Classification of the Environment

The topic essentially involves the classification of the environment under various layers of the atmosphere. The atmosphere is a mixture of a number of gases that surround the Earth and acts as its cover. Here are the layers of the atmosphere:

Troposphere

This is the first or the lowest layer of the atmosphere, ranging from the Earth's surface to the Stratosphere. It contains water vapours and has the greatest influence on air pollution.

Stratosphere

It is right above the Troposphere and below the Mesosphere. The ozone layer is also present in this region.

Mesosphere

This is the third layer which is above the Stratosphere and below the Thermosphere. The Mesosphere is the coldest region of the entire atmosphere with a temperature ranging from -2 to 92 degrees Celsius.

Thermosphere

The upper region of the atmosphere that is right above the Mesosphere is known as the Thermosphere. It is the hottest region of the atmosphere with a temperature of around 1200 degrees Celsius.

Exosphere

As per class 11 environmental chemistry, this is the top-most layer of the atmosphere which contains various ionic or atomic compounds of oxygen, hydrogen, and helium.

Hydrosphere

This is the aqueous cover or envelope around the Earth, which includes oceans, lakes, and other water bodies.

Lithosphere

This is the rock-solid portion, which includes the mountains and other rocky bodies of the Earth.

Biosphere

This is the foremost biological envelope of the Earth that supports living beings like animals, birds, human beings, etc.

Environmental Pollution and its Types

The very next topic of class 11 environmental chemistry notes is pollution.The contamination of the environment or the presence of unwanted/ toxic substances in natural resources or the environment is known as environmental pollution. The toxicity in the resources arises mostly due to human activities through natural disasters. All of these can highly contaminate the atmosphere, air, and soil.

As there are various types of pollutants and their causes, we will now study them in detail. Mentioned below is an advanced categorization of types of pollution:

Natural Pollution

Natural pollution is caused by natural resources or nature-based activities, for example, volcanic eruptions, methane gas release from the paddy fields, forest fires, etc.

Man-Made Pollution

Man-made pollution results from the excessive interference of humans in nature, or activities like burning fuel, industrial effluents, excessive use of pesticides and chemicals, deforestation, etc.

Pollutants

The substance which is either produced by natural activities or man-made activities that can potentially affect the natural composition of the environment is known as a pollutant. Pollutants also trigger pollution at a higher level. As per the class 11 environmental chemistry chapter, pollutants can be bifurcated into two categories depending upon their nature:

Biodegradable Pollutants

The pollutants that can be degraded by the microbial or biological actions of nature are known as biodegradable pollutants. For example, natural wastes, or domestic sewage.

Non-Biodegradable Pollutants

The pollutants that cannot be degraded or acted upon by the biological on microbial activities are known as non-biodegradable pollutants. They undergo biological

magnification which can be of two types such as wastes including glass, phenols, plastic, etc. and poison including pesticides, radioactive substances, heavy metals, etc.

Tropospheric Pollution

The concept of environmental chemistry holds significant importance in class 11 chemistry syllabus. Tropospheric environmental pollution occurs due to the presence of toxic or undesirable gaseous or solid substances in the air. The major pollutants causing this pollution are:

- Gaseous Pollutants such as oxides of nitrogen, sulfur, carbon, hydrocarbons, ozone, hydrogen sulfide, oxidants, etc
- Particulate Pollutants including fumes, dust, smog, mist, smoke, etc.

Acid Rain

Acid rain is a very high-scoring topic in class 11 environmental chemistry chapter. When the highly acidic compounds in the atmosphere react with rainwater, they increase the acidic level of water and result in acid rain. The pH level of rainwater is 5.6, which is acidic due to the presence of the H+ ions formed by the reaction of acidic compounds present in the atmosphere.

$$H_2O\ (liq) + CO_2\ (gas) \rightarrow H_2Co_3\ (aq)$$

There can be several sources that result in acid rain, but it mostly occurs because of the burning of fossil fuels. This contains highly toxic nitrogenous or sulfur matter like coal, petrol, or diesel that produces sulphur dioxide or nitrogen oxides.

The SO_2 and NO_2 chemicals, after the oxidation reaction with water, resulting in acid rain. This polluted water contains a number of particulate matters that catalyze the oxidation reactions.

The Greenhouse Effect

A large section of class 11 environmental chemistry chapter has a dedicated section to the greenhouse effect and its impact on the environment. Let us understand the same.

More than 70% of the solar energy entering the ecosystem of the Earth is absorbed by the Earth’s surface, which results in an increase in temperature. The remaining heat and solar energy radiate back to the Earth’s atmosphere. Some traces of the heat remain trapped by gases like methane, carbon dioxide, ozone, water vapour, or

chlorofluorocarbon compounds. This further increases the temperature of the atmosphere and causes global warming.

Greenhouse gases are one of the factors behind the increase in the Earth's temperature and melting polar ice caps. Ultimately it results in the consequential submerging of the coastal landmass. The greenhouse gases are carbon dioxide, ozone, methane, chlorofluorocarbons, water vapour, etc. Altogether they increase the Earth's temperature and the possibilities of the spread of infectious diseases.