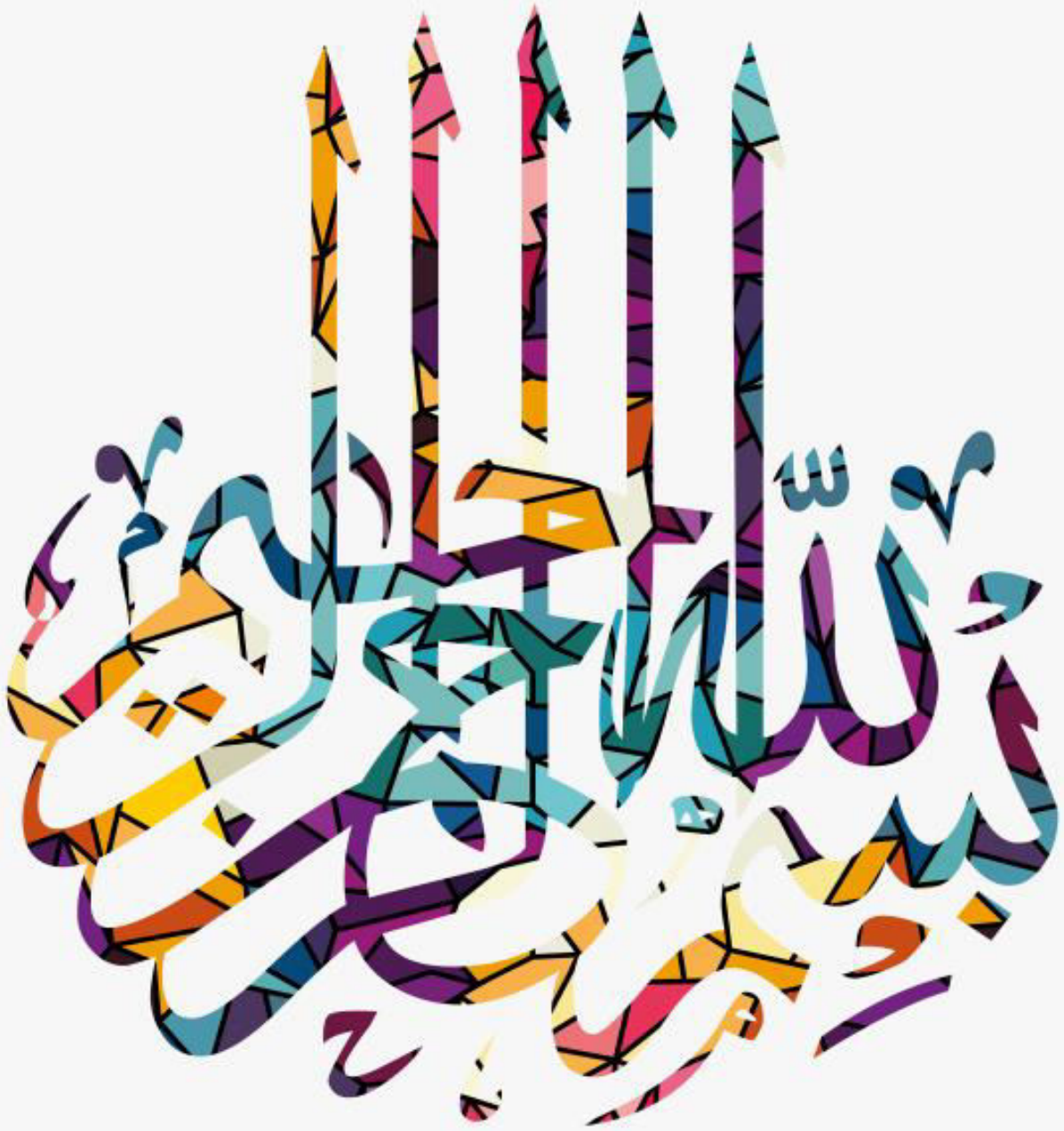
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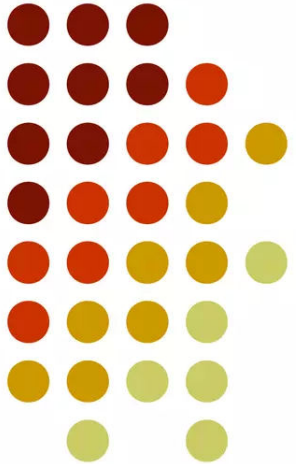
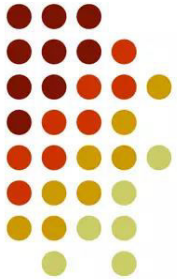
RADIATION POLLUTION



What is radiation pollution?

- Radiation pollution is caused by radioactive substances which emit invisible radiation released in the environment through human activities.



- It is classified into being ionizing or non-ionizing. Both types are harmful to humans and other organisms.
- Nuclear power plants are one of the most active sources.


WHAT CAUSES RADIOACTIVE POLLUTION?

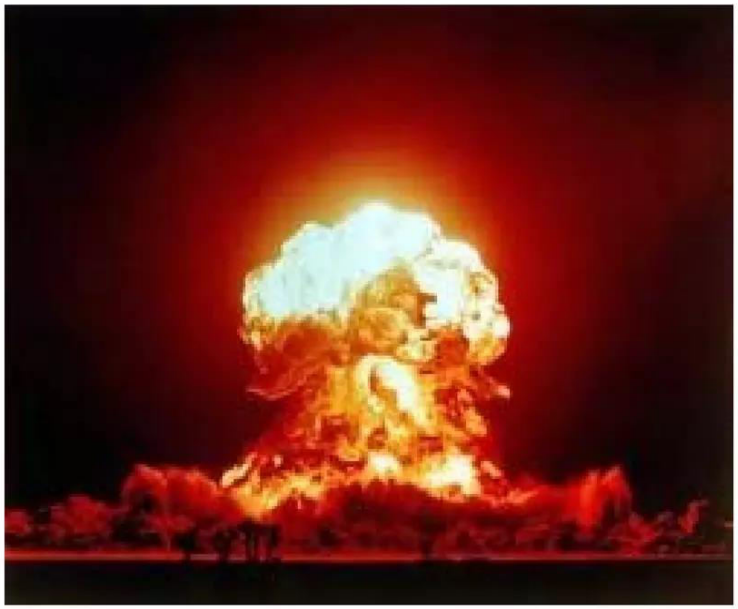
RADIATION POLLUTION

Sources of Radiation Pollution

SOURCES

- **Nuclear power plants**
- **Nuclear weapon**
- **Transportation** of nuclear waste
- **Disposal of nuclear waste**
- **Uranium mining**
- **Refining of radioactive substances**
- **Preparation of radioactive isotopes**

Nuclear explosion

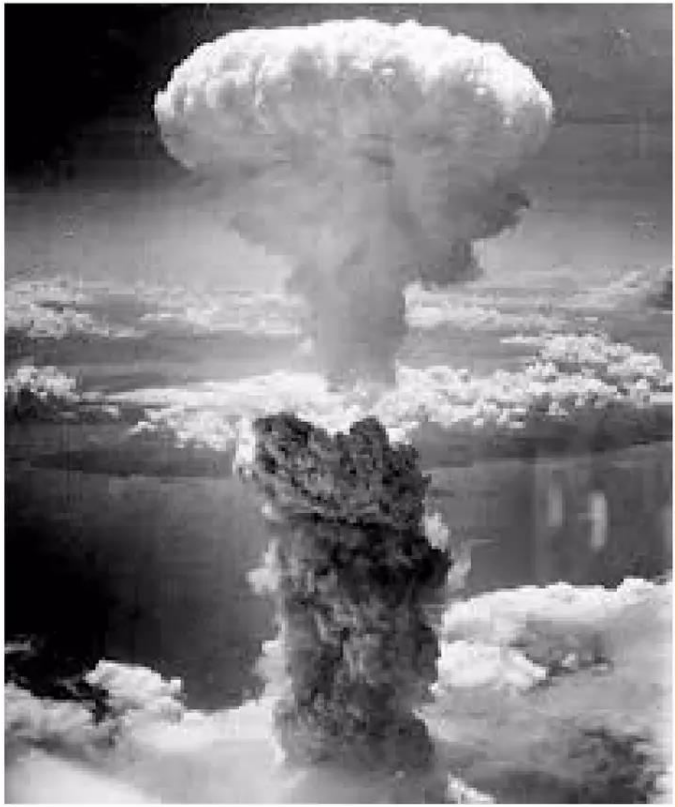


Nuclear power plant


HelpSaveNature.com
Radioactive waste generates radioactivity
and emits radioactive byproducts.

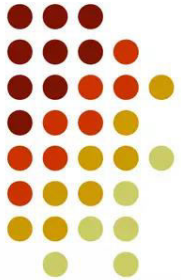

HIROSHIMA
AND NAGASAKI
BOMBING

Nuclear weapons



Uranium mining

TYPES OF POLLUTANTS



- **Non-ionizing** radiation is relatively long wavelength electromagnetic radiation, such as radio waves, microwaves, visible radiation, ultraviolet radiation, and very low electromagnetic fields.
- It is generally considered as less dangerous than ionizing radiation.

- Ionizing radiation is the short wavelength radiation emitted by certain unstable isotopes during radioactive decay.
- This can cause other atoms to release their electrons. These free electrons can damage biochemicals, such as proteins, lipids and nucleic acids including DNA causing severe health problems, including cancer and even death.

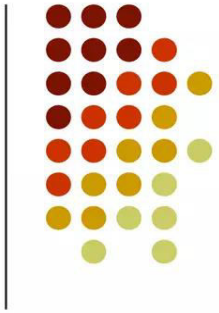
NATURAL CAUSES

- **Breathing of radon gas**
- Other more mild forms of natural radioactive elements include: radioactive materials in the earth's crust, rays from the cosmos and trace amounts of radioactivity in the body.

MAN-MADE CAUSE

medical procedures such as CT scans, X rays and nuclear medicine

EFFECTS



- skin irritation to death depending on how much radiation is exposed to the body, what parts of the body are exposed and how strong the immune system is.
- blood component changes, nausea, vomiting, fatigue, diarrhea and cancer

- Radiation is the pollutant that is more dangerous than any other pollutant on earth. Exposure to heavy doses of radiation causes skin burns and suppression of bone marrow functioning and increased to radiation results in cancer.

PREVENTION

- Disposing radioactive substances properly
- safety measures should be enforced strictly;
- leakages from nuclear reactors, careless handling, transport and use of radioactive fuels, fission products and radioactive isotopes have to be totally stopped;
- there should be regular monitoring and quantitative analysis through frequent sampling in the risk areas;

- safety measures should be strengthened against nuclear accidents;
- preventive measures should be followed so that background radiation levels do not exceed the permissible limits.

Thus, we can say that radioactivity causes long range effects, affecting the future of humans and hence, the future of our civilization.


THANK
YOU

- **AIR POLLUTION**

troduction

- Air is essential for life it self, without it we could survive only a few minutes.
- It constitutes immediate physical environment of living organisms
- The atmosphere is layered in to four distinct which are: Troposphere, stratosphere, mesosphere, and thermosphere.

Normal components of our atmosphere

- **Nitrogen - 78.1%**
- **Oxygen - 20.9%**
- **Carbon dioxide - 0.03%**
- **Everything else - 0.07%**
  - noble gases (krypton, xenon, argon, helium)
  - methane
  - sulfur dioxide

What is air Pollution?

Air pollution consists of gases, liquids, or solids present in the atmosphere in high enough levels to harm humans, other organisms, or materials

•Any visible or invisible particle or gas found in the air that is not part of the original, normal composition.

What is air Pollution?

- Air pollutants may be either emitted into the atmosphere or formed within atmosphere itself:
- Primary air pollutants:

Sources such as factory chimmey or exhaust pipe.

- Secondary air pollutants:

Ex ozone.

Sources of Primary Air Pollutants

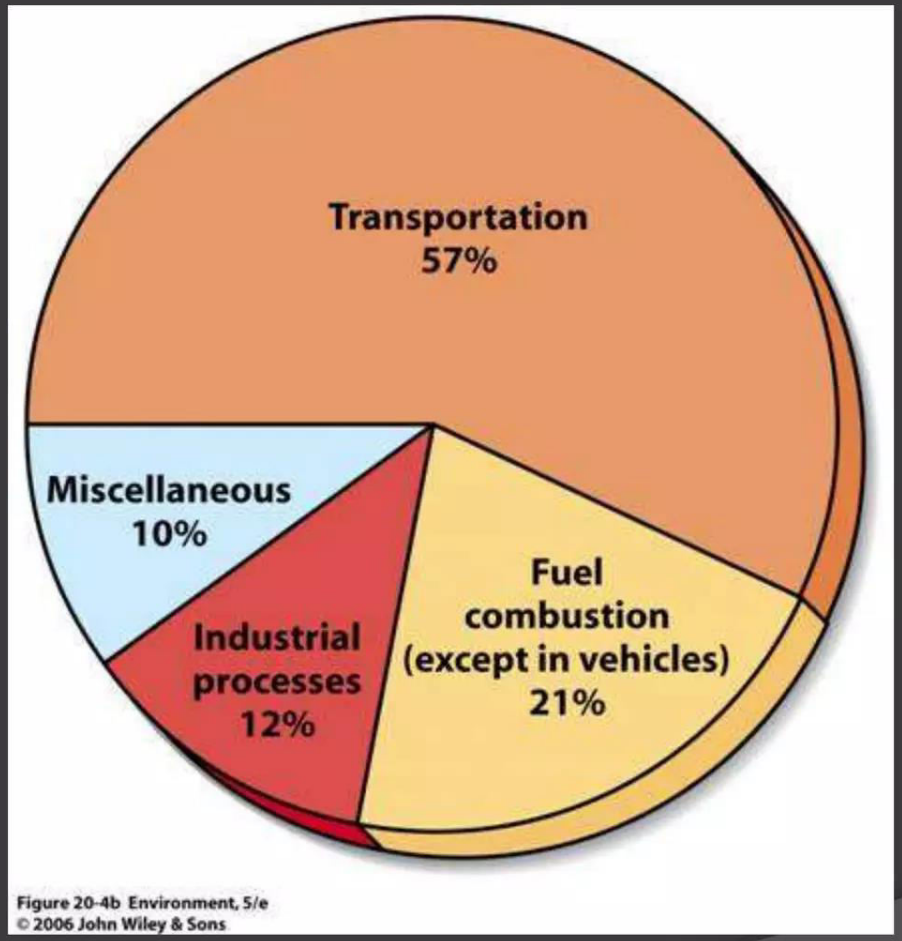


Figure 20-4b Environment, 5/e

The main sources of air pollution are:

(a)AUTOMOBILES:

- Motor vehicles are a major source of air pollution throughout the urban areas.
- They emit hydrocarbons, carbon monoxide, lead, nitrogen oxides and particulate matter.
- In strong sunlight, certain of these hydrocarbons and oxides of nitrogen may be converted in the atmosphere into "photochemical" pollutants of oxidizing nature.

The main sources of air pollution are:

- In addition, diesel engines, when misused or badly adjusted are capable of emitting black smoke and malodorous, fumes.

The main sources of air pollution are:

(b) INDUSTRIES:

- Combustion of fuel to generate heat and power produces smoke, sulphur dioxide, nitrogen oxides and fly ash.
- Petrochemical industries generate hydrogen fluoride, hydrochloric acid and organic halides.

The main sources of air pollution are:

- Many industries discharge carbon monoxide, carbon dioxide, ozone, hydrogen sulphide and sulphur dioxide.
- Industries discharge their wastes from high chimneys at high temperature and high speed.

The main sources of air pollution are:

(c)DOMESTIC SOURCES :

- Domestic combustion of coal, wood or oil is a major source of smoke, dust, sulphur dioxide and nitrogen oxides.

(d) tobacco smoke:

- The most direct and important source of air pollution affecting the health of many people .
- Even those who do not smoke may inhale the smoke produced by others ("passive smoking").

The main sources of air pollution are:

(e) MISCELLANEOUS:

- These comprise burning refuse, incinerators, pesticide spraying, natural sources (e.g., wind

borne dust, fungi, molds, bacteria) and nuclear energy programmes.

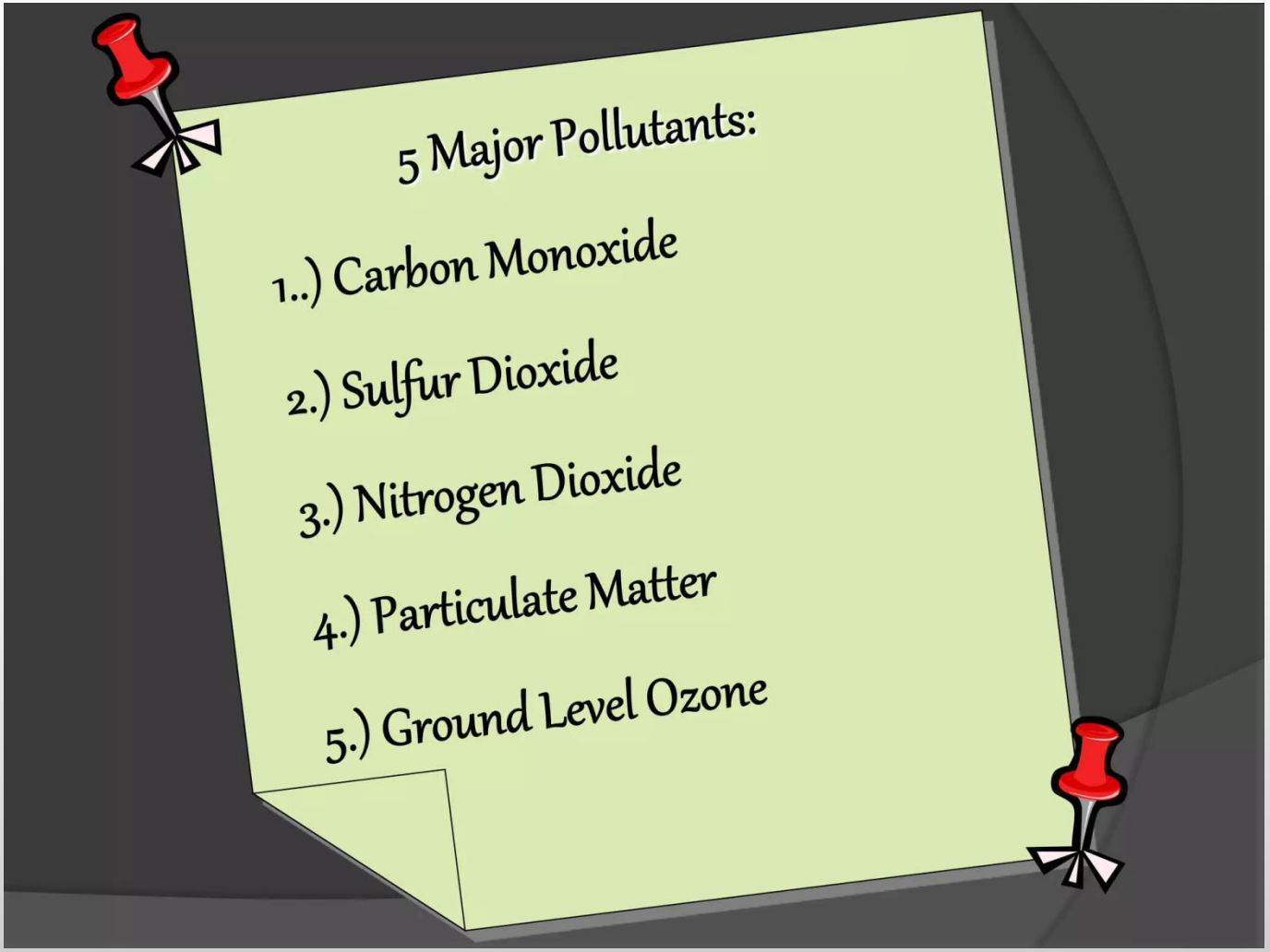
All these contribute to air pollution.

NOTE…

- Although the Earth's atmosphere extends to several layers above the surface, it is only the first30 km that hold the major portion of the atmospheric gases.
- Man is most directly concerned with only the 8-10 km of the atmosphere.
- The level of atmospheric pollution at anyone time depends upon meteorological factors, e.g., topography, air movement and climate.
- Winds help in the dispersal and dilution of pollutants.
- If the topography is dominated by mountains (or tall buildings) the winds become weak and calm, and pollutants tend to concentrate in the breathing zone.

NOTE…

- The vertical diffusion of pollutants depends upon the temperature gradient.
- When there is a rapid cooling of lower layers of air (temperature inversion), there is little vertical motion and the pollutants and water vapours remain trapped at the lower levels and the result is "smog".
- The "temperature inversion "which is more frequent in the winter months than in spring or summer, is a threat to human health.


5 Major Pollutants:
1..) Carbon Monoxide
2.) Sulfur Dioxide
3.) Nitrogen Dioxide
4.) Particulate Matter
5.) Ground Level Ozone

(1) **Carbon monoxide**

- It is colorless , odorless gas , a product of incomplete combustion of carbon containing materials, such as in in automobiles, industrial process, heating facilities and incinerators
- Some widespread natural non biological and biological sources have also been identified.
- Concentrations in urban areas depend on weather and traffic density.

Effect of CO pollution on the health:

- It causes harmful effect by reducing oxygeen delivery to body organ , in extermelly high level it can cause death.
- CO's affinity for Hb is 240–270 times greater than oxygen and Fetal Hb has higher affinity for CO , so it competes with O2 to bind (irreversibly) with haemoglobin.

Effect of CO pollution on the health:

- By this exposure to it reduce the oxygen -carrying capacity of the blood to the heart, brain and other organs .
- deprives body of O2 causing headaches, fatigue, MI and impaired vision.

(2) **Sulphur dioxide**

- It is one of the several forms in which sulphur exists in air.
- The others include H2S,H2SO4and sulphate salts.
- Sulphur dioxide results from the combustion of sulphur containing fossil fuel, and when coal and fuel oil are burned.
- Domestic fires can also produce emissions containing sulphur dioxide.
- Acid aerosol - sulphuric acid (H2S04)is a strong acid that is formed from the reaction of sulphur trioxide gas (S03) with water.

(3)**Nitrogen Dioxide**

- Nitric oxide (NO) is produced by combustion.
- Nitrogen dioxide (NO2), which has greater health effects, is a **secondary pollutant created by the oxidation of NO under conditions of sunlight,** or may be formed directly by higher temperature
- combustion in power plants or indoors from gas stoves.

(3)Nitrogen Dioxide

- reddish, brown gas present in car exhaust and power plants.
- Levels of exposure to nitrogen dioxide that should not be exceeded (WHO guideline levels) are respectively 400 µg/m3 (0.21 parts per million (ppm) for one hour and 150 µg/m3 (0.08 ppm) for 24 hours (WHO, 1987a).

(4) **Particulate matter :**

- represents a complex mixture of organic and inorganic substances.
- Mass and composition tend to divide into two principal groups :
- coarse particles larger than 2.5 μm in aerodynamic diameter, and fine particles smaller than 2.5 μm in aerodynamic diameter.
- The smaller particles contain the secondarily formed aerosols ,combustion particles and recompensed organic and metal vapours.
- The large particles usually contain earth's crustal material and fugitive dust from roads and industries.

(4) **Particulate matter :**

- Particulate matter of respirable size may be emitted from a number of sources, some of them natural (e.g. dust storms)and many others that are more widespread and more important (e.g., power plants and industrial processes, domestic coal burning, industrial incinerators).

(5) Ground level ozone

- This is formed when pollutants such as nitrogen oxides and volatile organic compounds (VOCs) react in sunlight .
- High levels can cause breathing problems, reduce lung function and trigger asthma symptoms.
- Ground level ozone can also seriously damage crops and vegetation.
- Ozone is a powerful greenhouse gas and contributes to global warming both directly and by reducing carbon uptake by vegetation.

(5) Ground level ozone

- The WHO guidelines are 150–200 µg/m3 (0.076–0.1 ppm) for one hour exposure and 100–200 µg/m3 (0.05-0.06 ppm) for 8 hour exposures (WHO, 1987a)

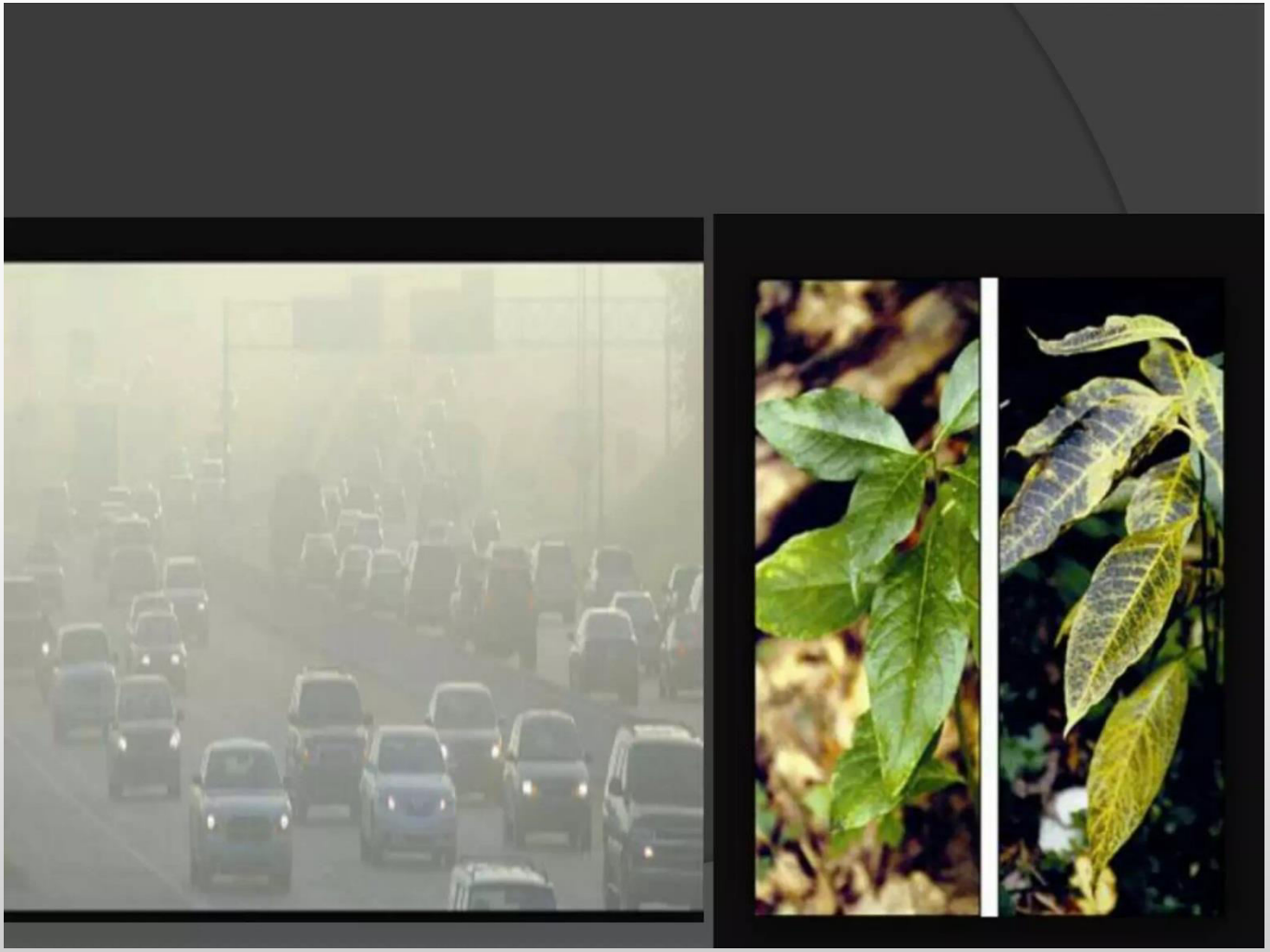

These 5 together form.....


SMOG

SMOG

- Smog is made up of mixture of those pollutants in the atmosphere .
- Combination of words smoke and fog.
- There are two types : reducing smog characterized by sulpher dioxide and particulate.
- And photochemical smog characterized by ozone and other oxidants.

- 1st smog related deaths were in London in 1873; death of 500 people; can you imagine how much worse the atmosphere is now?!
- Limits visibility
- Decreases UV radiation
- Yellow/black color over cities
- Causes respiratory problems and bronchial related deaths



Carbon dioxide:

- This is not commonly regarded as an air pollutant, although man generates enormous amount of it in combustion process using coal, oil and gas.
- Carbon dioxide is a natural constituent of the air.
- It does not take part in any significant chemical reactions with other substances in the air.
- However, its global concentration is rising above the natural level by an amount that could increase global temperature enough to affect climate markedly

Volatile organic compounds:

- VOCs are divided into the separate categories of methane (CH_4) and non-methane (NMVOCs)
- Methane is an extremely efficient greenhouse gas which contributes to enhanced global warming
- NMVOCs, the aromatic compounds benzene, toluene and xylene are suspected carcinogens and may lead to leukaemia through prolonged exposure .

THANKYOU