Environmental Science

chapter- 7

Topic → Acid rain →

* When gases emitted by motor vehicles and industrial processes encounter clouds, the water vapour in the clouds combines with them to form acids, which are then returned to earth as 'acid rain'.

* Acid rain, also called acid precipitation or acid decomposition, having pH of about 5.2 or below.

* Acid rain mainly produced from the emission of sulfur dioxide (SO_2) and nitrogen oxides ($NO_x \rightarrow NO, NO_2$) from human activity, mostly the combustion of fossil fuels.

→ Effects of Acid Rain

1. Effect on Aquatic Environment:
The aquatic plants and animals need a particular pH level to survive. If the pH level falls below that the conditions become worst (bad) for their survival.
At pH levels below 5, most fish eggs cannot hatch.
Lower pH can also kill adult fish.

2. Effect on Forests:
Acid rain makes trees vulnerable to disease, extreme weather and insects by destroying their leaves, damaging the bark and stoping their growth.

3. Effect on soil:
Acid rain highly impacts on soil chemistry and biology. It means, soil microbes and biological activity as well as soil chemical composition such as soil pH are damaged or reversed due to the effects of acid rain.

4. Effect on Architecture and Buildings:
Acid rain on buildings, especially those constructed with limestone, react with minerals and corrode them away. This makes the building weak. Modern buildings, cars, airplanes, steel bridges and pipes are all affected by acid rain.

5. Effect on Public Health:
Acid rain cannot harm humans directly.
The sulfur dioxide which is generated by human activity, it can cause health problems. specifically, sulfur dioxide particles in the air can cause lungs problem, like asthma and bronchitis.

→ Important Measures to control Acid Rain.

1. Reduce amount of sulphur dioxide and oxides of nitrogen released into the atmosphere.
2. Use cleaner fuels.
3. Use other source of electricity (i.e., nuclear power, wind energy and solar energy).
4. Flue gas desulphurization.
5. Plants more and more trees.

→ Eco friendly materials →

Eco-friendly materials or Eco-materials are defined as those materials that enhance (increase) the environmental improvement throughout the whole life cycle.
Eco-materials plays a key role in material science and technology to minimize environmental impacts, enhance the recyclability of materials, and to increase energy and material efficiency.

↳ Properties of Eco-materials

1> Energy saving ability → to reduce total life cycle material consumption of a system or device.

2> Resource saving ability → to reduce the total life cycle material consumption of a system or device.

3> Re-usability → to allow the reuse of collected products as similar functions.

4> Recyclability → to allow the use of collected products of materials as a raw materials.

5> chemical stability → to be used over long term without chemical degradation.

6> Substitutability → to be used as an alternative of "bad" materials.

→ Recycling of materials →

* Recycling is the process of converting waste material into new materials and objects.

* Recycling can benefit our community and the Environment.

↳ Benefits of Recycling

- Reduce the amount of waste sent to landfills.
- conserves natural resources such as timber, water and minerals.
- Control pollution by reducing the need to collect new raw material.
- Saves energy.
- Helps create jobs in the recycling and manufacturing industries

* 3 R's of the Environment - 'Reduce', 'Reuse' & 'recycle'

- Reduce → Purchase products that require less packaging or to limit the waste you are producing.

- Reuse → Use a travel mug or reusable water bottle and avoid single use bags

- Recycle → Paper, plastics, glass, electronics and more can be processed into new products while using fewer natural resources and less energy.

* steps to Recycling Materials →

Recycling includes the three steps, which create a continuous loop, repersented by the familiar recycling symbol.

step→1 Collection and Processing →

There are several methods for collecting recyclables, including curbside collection, drop-off centers and deposite.

After collection, recyclables are sent to a recovery facility to be sorted, cleaned and processed into materials that can be used in manufacturing.

step→2. Manufacturing →

common household items that contain recycled materials include the following:

- Newspapers, Aluminium, Plastic and glass
- steel cans.

step→3 Purchasing New products Made from Recycled Materials

Some of the common products you can find that can be made with recycled content include the following:

- Aluminium cans, carpenting, Glass container
- Motor oils, Newspaper, steel products etc.

⇒ Concept of "Green Building"

* A 'green building' is a building that, in its design, construction, reduce or eliminates negative impacts, and can create positive impact on our climate and natural environment.

* Green building preserve precious natural resources and improve our quality of life.

* There are a number of features which can make a building 'green'. These include :

→ Efficient use of energy, water and other resources.
→ Use of renewable energy, such as solar energy
→ Pollution and Waste reduction measures, and the enabling of re-use and recycling.
→ Use of materials that are non-toxic, ethical and sustainable.
→ A design that enables adaptation to a changing environment.

Example → 1. The Crystal, London (UK)

2. Pixel Building, Melbourne (Australia)

3. ACROS Fukuoka Foundation Building (Japan)