insects, hurricanes, etc.
 - Other toxic metal ions (lead, mercury)



Vehicle

VOC's - Organic compounds
 Lead - Leaded gasoline (now phased out)
 Industrial solvents, paints, nail polish, etc.
 Catalytic converter
 Eliminates NO_x + VOCs to reduce photochemical smog.



Both Industry & Vehicular

Suspended particulate matter - solid particles & liquid droplets, ex: black carbon, soot, aggravate respiratory issues & contribute to smog

Carbon monoxide
 Incomplete combustion of carbon containing materials
 Reduces the ability of blood to transport oxygen. Shortness of breath, death

Carbon dioxide - Burning of fossil fuels, accelerates climate change
 Nitrogen oxide (NO_x) - Combustion of fossil fuels in vehicles or coal-fired power plants, Eye, nose, throat asthma

Volatile compounds
 Lead - Leaded gasoline (now phased out)
 Industrial solvents, paints, nail polish, etc.

Catalytic converter
 Eliminates NO_x + VOCs to reduce photochemical smog.

Coal Fired Power Plant

Industrial smog - suspended particulate matter, sulfur dioxide, & sulfuric acid.

Called gray-air smog

Not a significant problem in developed countries

Electrostatic precipitating baghouse filter
 remove particulate matter

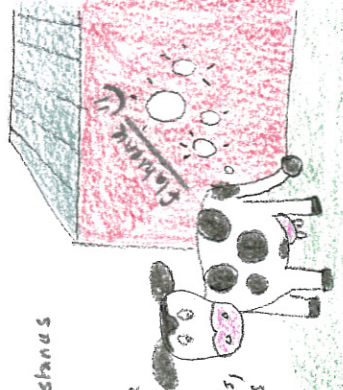
Wet scrubber - Uses a scrubbing liquid to collect particulates & gases (such as sulfur dioxide)

Indoor Air Pollutants

Carbon monoxide - Faulty furnaces, unvented gas stoves, kerosene heaters, etc. Headaches, irregular heart beat, death
 Particulates - Pollen, pet danders, dust, mites, etc. Irritated eyes, lungs, asthma
 Styrene - Carpets, plastic products
 Kidney & liver damage

Primary air pollutants - are chemicals or substances emitted directly into the air. While in the atmosphere, primary pollutants react with each other & other components of air to form secondary air pollutants

Methane - Greenhouse gas 20x more potent than CO₂
 Released from CAFE's, landfills, natural gas production, etc.
 Ex: primary: SO₂ + NO₂
 secondary: H₂SO₄ + H₂SO₄



Formaldehyde - Found in many building materials like insulation, plywood, particle board
 A known carcinogen. Breathing problems, sore throat, etc.

Radon - A radioactive gas that seeps up from underground rock deposits. Causes lung cancer

Asbestos - Fibrous insulation used around pipes, ceiling tiles, etc. Causes lung cancer

Tobacco smoke - Cigarettes, pipe, cigars
 Lung cancer, respiratory ailments, heart disease