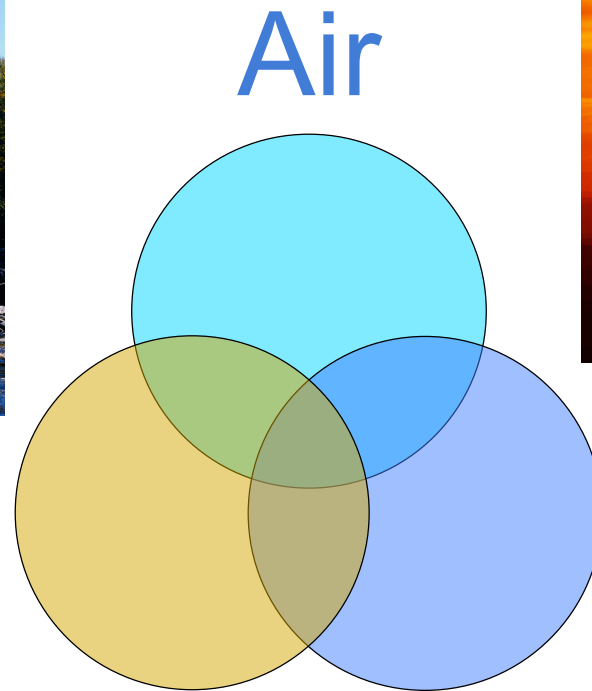


An Overview of Environmental Pollution

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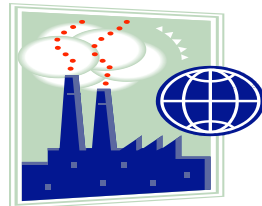
March 2006

Environmental Pollution

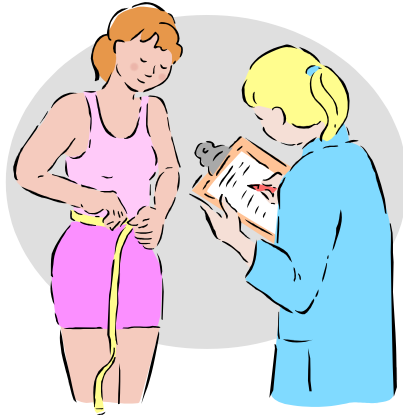


Soil

Water



Common Goals in Life



Health



Happiness



Freedom



Quality of Air, Water, Soil, Food Affects Quality of Life

❖ Human Health

- Allergies
- Asthma
- Toxic Effects
- Disease
- Cancer
- Mutation



❖ Biosphere

- Animal health/survival
- Plant health/survival

❖ Planet

- Visibility
- Acid Rain
- Climate
- Ecology



Health Problems and Treatment Related to Pollution

❖ Genetics – affects susceptibility

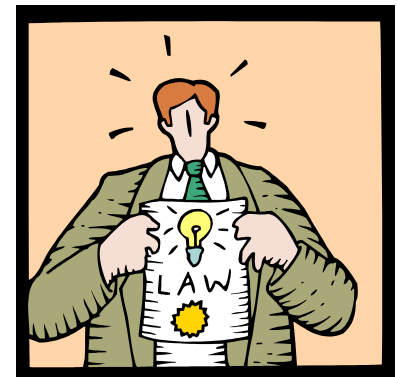


❖ Diet – affects susceptibility

❖ Medicine – affects susceptibility



❖ Control Strategies – can help or hurt



Economic Problems and Pollution

- ❖ Health remediation costs
- ❖ Damage to crops and materials
- ❖ Lost productivity
- ❖ Job loss
- ❖ International conflicts
- ❖ Over-population
- ❖ Control costs versus benefits
- ❖ How much cost are we willing to support ?

Types of Pollution

❖ Inorganic compounds

Examples:

- Arsenic, mercury, lead, radon, ozone
- Asbestos, chlorine, sulfur dioxide

❖ Organic compounds (carbon base)

Examples:

- Benzene, formaldehyde, carbon dioxide
- Viruses, bacteria, bio-fragments, aflatoxin

Types of Air Pollution

- ❖ Gaseous
- ❖ Liquid aerosol
- ❖ Particle aerosol
- ❖ Inhalable particulate
- ❖ Respirable particulate
- ❖ Coarse particulate
- ❖ Fine particulate
- ❖ Primary
 - Direct emissions
- ❖ Secondary
 - Formed in atmosphere
- ❖ Organic
- ❖ Inorganic
- ❖ Criteria (regulated)
- ❖ Air toxics
- ❖ Radioactive

Air Pollution - Personal Scale

❖ Indoors

- Where most people spend 80-90% of their time
- Ozone typically ~30% of outdoor levels
- Cigarette smoke, smoke from cooking, mold, dust, dander-dust mites, pesticides, radon gas, carbon monoxide, formaldehyde
- Contagious viruses and bacteria may be transmitted via exhaled liquid aerosols, especially with coughing and sneezing



❖ Outdoors

- Yard, parks, playgrounds – pesticides, mold spores, mold, pollen, dust, ozone, smoke from fireplaces and outdoor cooking, fireworks
- Streets, highways, cars, filling stations – organic gases, road dust, nitrogen dioxide, carbon monoxide, diesel smoke



Air Pollution – Urban and Regional

❖ Area sources

- Solvents, paints, oil and gas production, biogenics

❖ Point sources

- Industry



❖ Mobile sources

- On-road

- Traffic



- Off-road

- Boats, aircraft, construction



❖ Urban plumes

❖ Industrial plumes

❖ Large fires

❖ Volcanoes

❖ Climate change

❖ Ecological cycles $\text{CO}_2 - \text{O}_2 - \text{H}_2\text{O}$

