ENVIRONMENTAL EDUCATION

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WHAT IS ENVIRONMENT

- The natural world, as a whole or in a particular geographical area, especially as affected by human activity.
- The surroundings or conditions in which a person, animal, or plant lives or operates.

What is Environment Education

- Environment Education is a process that allows individuals to explore environment issues, engage in problem solving, and take action to improve the environment. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decisions.

Goal Objectives and Aims of Environment Education

The goals of Environment Education are:

- To improve the quality of environment
- To create awareness among the people on environment problems and conservation.
- To create an atmosphere so that people participate in decision-making and develop capabilities to evaluate the development programs.

The objectives of the Environment Education:

- Awareness
- Knowledge
- Attitudes
- Skills
- Participation

Importance of Environmental Education

- Increase student engagement in science.
- Improves student achievement in core subject areas.
- Helps address “nature deficits disorder”.

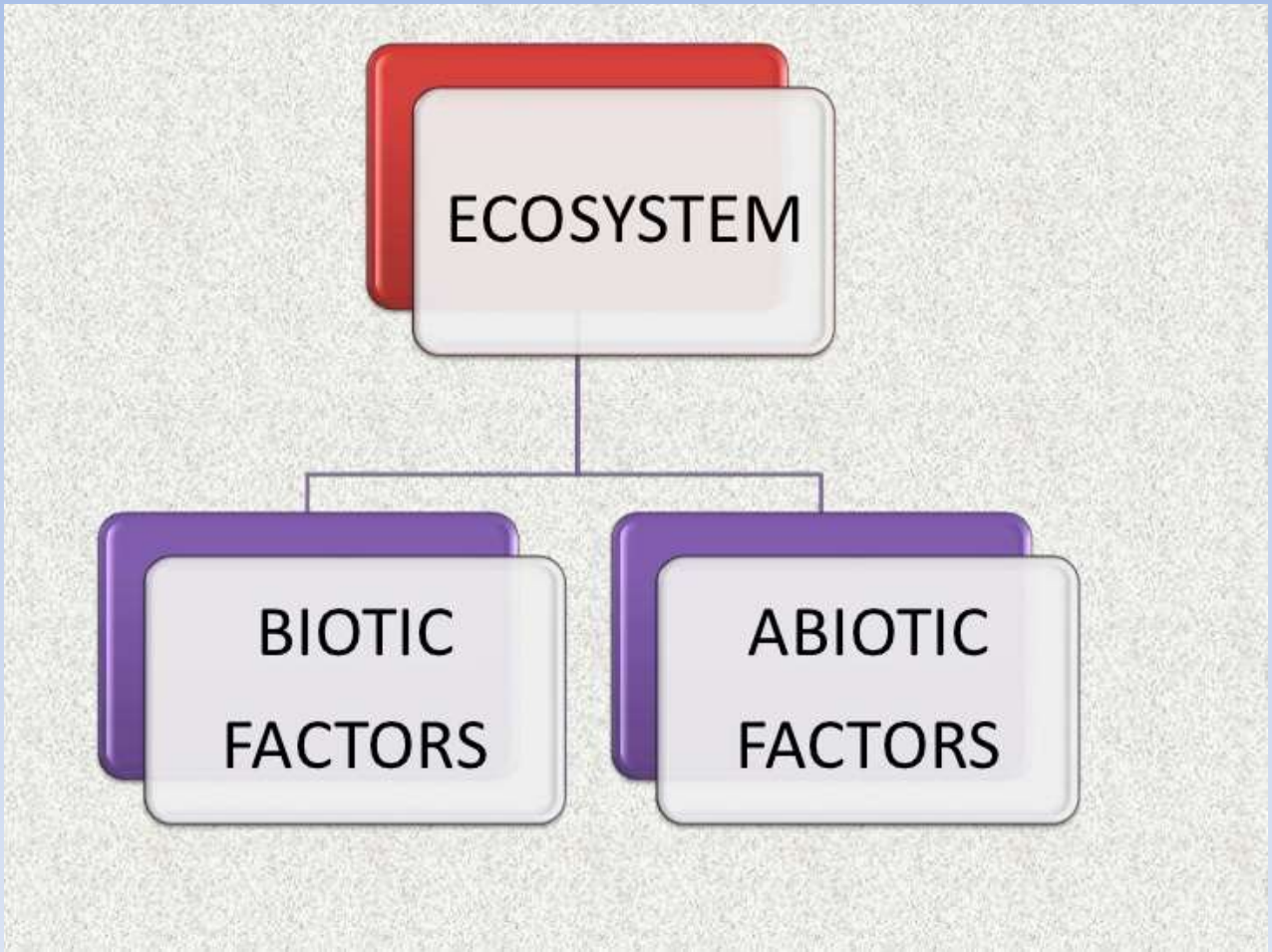
Ecology

- Ecology is studies of the interactions among organisms and their environment.
- Ecology is the scientific study of the distributions, abundance and relations of organisms and their interactions with the environment.
- Ecology includes the study of plant and animal populations, plant and animal communities and ecosystems.

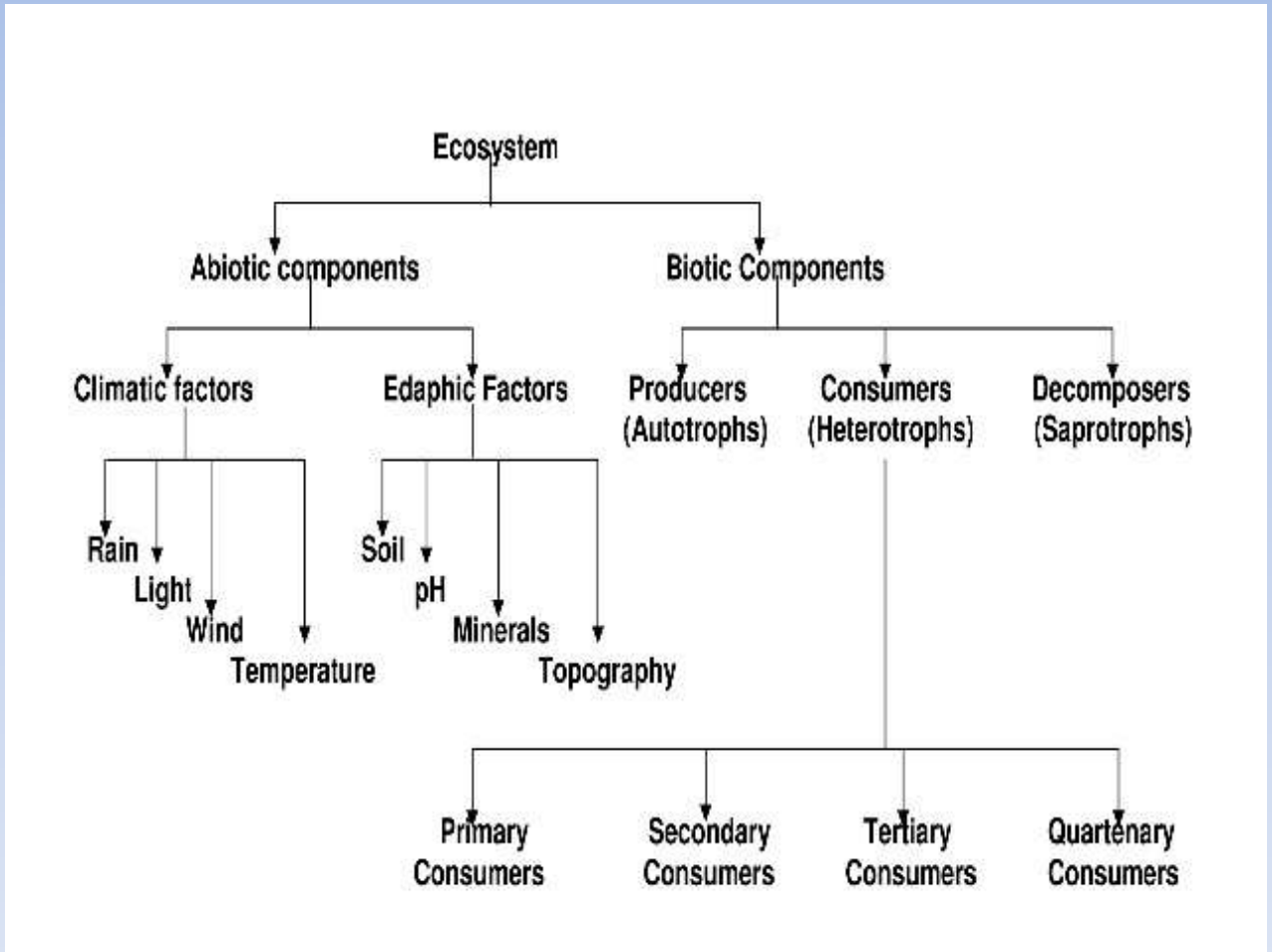
ECOSYSTEM

- An **ecosystem** is a biological environment consisting of all the living organisms or **Biotic component**, in a particular area, and the nonliving, or **Abiotic component** such as air, soil, water and sunlight with which the organisms interact
- Ecosystem is a system of living things that interact with each other and with the physical world.

Ecosystem



Components of Ecosystem



Biogeochemical Cycle

- Biogeochemical cycle is a pathway by which a chemical substance moves through both biotic (biosphere) and abiotic (lithosphere, atmosphere, and hydrosphere) compartments of Earth. A cycle is a series of change which comes back to the starting point and which can be repeated.
- The term "biogeochemical" tells us that biological, geological and chemical factors are all involved. The circulation of chemical nutrients like carbon, oxygen, nitrogen, phosphorus, calcium, and water etc. through the biological and physical world are known as biogeochemical cycles. In effect, the element is recycled, although in some cycles there may be places (called reservoirs) where the element is accumulated or held for a long period of time (such as an ocean or lake for water).

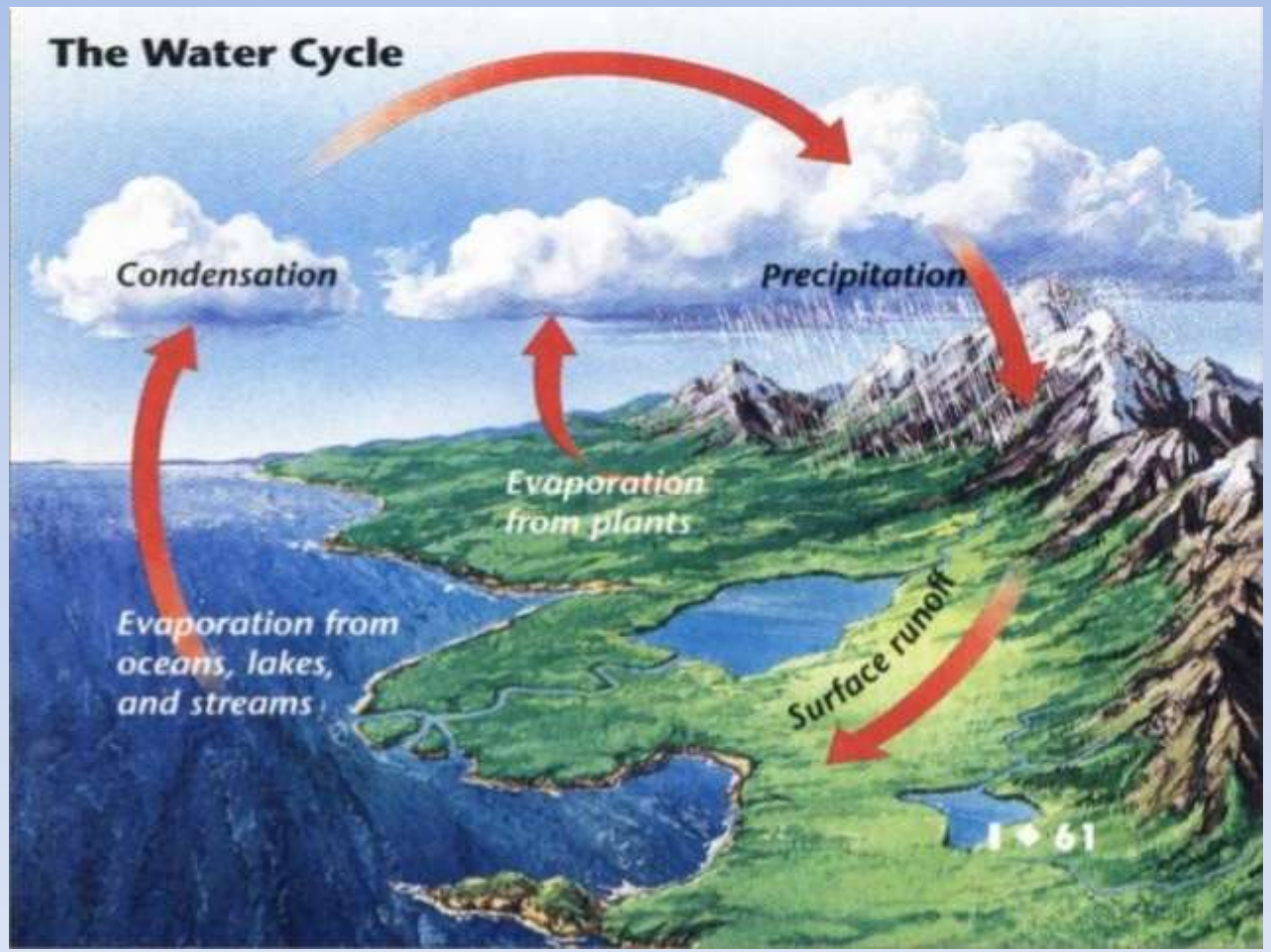
The Cycles

- The 5 biogeochemical cycles are:
- Water or Hydrologic Cycle
- Carbon Cycle
- Nitrogen Cycle
- Phosphorus Cycle
- Sulfur Cycle

Water Cycle

- Water cycle is the cycle of evaporation and condensation that controls the distribution of the earth's water as it evaporates from bodies of water, condenses, precipitates, and returns to those bodies of water.

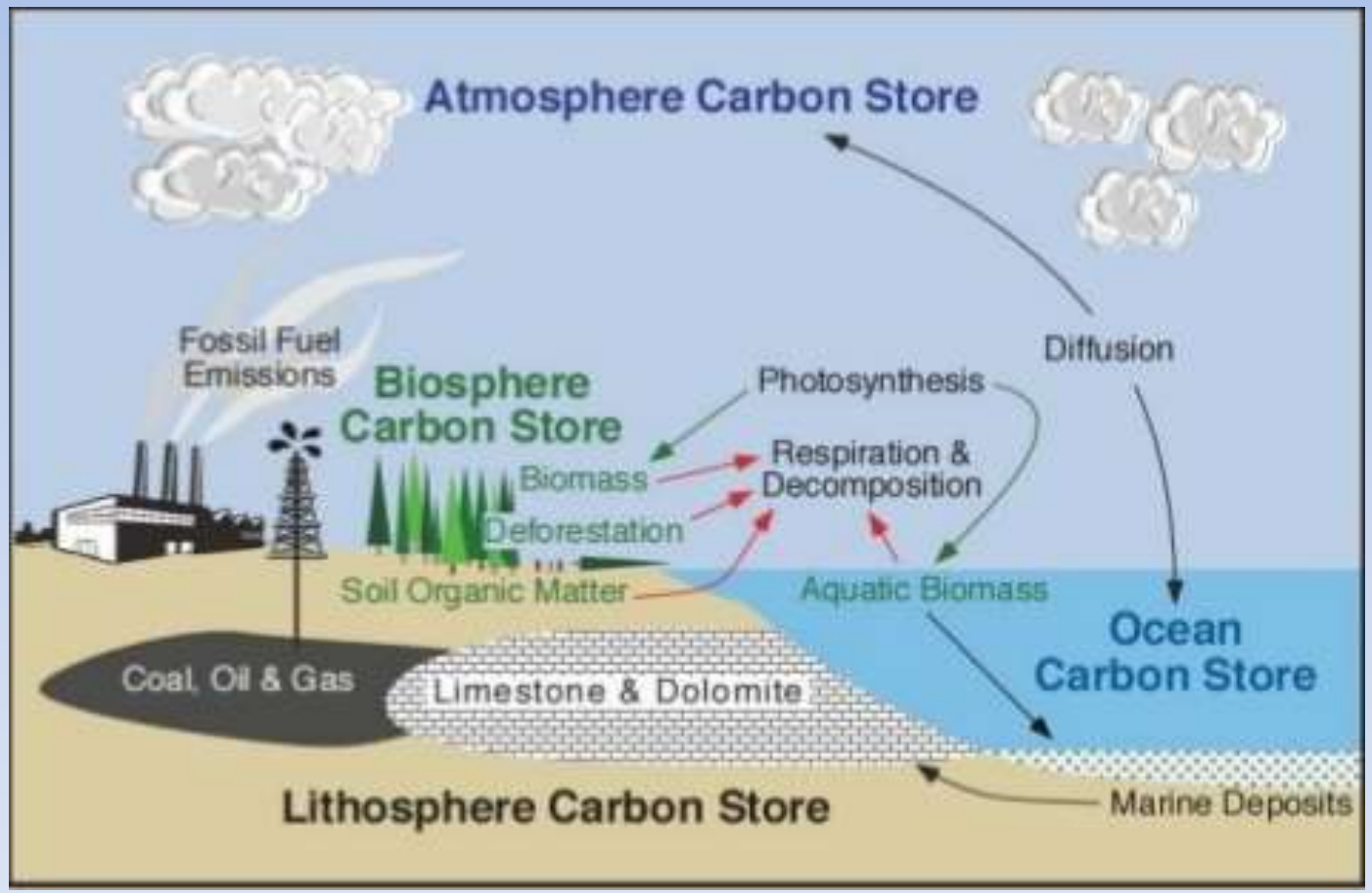
Water Cycle


The Water Cycle
Condensation
Precipitation
Evaporation from plants
Evaporation from oceans, lakes, and streams
Surface runoff

Carbon Cycle

- Carbon cycle are the combined processes, including photosynthesis, decomposition, and respiration, by which carbon as a component of various compounds cycles between its major reservoirs—the atmosphere, oceans, and living organisms.

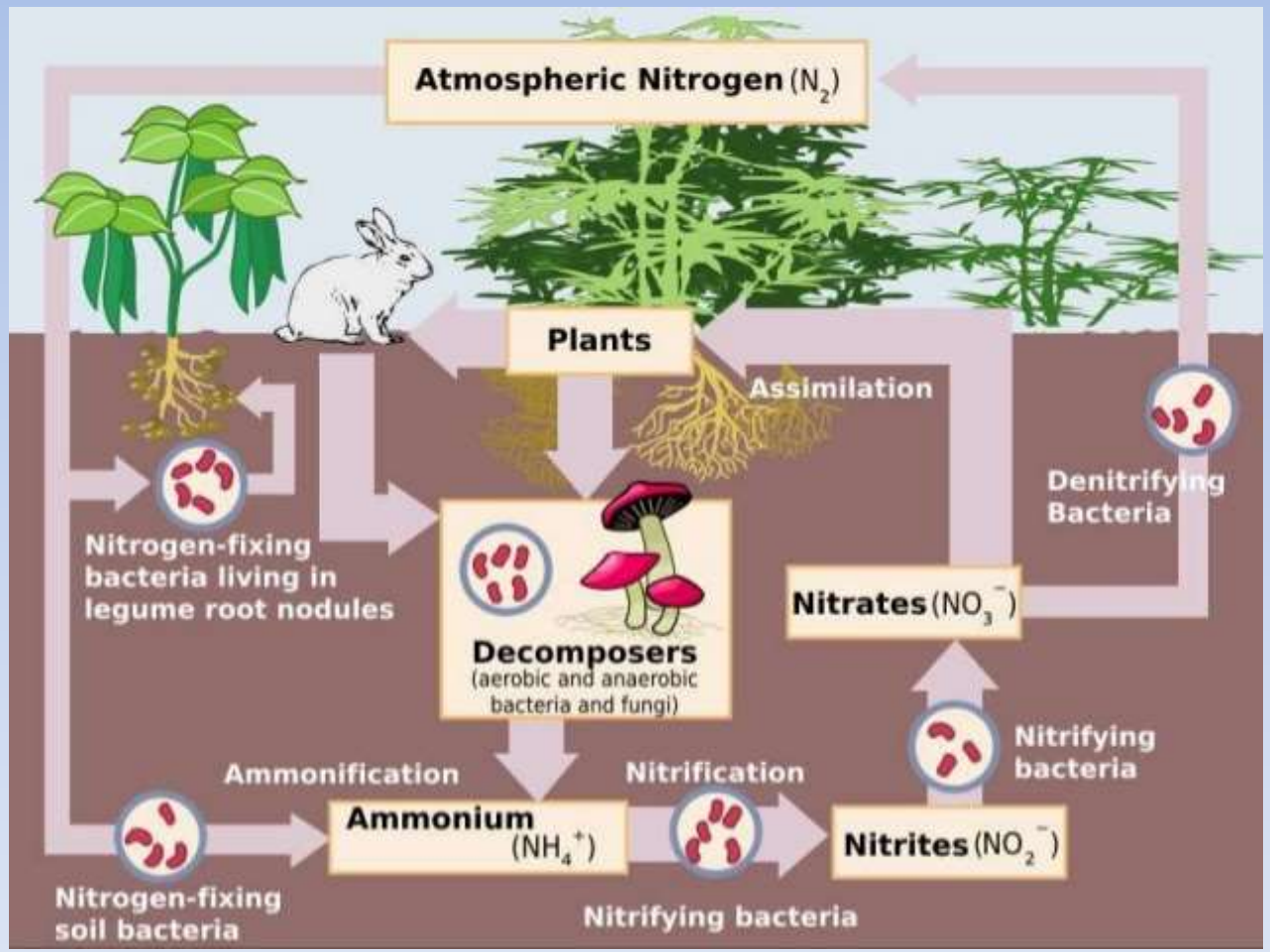
Carbon Cycle



Nitrogen Cycle

- Nitrogen cycle the continuous sequence of natural processes by which nitrogen in the atmosphere and nitrogenous compounds in the soil are converted, as by nitrification and nitrogen fixation, into substances that can be utilized by green plants and then returned to the air and soil as a result of denitrification and plant decay.

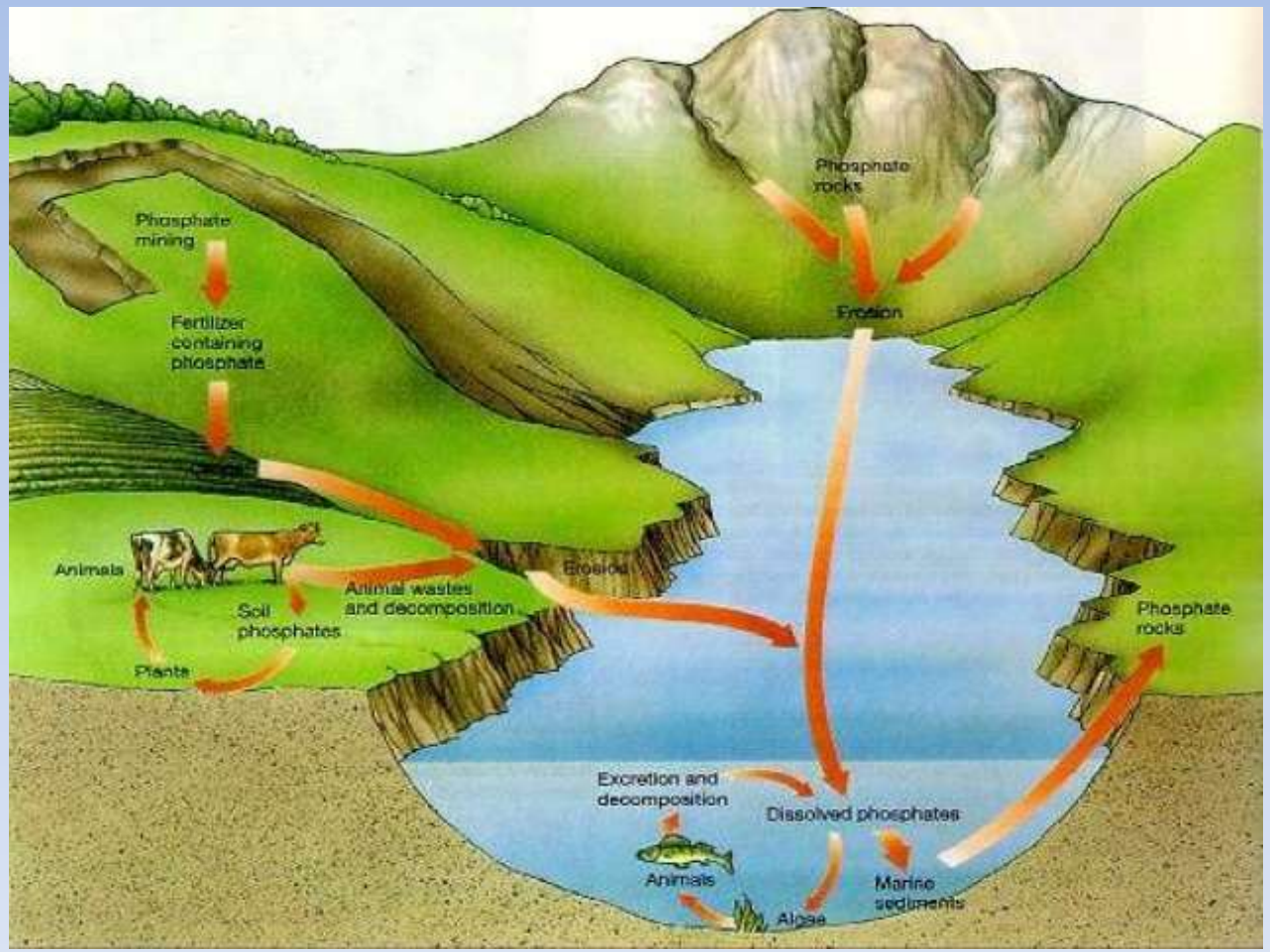
Nitrogen Cycle



Phosphorus Cycle

- The phosphorus cycle is the process in which phosphorus travels from its main source of rocks through ecosystems to living organisms.

Phosphorus Cycle



Sustainable Development

- The use of renewable and nonrenewable resources in a manner that satisfies our current needs but does not compromise the future availability of resources.
- According to the UN, sustainable development "meets the needs of the present without sacrificing the ability of future generations to meet their own needs."

Energy Conservation

Energy

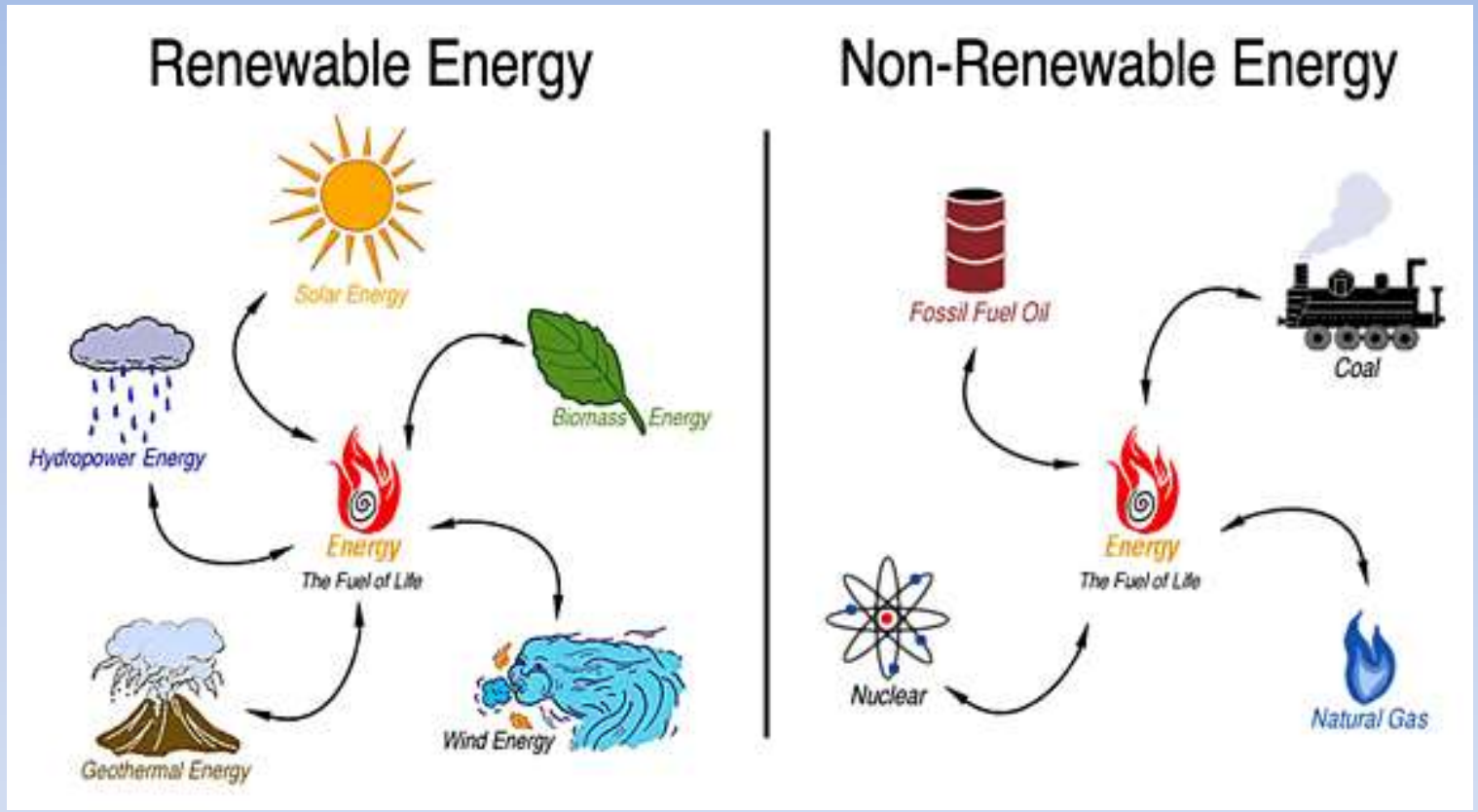
- Energy lights our cities, power our vehicles and run machineries in factories. It warms and cools our homes, cooks our food, play our music and gives us picture on television.
- Energy is defined as the ability or capacity to do work.
- Energy is all around us. It's flowing in our bodies, flying through the air, and beating down on us from the sun.
- The physics definition says that **energy** is a currency that allows you to do work.
- **Work** is done when you apply a force over a distance, or transfer energy from one place to another. So, all that really says is that energy allows you to transfer it, and to do that, you apply a force.

Types of Energy

- Renewable Energy (Non-Conventional): Renewable energy can be generated continuously practically without decay of sources.

  Some examples are: solar energy, wind energy, Geothermal energy, Hydro energy,
- Non-Renewable Energy (Conventional): Non-renewable energy is energy that comes from the ground and is not replaced in a relatively short amount of time.

  For example: energy generated from combustion of fossil fuels, Coal, Natural Gas, etc.

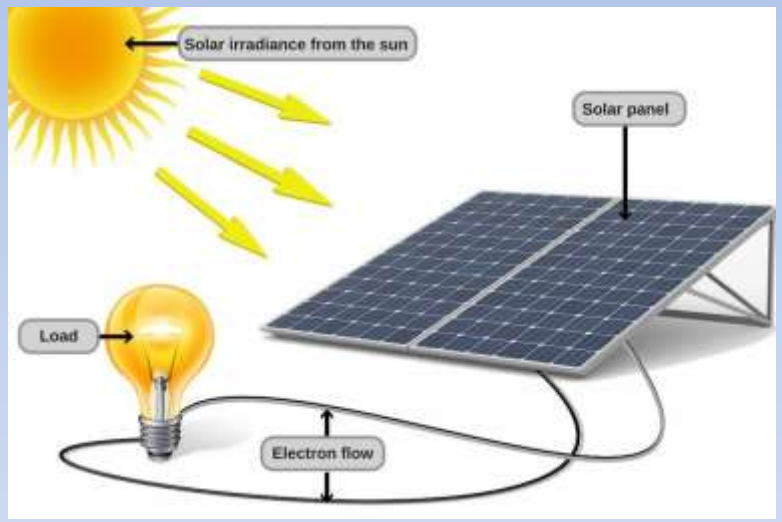

Renewable Energy
Solar Energy
Hydropower Energy
Biomass Energy
Energy
The Fuel of Life
Geothermal Energy
Wind Energy
Non-Renewable Energy
Fossil Fuel Oil
Coal
Energy
The Fuel of Life
Nuclear
Natural Gas

Energy conservation

- Energy conservation are efforts made to reduce the consumption of energy by using less of an energy service. This can be achieved either by using energy more efficiently or by reducing the amount of services used.
- Reduction in the amount of energy consumed in a process or system, or by an organization or society, through economy, elimination of waste, and rational use.

Solar Energy

- Solar energy is the non conventional source of energy.
- Solar energy is non polluting and therefore helps in lessening the green house effect.
- Solar energy is energy from the sun and without it presence all life on earth would end.
- Solar energy has been for many years because of the vast amounts of energy that are made freely available, if harnessed by modern technology.
- A simple example of the power of the sun can be seen by using a magnifying glass to focus the sun rays on a piece of paper. Before long the paper ignites into flames.



Application of Solar Energy

- Water heating
- Air heating for agricultural and industrial application
- Cold storage for preservation of food
- Water pumping
- Power generation
- Cooking food
- Green houses

Solar Energy Advantages

- **Saves you money**
- After the initial investment has been recovered, the energy from the sun is practically FREE.
- Financial incentives are available form the government that will reduce your cost.
- **Environment friendly**
- It's not affected by the supply and demand of fuel and is therefore not subjected to the ever-increasing price of gasoline.
- Solar Energy is clean, renewable (unlike gas, oil and coal), sustainable and helping to protect our environment.
- As we see previously ,it does no pollute air.
- Therefore Solar Energy does not contribute to global warming, acid rain or smog. It actively contributes to the decrease of harmful green house gas emissions. By not using any fuel, Solar Energy does not contribute to the cost and problems of the recovery and transportation of fuel or the storage of radioactive waste.
- Low/ no maintenance •
- Solar Energy systems are virtually maintenance free and will last for decades.

Disadvantages of Solar Energy

- Cannot be generated all the time.
- Cannot be built everywhere.
- Solar Plants take up lots of space.
- Very expensive to buy solar panels.

Wind Energy

- When wind strikes an object, it exerts a force in an attempt to move it out of the way. Some of the winds' energy is transferred to the object, in this case the windmill, causing it to move.
- Electrical energy obtained from harnessing the wind with windmills or wind turbines.

Advantages and Disadvantages of wind energy

Advantages:

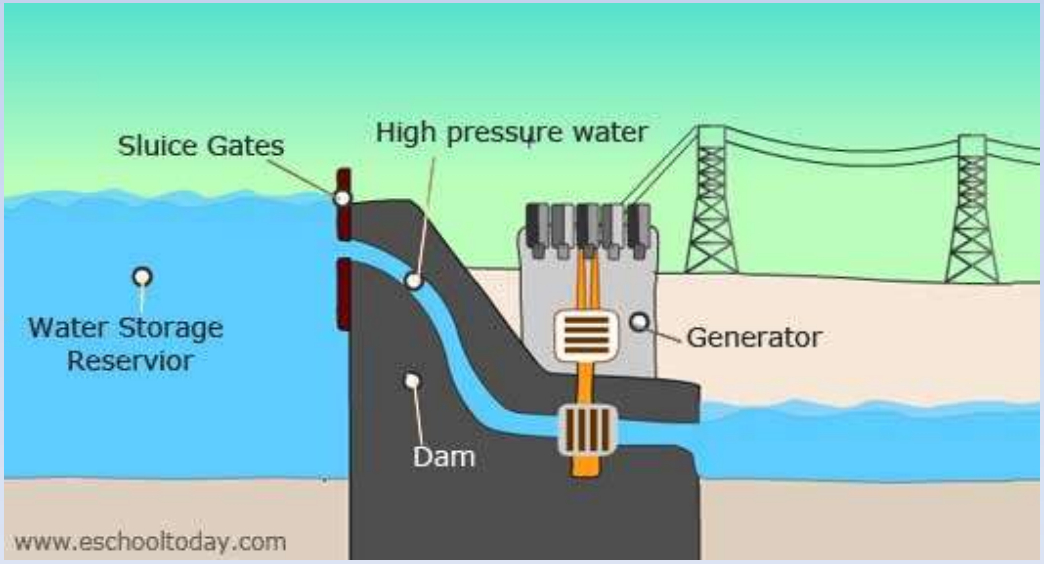
- No pollution.
- Lowest prices renewable resources.
- Don’t produce atmospheric emissions that cause acid rains and green house effects.

Disadvantages:

- Depending on how energetic a wind site is, the wind farm may or may not be cost competitive.
- Wind energy cannot be stored (unless batteries are used) Good wind sites are often located in remote locations
- Wind resource development may compete with other uses for the land and those alternative uses may be more highly valued than electricity generation.
- sometimes birds have been killed by flying into the rotors

Hydro Power

- Hydropower transforms the potential energy of a mass of water flowing in a river or stream with a certain vertical fall (termed the “head”)
- Hydroelectric power is the cheapest source of energy, renewable and environmentally benign during running.
- The potential annual power generation of a hydropower project is proportional to the head and flow of water



Advantages of Hydroelectric Energy

- It is a non-polluting source of energy.
- It's lower working price versus fossil fuel-based generation plants.
- Can be easily sent through wires to lengthy distances.
- Dams created for generation of Hydroelectricity additionally aid in irrigation tasks.

Disadvantages of Hydro Power

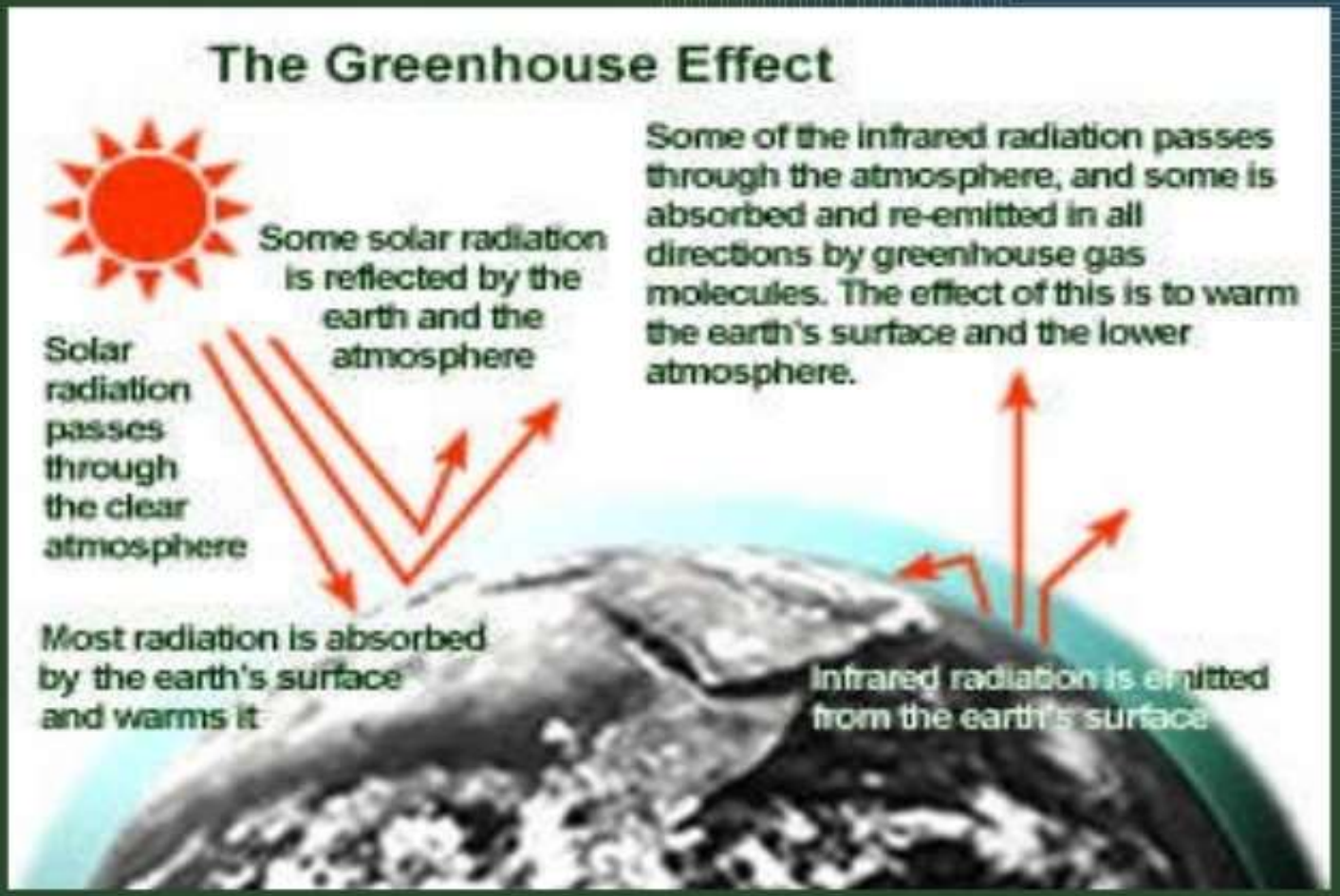
- Dams are extremely expensive to build and must be built to a very high standard.
- People living in villages and towns that are in the valley to be flooded must move out.
- Fish population can be impacted if fish live in the dam.

Green House Effect

- The greenhouse effect refers to circumstances where the short wavelengths of visible light from the sun pass through a transparent medium and are absorbed, but the longer wavelengths of the infrared re-radiation from the heated objects are unable to pass through that medium.

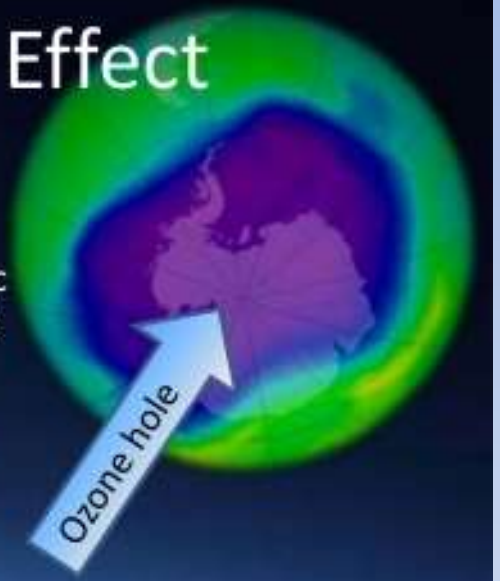
  The trapping of the long wavelength radiation leads to more heating and a higher resultant temperature. Besides the heating of an automobile by sunlight through the windshield and the namesake example of heating the greenhouse by sunlight passing through sealed, transparent windows, the greenhouse effect has been widely used to describe the trapping of excess heat by the rising concentration of carbon dioxide in the atmosphere. The carbon dioxide strongly absorbs infrared and does not allow as much of it to escape into space.

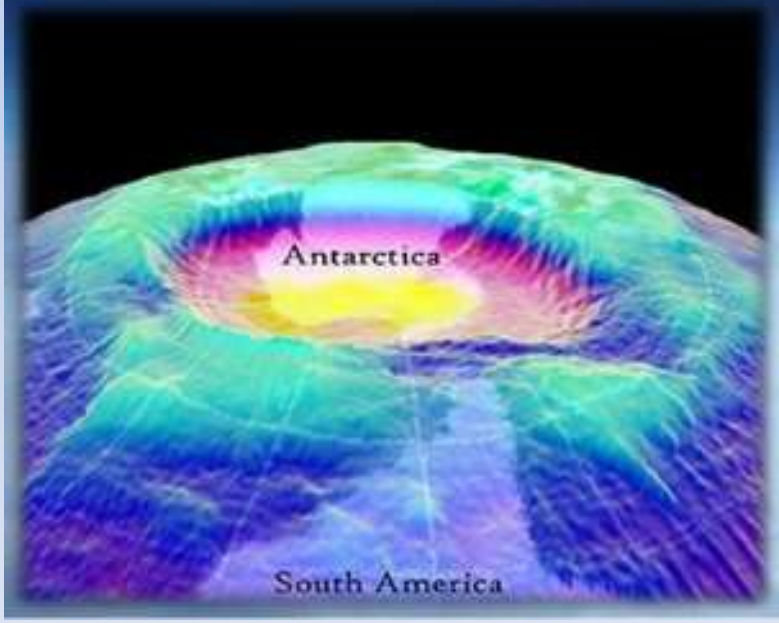
Process of the Greenhouse Effect

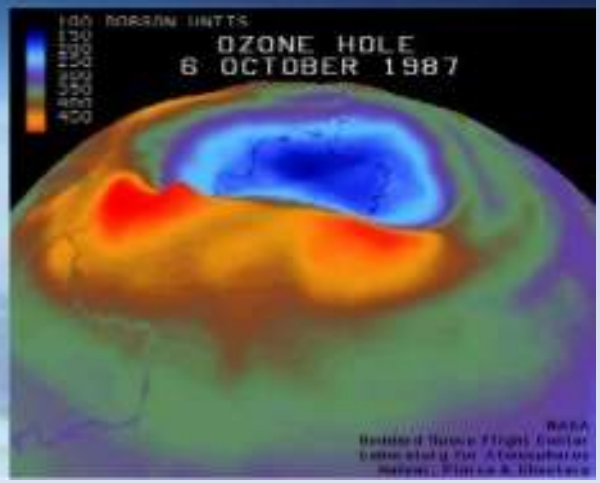


Ozone Layer Depletion: A cause of increasing Greenhouse Effect

Ozone depletion describes two distinct but related phenomena observed since the late 1970s: a steady decline of about 4% per decade in the total volume of ozone in Earth's stratosphere (the ozone layer), and a much larger springtime decrease in stratospheric ozone over Earth's polar regions. The latter phenomenon is referred to as the **ozone hole**.







CAUSES OF GLOBAL WARMING…

Eco-Friendly Material

What is recycling?

- Recycling is a process in which waste materials are treated in a way that they can be used again.
- Recycling is a key component of modern waste management and is the third component of the "Reduce, Reuse, Recycle" waste hierarchy.
- Recyclable materials include many kinds of glass, paper, metal, plastic, textiles, and electronics.
- Materials to be recycled are either brought to a collection center or picked up from the curbside, then sorted, cleaned, and reprocessed into new materials bound for manufacturing.

Recycling of Metals

- Steel
- Brass
- Copper
- Aluminum
- Iron

Benefits Of Recycling

- Recycling helps reduce the amount of trash that is disposed of in landfills.
- Recycling, rather than throwing things away, is also better for the environment.
- Currently it is believed that the amount of carbon dioxide in the earth's atmosphere is causing global warming which can have devastating long term effects.
- Recycling is one of many ways that people can cut down the amount of carbon dioxide that is released into our atmosphere.
- Purchasing recycled paper is also better for the environment because it takes less energy to produce recycled paper and saves some trees along the way.

Green Building

Introduction

- Green building (also known as green construction or sustainable building) expands and complements the building design concerns of economy, utility, durability, and comfort.
- A Green Building is one which uses less water, optimizes energy efficiency, conserves natural resources, generates less waste and provides healthier space for occupants as compared to conventional buildings.

Objectives of Green Building

- Green Buildings are designed to reduce the overall impact on human health and the natural environment by the following ways:
- Using energy, water and other resources efficiently.
- By reducing waste, pollution, and environmental degradation.

Fundamental Principles

- Structure design efficiency
- Energy efficiency
- Water efficiency
- Materials efficiency
- Waste and toxic reduction

Green Building

Structure Efficiency:

- It is the concept of sustainable building and has largest impact on cost and performance.
- It aims to minimize the environment impact associated with all life-cycles.

Energy Efficiency:

- The layout of the construction can be strategized so that natural light pours for additional warmth.
- Shading the roof with trees offers an eco-friendly alternative to air conditioning.

Benefits of Green Building

- Buildings have a large effect on the environment, human health and the economy.
- The successful adoption of GREEN BUILDING development can maximize both the economic and environmental performance of the buildings.

Environmental Benefits

- Protect biodiversity and ecosystems
- Improve air and water quality
- Reduce waste streams
- Conserve natural resources

Economic Benefits

- Reduce operating costs
- Create, expand, and shape markets for green product and services
- Improve occupant productivity

Social Benefits

- Enhance occupant comfort and health.
- Heighten aesthetic qualities.
- Minimize strain on local infrastructure.
- Improve overall quality of life.