FAQs

1. **What is ecology? What five levels of the organization of matter are the main focus of the ecology?**

Ecology is the science that focuses on how organisms interact with one another and with their nonliving environment of matter and energy. Scientists classify matter into levels of organization ranging from atoms to galaxies. Ecologists study interactions within and among five of these levels—organisms, populations communities, ecosystems, and the biosphere.

Biosphere: Parts of the earth's air, water, and soil where life is found

Ecosystem : A community of different species interacting with one another and with their nonliving environment of matter and energy

Community: Populations of different species living in a particular place, and potentially interacting with each other

Population : A group of individuals of the same species living in a particular place Organism : An individual living being

2. **Describe the water cycle? How are human activities affecting the water cycle?**

The water cycle depicts water moving through the atmosphere and on and under the surface of the earth. Arrows depict movements in the water (hydrologic) cycle. (Refer to the slides)

Water moves downward as precipitation, into the soil as infiltration. It moves laterally on the surface as surface runoff to lakes, wetlands, streams, and river. It moves upward as evapotranspiration from lakes, wetlands, streams, and rivers, plants, soil, wind and air masses transport water vapors over various parts of the earth it returns to the surface as precipitation. Human activities are altering these chemical cycles.

We alter the water cycle in three major ways. First, we withdraw large quantities of freshwater from streams, lakes, and aquifers sometimes at rates faster than nature can replace it. Second, we clear vegetation from land for agriculture, mining, road building, and other activities, and cover much of the land with buildings, concrete, and asphalt. This increases runoff, reduces infiltration that would normally recharge groundwater supplies, accelerates topsoil erosion, and increases the risk of flooding. Third, we also increase flooding when we drain and fill wetlands for farming and urban development. Left undisturbed, wetlands provide the natural service of flood control, acting like sponges to absorb and hold overflows of water from drenching rains or rapidly melting snow.

3. **What is ecological succession? Distinguish between primary ecological succession and secondary ecological succession and give an example of each.**

The structure and species composition of communities and ecosystems change in response to changing environmental conditions through a process called ecological succession. Ecologists recognize two main types of ecological succession, depending on the conditions present at the beginning of the process: Primary ecological succession and Secondary ecological succession

Primary ecological succession involves the gradual establishment of biotic communities in lifeless areas where there is no soil in a terrestrial ecosystem or no bottom sediment in an aquatic ecosystem. Examples include bare rock exposed by a retreating glacier, newly cooled lava, and a newly created shallow pond or reservoir. Primary succession usually takes hundreds to thousands of years because of the need to build up fertile soil or aquatic sediments to provide the nutrients needed to establish a plant community

The other, more common type of ecological succession is called **secondary ecological succession**, in which a series of communities or ecosystems with different species develop in places containing soil or bottom sediment. This type of succession begins in an area where an ecosystem has been disturbed, removed, or destroyed, but some soil or bottom sediment remains. Candidates for secondary succession include abandoned farmland, burned or cut forests, heavily polluted streams, and land that has been flooded. Because some soil or sediment is present, new vegetation can begin to germinate, usually within a few weeks. It begins with seeds already in the soil and seeds imported by wind or in the droppings of birds and other animals.

4. **4. What are the four components of biodiversity? Why is biodiversity important?**

5. Biological diversity, or biodiversity, is the variety of the earth's species, or varying life-forms, the genes they contain, the ecosystems in which they live, and the ecosystem processes of energy flow and nutrient cycling that sustain all life.

6. **Species Diversity:** The number and abundance of species present in different communities. **Functional Diversity:** The biological and chemical processes such as energy flow and matter recycling needed for the survival of species, communities, and ecosystems.
7. **Ecological Diversity:** The variety of terrestrial and aquatic ecosystems found in an area or on the earth.
8. **Genetic diversity**: The earth's variety of species contains an even greater variety of genes. This genetic diversity enables life on the earth to adapt to and survive dramatic environmental changes.

9. The earth's biodiversity is a vital part of the natural capital that helps keep us alive and supports our economies. With the help of technology, we use biodiversity to provide us with food, wood, fibers, energy from wood and biofuels, and medicines. Biodiversity also plays critical roles in preserving the quality of the air and water, maintaining the fertility of topsoil, decomposing and recycling waste, and controlling populations of species that humans consider to be pests. In carrying out these free ecological services, which are also part of the earth's natural capital, biodiversity helps to sustain life on the earth.

10. List various potentially harmful ways in which humans modify natural ecosystems?

α. Fragmenting and degrading habitat
β. Simplifying natural ecosystems
χ. Introducing new or non-native species
δ. Eliminating some species
ε. Interfering with normal chemical cycling and energy flows in ecosystems.
ϕ. Overharvesting renewable resources