6. Study of suspended particulate matter in air at the two widely different sites, in your area.

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Aim : To study the suspended particulate matter on the leaves collected from different sites.

Requirements : Slides, coverslips, ear buds, microscope, leaves of roadside plants and leaves of a plant from glass house if available.

- While walking on a busy road, in a crowded market or in an industrial area, and then wiping the face with a white cotton cloth. One can observe a large amount of pollutants (dirt) collected on it.

Procedure :

1. Take two leaves from the same location of the same plant. Wash one leaf under the tap and leave other leaf as it is (i.e. unwashed). Put drop of glycerine on the surface of leaves.
2. Spread glycerine with the help of a clean ear bud.
3. Smear this ear bud on a clean slide, observe under microscope.
4. Prepare separate slides for each sample.
5. This experiment can also be performed by following method.

Observation :

We can observe many air pollutants such as dust particles, carbon particles, pollen grains, spores, etc.

Observation table :

Sr. no.	Leaf sample	Observation
1.	Washed leaf	smoke, dust and particulate matter is absent on slide under microscope.
2.	Unwashed leaf	smoke, dust, pollen grains and particulate matter are observed on slide under the microscope.

Inference :

The suspended particles in the area with heavy vehicular traffic is greater than that in the area with very little traffic. This is because the air in the areas with heavy traffic is rich in smoke, dust and particulate matter when compared to the areas with little traffic.

Give the reasons for washing one leaf :

washing of one leaf is creating the ideal condition simillar to unpolluted air.

Questions

1. What is air pollution?

Pollution is the introduction of contaminants into the natural environment that cause adverse change.

2. Enlist the different air pollutants.

There are six pollutants are-
1. carbon monoxide
2. lead
3. nitrogen oxides
4. ground-level ozone,
5. particle pollution (often referred to as particulate matter)
6. sulfur oxides.

3. Do you know any disease caused by air pollution?

1. asthma
2. chronic obstructive pulmonary disease (COPD)
3. lung cancer

4. Write note on Electrostatic precipitator.

Electrostatic precipitator (ESP) is a filtration device that removes fine particles like dust and smoke from a flowing gas using an high voltage electrostatic charge and collecting them on collecting plates. The electrode wires that are maintained at several thousand volts releases electrons. These electrons attach to dust particles and give them a net negative charge. The collecting plates then attracts negative charged dust particles. The dust particles fall down. This is the principle of electrostatic precipitation. Electrostatic precipitator apply this principle on an industrial scale.

5. What is CNG ?

CNG, also known as compressed natural gas, is an eco-friendly alternative to gasoline. Made by compressing natural gas (methane) down to less than 1% of its volume, CNG fuel is safer than gasoline and diesel because it is non-toxic and does not contaminate ground water.

6. How to control air pollution ?

1. By minimizing and reducing the use of fire and fire products.
2. Since industrial emissions are one of the major causes of air pollution, the pollutants can be controlled or treated at the source itself to reduce its effects. For example, if the reactions of a certain raw material yield a pollutant, then the raw materials can be substituted with other less polluting materials.
3. Fuel substitution is another way of controlling air pollution. In many parts of India, petrol and diesel are being replaced by CNG – Compressed Natural Gas fueled vehicles. These are mostly adopted by vehicles that aren't fully operating with ideal emission engines.
4. Although there are many practices in India, which focus on repairing the quality of air, most of them are either forgotten or not being enforced properly. There are still a lot of vehicles on roads which haven't been tested for vehicle emissions.
5. Another way of controlling air pollution caused by industries is to modify and maintain existing pieces of equipment so that the emission of pollutants is minimized.
6. Sometimes controlling pollutants at the source is not possible. In that case, we can have process control equipment to control the pollution.

7. How are air pollutants harmful to plants ?

The air pollutants combine with water droplets in clouds to combine and form acid rain which destroys the crops and plants.
air pollutants (especially sulfur dioxide, ozone, and oxides of nitrogen) can alter the physiological processes of plants, thereby affecting patterns of growth. Air pollutants cause damage to leaf cuticles and affect stomatal conductance. They can also have direct effects on photosynthetic systems, leaf longevity

Multiple Choice Questions

1. Carbon dioxide is called green-house gas because .....
   a. used in green-house to increase plant growth
   b. Transparent to sunlight but traps heat
   c. Transparent to sunlight but do not traps heat
   d. used in photosynthesis

2. The scruber is used to remove gases like .....
   a. carbon dioxide
   b. sulphur dioxide
   c. carbon monoxide
   d. Nitrogen dioxide

3. Which of the following size of particulate matter causes greater harm to human health ?
   a. 2.5 micrometer in diameter
   b. more than 2.5 micrometer in diameter
   c. 4.5 micrometer in diameter
   d. more than 4.5 micrometer in diameter

4. Which of the following device used for removing particulate matter in thermal power plant ?
   a. Electrostatic precipitator
   b. Scrubber
   c. CNG
   d. Catalytic converter

Remark and Signature of Teacher .....