Our Environment

- The surroundings or space in which a person, animal, or plant lives, is known as on environment.
- Environment is everything that is surround us.
- It can have both living (biotic) and non-living things (abiotic).
- Abiotic factors are non-living parts such as sunlight, air, water and minerals in soil.
- Biotic factors are living things of our environment such as plants, animals, bacteria and more.
- Ecosystem is a community of living and non-living things that work together.

Natural ecosystem

- Ecosystem originated without human intervention is called a **natural ecosystem**.
- This can be an **aquatic ecosystem** or a terrestrial ecosystem.
- The ecosystem in water is called aquatic ecosystem.
- Sea, river, lake, pond and puddle are some examples of natural aquatic ecosystem.
- Ecosystems outside the water body and on land are called **terrestrial ecosystems.**
- Forests, Mountain regions, deserts etc., are examples of natural terrestrial ecosystems.

Artifi cial ecosystem

- Artifi cial ecosystems are created and maintained by human.
- Much simpler than the natural ecosystems.
- Terrestrial ecosystems such as paddy fi elds, gardens etc. or the aquatic ecosystem such as fi sh tank.

- ❖ Aquarium is a place in which fish and other water creatures and plants are maintained.
- ❖ An aquarium can be a small tank, or a large building with one or more large tanks.
- ❖ Terrarium is a place in which live terrestrial animals and plants are kept.
- ❖ Plants and animals are kept in a terrarium with controlled conditions that copy their natural environment.

Food Chain and Food Web

- ❖ Producers and consumers.
- ❖ Producers are organisms that are able to produce their own organic food.
- ❖ They do not need to eat other organisms to do this.
- ❖ Producers are also called autotrophs.

Consumers

- ❖ Organisms which cannot produce their own food, need to eat other organisms as food.
- ❖ These organisms are called consumers.
- ❖ Consumers are also called heterotrophs.
- ❖ Depending on the food

Herbivores

- ❖ Animals which eat plants or plant products e.g: cattle, deer, goat and rat.

Carnivores

- ❖ Animals that eat other animals e.g: Lion, tiger, frog and owl.

Omnivores

- ❖ Animals that eat both plants and animals e.g: Humans, dog and crow

Decomposers

- ❖ Micro-organisms that obtain energy from the chemical breakdown of dead organisms (both plants and animals).
- ❖ They break complex organic substances into simple organic substances

Food chain

- ❖ This sequence of who eats whom in an ecosystem is called as food chain.

Energy flow

- ❖ The food chain begins with the energy given by the Sun. Sunlight triggers photosynthesis in plants.

❖ Stored in the plant parts.

Trophic levels

- ❖ Animals that eat plants are primary consumers.
- ❖ Animals that eat primary consumers are called secondary consumers.
- ❖ Animals that eat the secondary consumers (mostly predators) are the tertiary consumers.
- ❖ There may even be large predators that eat tertiary consumers.
- ❖ They are called as quaternary consumers.
- ❖ Each of these levels in the food chain is called a trophic level.
- ❖ Organism uses up to 90% of its food energy for its life processes.
- ❖ Only about 10% of energy goes into new body cells and will be available to the next animal when it gets eaten.
- ❖ This loss of energy at each trophic level can be shown by an energy pyramid.
- ❖ In all food chain there is a top level predator that has no natural predators.
- ❖ In an aquatic ecosystem there are no natural predator for alligator; in a forest there are no natural predators for tigers.

Importance of food chain

- ❖ Learning food chain help us to understand the feeding relationship and interaction between organisms in any ecosystem.
- ❖ Understanding the food chain also helps us to appreciate the energy flow and nutrient circulation in an ecosystem.
- ❖ This is important because pollution impacts the ecosystem.

Food web

- ❖ Consumers have different sources of food in an ecosystem and do not rely on only one species for their food.
- ❖ If we put all the food chains within an ecosystem together, then we end up with many interconnected food chains.
- ❖ This is called a food web.

Waste Management and Recycling

- ❖ There are many types of waste.

- There is liquid waste (in our drains), there are gases hiding in the air (like pollutants from factories), and there is solid waste (garbage) we put in our waste bins.
- Biodegradable waste
- Non-biodegradable waste
- The term 'Biodegradable' is used for those things that can be easily decomposed by natural agents like water, oxygen, ultraviolet rays of the sun, micro- organisms, etc.
- Decomposed matter eventually mixes or returns back to the soil and thus the soil is once again nourished with various nutrients and minerals.

Non-biodegradable waste

- Materials broken down or decomposed into the soil by micro-organisms and natural agents are labeled as non-biodegradable.
- These substances consist of plastic materials, metal scraps, aluminum cans and bottles, etc.
- These things are practically immune to the natural processes and thus cannot be fed upon or broken down even after thousands of years.

Solid Waste Management

- It is our duty to reduce creating waste and protect environment. 3R's are important in protecting environment.
- The first R is reduce and the second R is reuse and the last R is recycle.

Avoid

- Avoid the usage of unwanted materials

Reduce

- We can reduce the waste by using durable goods that last longer instead of things that are used once and thrown away.

Reuse

- Reusing means using a thing again and again, rather than using and throwing after a single use. (e.g) Instead of using plastic bags, use and throw pens and batteries, use cloth bags, fountain pens and rechargeable batteries.

Creative reuse: Creative reuse or Up- cycling is the process of converting waste materials or useless products into new materials or products of better quality or for better environmental value. When you upcycle, you are giving an item a new purpose. (e.g) Used tyres into chairs. Used PET bottle into penstand.

Recycle

- ❖ The process by which waste materials are used to make new products is called recycling.(e.g) Using old clothes to make paper and melting some plastics to make floor mats, plastic boards and hose pipes.

Compost

- ❖ The process of degradation of organic wastes into manure by the action of microorganism is called composting.
- ❖ The manure thus obtained becomes natural fertilizer for the plants as well as increases the soil fertility.

Incinerate

- ❖ The burning of solid waste in incinerator is called incineration. Human anatomical wastes (discarded medicines, toxic drugs, blood, pus) are disposed by means of incineration.
- ❖ During incineration, the enormous heat kills all contagious disease-causing germs.
- ❖ We can also produce electricity with the help of this heat.

Landfill

- ❖ Landfilling is a method in which wastes are dumped into naturally occurring or man-made pits and covered with soil.
- ❖ Garbage buried inside landfills remain here for a long time as they decompose very slowly and become manure. These

Waste separation exercise

- ❖ The Solid Waste Management (SWM) rules, 2016 say that,

1. Every Household should segregate and store the waste generated by them in three separate streams – namely bio-degradable, non bio-degradable and domestic hazardous waste

- ❖ Domestic hazardous waste means discarded paint drums, pesticide cans, CFL bulbs, tube lights, expired medicines,

- broken mercury thermometers, used batteries, used needles and syringes and contaminated gauge, etc., generated at the household level.
- The average person in India produces 0.45kg of waste every day.
- It may be small amount of waste.
- But, India has a large population and imagine you collected all the waste today and put it into tractors.
- You would fill so many tractors that you could create a traffic jam approximately 2,800 kilometres long.
- India produces 532 million kilos of solid waste every day.
- Pollution occurs when the environment gets contaminated by waste, chemicals and harmful substances.
- Mainly because of human activities.
- Any substance that causes pollution is known as a pollutant.

Types of Pollution

- 1. Air pollution
- 2. Water pollution
- 3. Land (soil) pollution
- 4. Noise pollution

Air pollution

- Most air pollution is caused by the burning of fossil fuels (e.g. oil, petrol, coal and natural gas).
- These fossil fuels are used in factories (industries), power plants and motor vehicles.
- Release toxic gases and fine particles (such as ash and soot) into the air causing air pollution.
- Air pollution is also caused by burning solid waste (especially some plastics), gases or chemicals released from factories and fumes from aerosols (like deodorant spray cans) or paints.
- Certain toxic gases produced by industries mix with raindrops high in the atmosphere and make rain unusually acidic.
- This is called acid rain.
- Polluted air affects skin, eyes and respiratory system.
- Cycle or walk short distances instead of using a motor vehicle.
- Travel by public transport (bus or train)

- ❖ Do not burn solid waste.
- ❖ Avoid fireworks.
- ❖ Water pollution occurs when wastes from factories, houses and farms mixes with the water in rivers, lakes, ponds, the ocean or even groundwater.
- ❖ The most significant sources of water pollutants are
- ❖ Sewage (water we use at home for bathing, cleaning, cooking).
- ❖ Industrial effluents (liquid wastes from factories).
- ❖ Agricultural pollutants (chemical pesticides and fertilisers that get washed from farms).
- ❖ Solid waste (when waste gets dumped into water bodies).
- ❖ 1. Do not pour leftover oil, old medicines or waste down the drain or into the toilet.
- ❖ 2. Reduce the use of chemical pesticides and fertilizers to grow crops.
- ❖ 3. Use waste water for garden in home.
- ❖ 4. Do not litter or dump waste – always use a waste bin.

Land (soil) pollution

- ❖ soil pollution happens when toxic chemicals change the natural balance in soil.
- ❖ Land pollution comes from farming (Excess use of chemical pesticides and fertilisers), mining (digging up metalsand other materials), factories (industrial waste) and the solid waste from our own homes like plastics and broken electronics.
- ❖ 1. First try to reduce waste, then recycle the rest.
- ❖ 2. Always use a waste bin and never litter.
- ❖ 3. Do not burn waste, the ash mixes easily with soil.
- ❖ Noise pollution affects the environment.
- ❖ Noise pollution has been directly linked to stress and health impacts such as high blood pressure and hearing loss.
- ❖ Loud noise or even loud music can damage our ears.
- ❖ Even underwater noise pollution from ships, can make whales lose their way as they use sounds to navigate.
- ❖ Turn off your electronics when you do not use them.
- ❖ Lower the volume when you watch TV or listen to music.

- Remind drivers not to use the horn too much.
- Avoid fireworks.
- Speak, do not shout (try to set an example).