

Unit - 2 (Natural Resources)

* Natural Resources :-

Natural Resources are those components of environment which are inherently created by environment for supporting life. these resources are equal available in atmosphere, and hydrosphere and lithosphere in the form of air, water, soil, minerals, food, animals, plants, etc.

these resources are very essential for sustaining life on earth.

→ Types of natural Resources -

Natural resources may be classified into two categories -

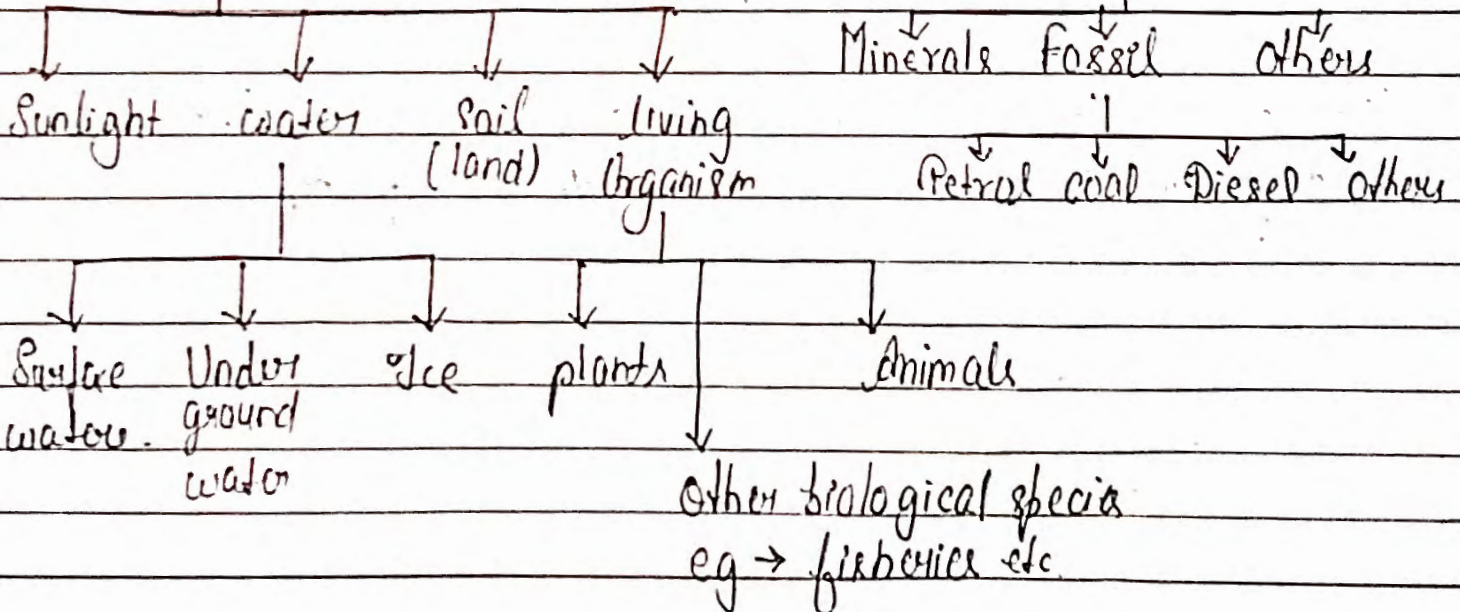
1.) Renewable

2.) Non-Renewable.

Natural Resources

↓
Renewable

↓
Non-Renewable



1) Renewable Resource :-

A resource that can be used repeatedly and does not run out because it is naturally replaced, such as solar, wind, hydro, geothermal, and biomass energy.

2) Non-Renewable Resources :-

A natural substance that is not replenished with the speed at which it is consumed; it is a finite resource like fossil fuels (oil, natural gas, coal).

* Water Resources :-

(i) Availability :-

literally, because in a world that which is occupied by water, all living things depend on water.

(ii) Sources of water :- There are two types of sources of water.

a) Surface water - rain, rivers, lakes, sea, ocean etc

b) Underground water - tubewell, well, hand pump etc.

Water resources

Surface water

Underground water

Drinkable
fresh water

Non drinkable
salty water

Aquifers

Local
reservoirs

Natural
lake, & ponds
Rivers
Streams
artificial
reservoirs

Sea
Ocean

→ Quality aspects of water:-

The quality of water is characterised by the following properties.

- 1.) Physical properties such as colour, taste, odour, temp, turbidity etc.
- 2.) Chemical properties such as hardness, pH value, solid content
- 3.) Bacterial properties such as Bacteria, viruses.

These properties may be checked by performing various test such as given below-

① OTA Test (Oryzotolidine arabinide test) :-

Test is perform to determine the concentration of

freely available chlorine and combinedly available chlorine.

②. Oxygen intensity and Oxygen number :-

This is a measure of presence of oxygen or taste in water.

* Water Borne disease :-

Water Borne disease are any illness cost by drinking water contaminated by human or animals which contain pathogenic micro organism.

Diseases	Responsible pathogen	Route of exposure	Mode of transmission - million.
Cholera	Vibrio cholera bacteria	gastro-intestinal	often water borne
Typhoid	Salmonella typhi bacteria	" "	water/food borne
Hepatitis - A	Hepatitis - A virus	" "	" / "
Dysentery	Shigella dysenteriae bacteria or Entamoeba histolytica amoeba	" "	food/water borne
Polio	Polio viruses	" "	exposure to untreated sewage; may also be water borne
Giardia	Giardia lamblia protozoa	" "	water borne

* Preventions of water Borne diseases -

1. Cholera :-

Cholera is a bacterial disease that is commonly found in rural villages where there is poor sanitation. This cholera is a disease that spreads through water and can be fatal if it is not treated on time.

→ Symptom - Dehydration, Diarrhoea, muscle cramps, vomiting.

→ Treatment - for the treatment plan for cholera is rehydrating the body with IVF fluids and antibiotics.

→ Prevention - washing your hand properly and often can help prevent cholera or any water borne disease. Eat completely cooked food, and wash vegetables with fresh water only.

2) Typhoid fever :-

Typhoid fever is an infection that spreads through food that is contaminated and unhygienic water. People living in poor sanitation areas are more prone to be infected with typhoid fever.

→ Symptoms - High fever, muscle pain, weakness, stomach ache, vomiting, loose motion.

→ Treatment - The treatment recommended and prescribed by the doctor will be antibiotics and fluids.

→ Prevention - To prevent the infection, timely vaccines are recommended for people who live or travel in places where there is poor sanitation and unhygienic drinking water. In such places, avoid drinking tap water and always prefer bottled water.

3.) Giardia :-

Giardia, also called beaver fever, is an intestinal infection caused by a parasite named Giardia. It is another type of water borne disease that spreads through contaminated water and food. Giardia can also spread person-to-person.

→ Symptoms - Nausea, fatigue, Belching wind, cramps, weight loss, ~~Blot~~ Bloating, abdominal pain, Diarrhoea or loose motions.

bore

→ Treatment - Like other water^{bore} disease, giardia is also treated by antibiotics and anti-parasite.

→ Prevention - Though there is no vaccine available for giardia until now, there are simple changes one can make to avoid the infection. For example, washing hands with soap every now and then, avoiding swallowing swimming pool water, and drinking bottled water only.

4.) Dysentery :-

Dysentery is an intestinal infection characterized by inflammation and bloody diarrhoea. The Bacteria (Shigellosis) or an amoeba. It is spread through contaminated water and food.

→ Symptoms → abdominal pain, cramps, fever, vomiting, Malaise, Dehydration, Bloody diarrhoea, Nausea.

→ Treatment - Increased fluid intake, rehydration solutions, IV fluids, and antibiotics are all possible treatments for dysentery. With rest and drinks, mild dysentery cramps are relieved with over the counter.

→ Prevention → To prevent dysentery or any water-borne diseases, it is essential to wash hands frequently with soap for at least 60 seconds. In addition, avoid eating food from outside and try to increase your intake of fruits.

5) Hepatitis - A :-

Hepatitis A is a contagious liver infection caused by contaminated water or food. Therefore, people travelling to several rural places should be extra caution. cautious of their hygiene to prevent and protect themselves from any water borne diseases.

→ Symptoms - Fatigue, Nausea, abdominal pain, weight loss, jaundice, low grade fever.

→ Treatment - Though the infection clears away within weeks, it may also vary as per each case and the severity of the infection. Hepatitis A can leave your body feeling tired and weak for days and weeks, so taking extra care and rest is recommended until you fully recover.

→ Prevention - The Best way to prevent Hepatitis A is a vaccine. Doctors always suggest that every individual get vaccinated against all types of water-borne diseases and others. In some nations, the government has made it mandatory for every individual to get vaccinations. Other than the vaccine, there are few things individuals can do in everyday life to prevent the infection.

Maintain hygiene; wash hands before and after eating, use the toilet, sanitise hands every now and then, avoid intake of unwashed fruits and vegetables, and practice safe and protected sexual intimacy.

* Fluoride fluoride & Arsenic drinking water :-

Fluoride - Fluoride found naturally in soil, water and foods. It is also produced synthetically for use in drinking water, toothpaste, mouthwashes and various chemical products. Water authorities add fluoride to the municipal water supply, because studies have shown that adding in areas where fluoride levels in the water are low, can reduce the prevalence of tooth decay.

→ Effects of fluoride :-

- (i) Fluorosis affects bones, teeth and other organs of the body.
- (ii) It also leads to dental decoloration, and deformation of bones, causing joints and back pains.
- (iii) The expanded expectant and lactating mothers are more vulnerable. There is a high incidence of - stillbirths and abortions.

Arsenic - Arsenic occurs naturally in the earth crust. most arsenic in drinking water comes from natural rock formations. As water flows through these formations it can dissolve Arsenic and carry it under ground. that may become drinking water supplies.

Arsenic affects a broad range of organs and system including skin, nervous system, respiratory system, liver and kidney.

(Material Cycle)

Material cycle in the environment are the cyclic pathways in which a regular and transition of elements occur from the environment to the organism and organism to the environment.

1) Nitrogen cycle:-

Nitrogen cycle is a biogeochemical process which transform the inert nitrogen present in the atmosphere to a more usable form for living organism.

→ Stages of Nitrogen cycle -

(i) Nitrogen fixation.

(ii) Ammonification.

(iii) Nitrification.

(iv) Denitrification.

(i) Nitrogen fixation →

These processes are responsible for most of the nitrogen fixation.

(i) Atmospheric fixation by lightning →

It breaks nitrogen molecules, these molecules combine with oxygen and form nitrogen oxide. It dissolves in rain forming nitrate (NO_3).

(ii) Industrial fixation →

Under great pressure atmospheric nitrogen and hydrogen combined to form ammonia (NH_3).

(iii) Biological fixation by certain microbes →

The entire process of nitrogen fixation is completed by symbiotic bacteria which are known as diazotrophs.

Rhizobacter, *Rhizobium* have a major role in this process.

nitrogenase enzyme has capability to combine gaseous nitrogen with hydrogen.

(ii) Ammonification :-

Ammonification is the process of release of ammonia through decomposition of death bodies and excretory wastage of organism.

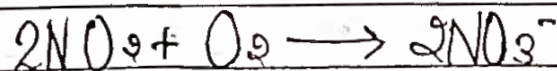
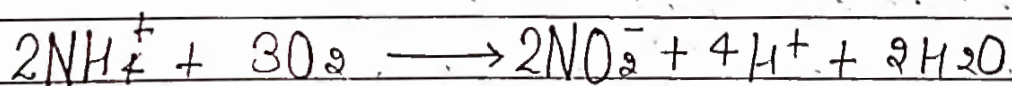
Various fungi and prokaryotes decomposed the tissues and release inorganic nitrogen back into the ecosystem.

(iii) Nitrification :-

The process in which the ammonia is converted into nitrite (NO_2^-) and then nitrate (NO_3^-) is called nitrification.

By the oxidation of ammonia, nitrites are formed with the help of nitrosomonas bacterium species.

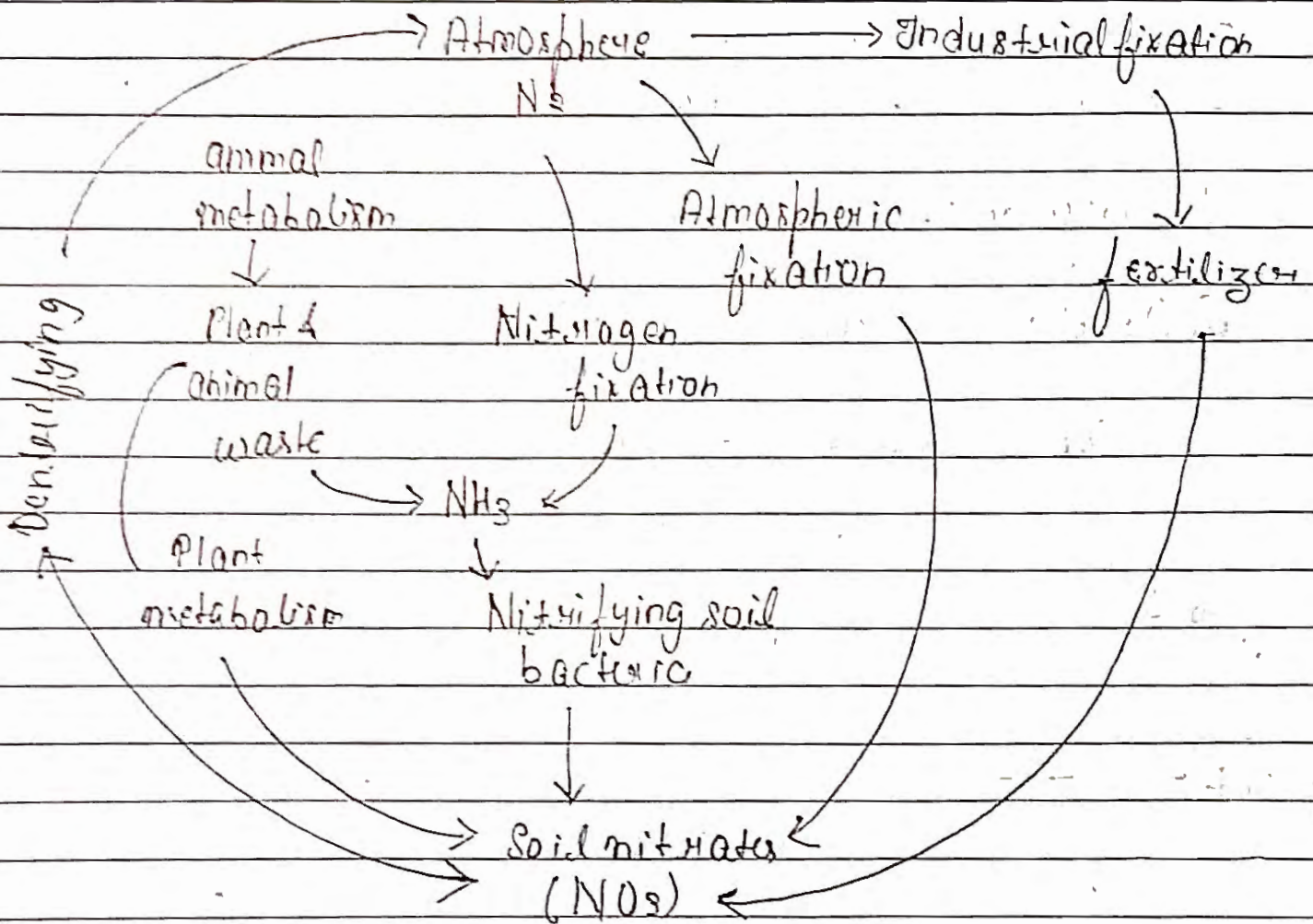
Nitrites are converted into nitrates by nitrobacter.



(v) Denitrification:-

Denitrification is the process in which the nitrogen compound mix makes its way back into the atmosphere by converting nitrate into gaseous nitrogen.

Denitrification is carried out by the denitrifying bacterial species *clostridium* and *Pseudomonas*.



(Nitrogen cycle)

Carbon cycle:-

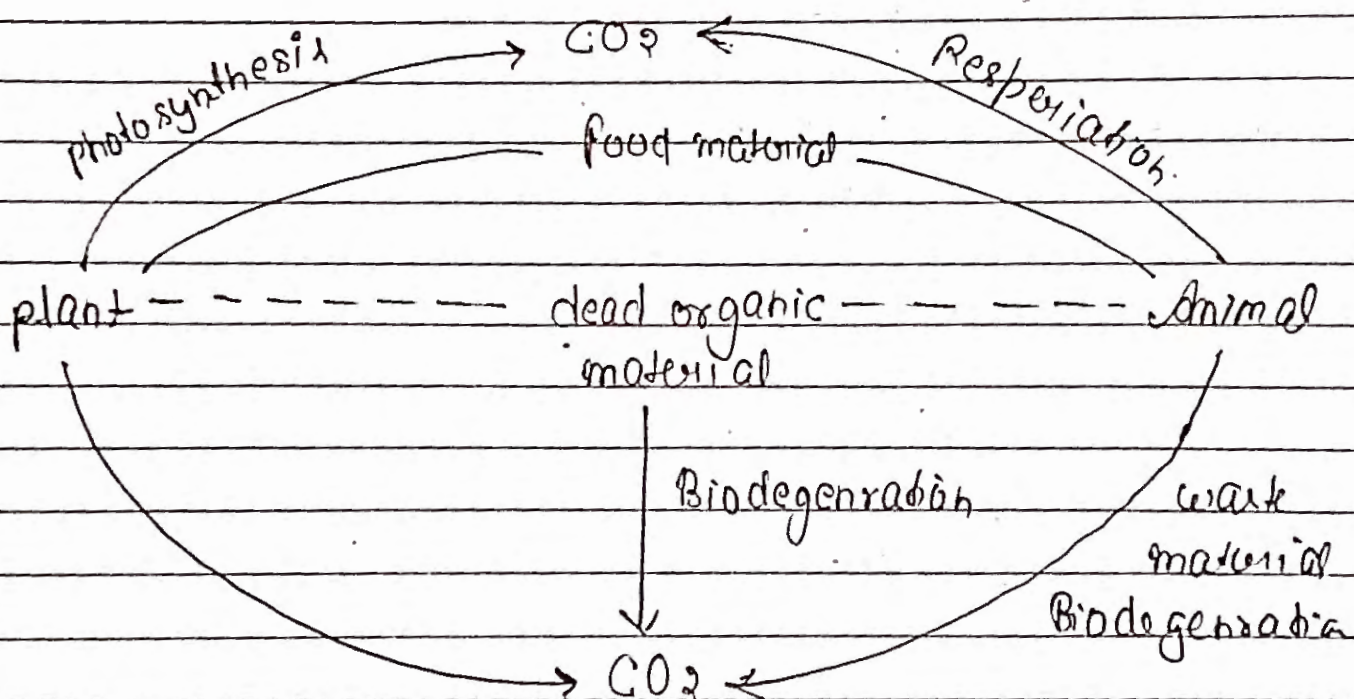
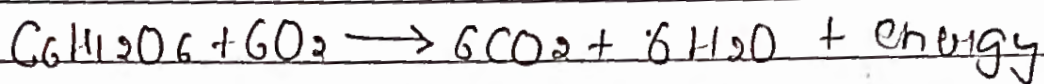
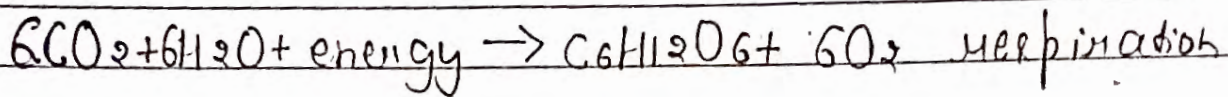
Carbon is the basis of life on earth carbon is in form of sugar or carbon dioxide gas

Carbon is continuously cycle and reversed.

"The circulation and recycling of carbon from atmosphere to living organism and after their death back to the atmosphere is called carbon cycle."

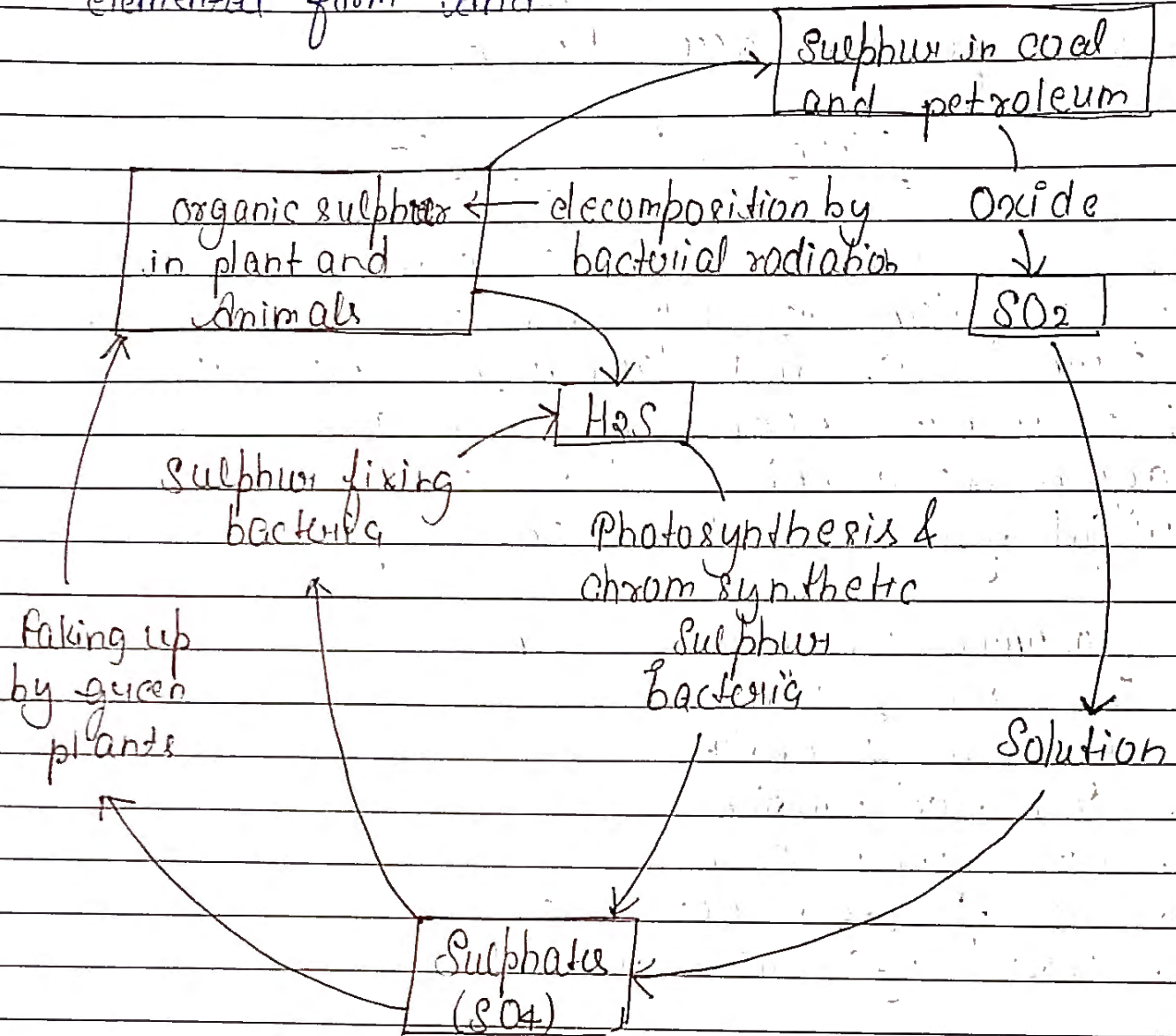
Carbon is circulated and recycled through photosynthesis and respiration.

Photosynthesis -



Sulphur Cycle :-

Sulphur is an essential element in protein synthesis. In nature sulphur exist in the elemental form and



(Sulphur Cycle) (S)

In several oxidation states, including hydrosulphide, sulphites and sulphates, organic sulphur in plants and animals is decomposed to H₂S by bacterial action, and the H₂S is further

Oxidised to sulphates by Sulphur oxidating bacteria these sulphates are then taken up by plants

Sulphur is also present in soil and petroleum and is released Sulphur dioxide when these products are burnt.

∴ Forest Resources :-

Forest is defined as biotic community comprising of vegetation of trees, woods, herbs etc. They are renewable resources because new vegetations can be grown again and again, forest resources are very useful for the following purpose. -

1. Economic development of country
2. Industrial Growth.
3. Pollution prevention
4. Soil Conservation
5. ~~Ex~~ Creating rains
6. full peaking, social needs.
7. Building construction.

Total forests resources of our country has been estimated to be 637292 km².

This is a 19.39% of total Geographical of the country

Depending upon the density, these forests may be, hence, open, mangrove and scrub

Stukeyat.

-: Depletion of forest :-

It is also called deforestation.

by deforestation. It means the gradual demolition of trees and plants these activities are being done for economic gains and the following reasons are also responsible for it.

- 1.) Overgrazing
- 2.) Timber harvesting
- 3.) Agriculture
- 4.) Industries
- 5.) Development projects
- 6.) Fuel wood.
- 7.) Need of land to accommodate
- 8.) Increase population and expanding urbanization.
- 9.) economic gains by selling timber and using woods as fuels.

-: Effects of depletion of forest :-

Shrinking of forest cause wide-reaching problems like - soil erosion, fewer crop crops, flooding, water cycle disruption, green house gas emissions, changes in the climatic conditions, and loss of biodiversity.

Energy Resources :-

1) Non-conventional sources of energy :-

Non-conventional energy resources are also known as renewable sources of energy.

Ex → Solar energy, wind energy.

(i) Solar energy :-

Solar energy is simply the light and heat that comes from sun. Solar energy is discovered by Edmond Becquerel. Other related details of solar energy are as follows -

a.) energy radiated by the sun into space per year = 1.17×10^{31} KJoule.

b.) Solar energy that reach the earth = 54.4×10^{20} kg per year.

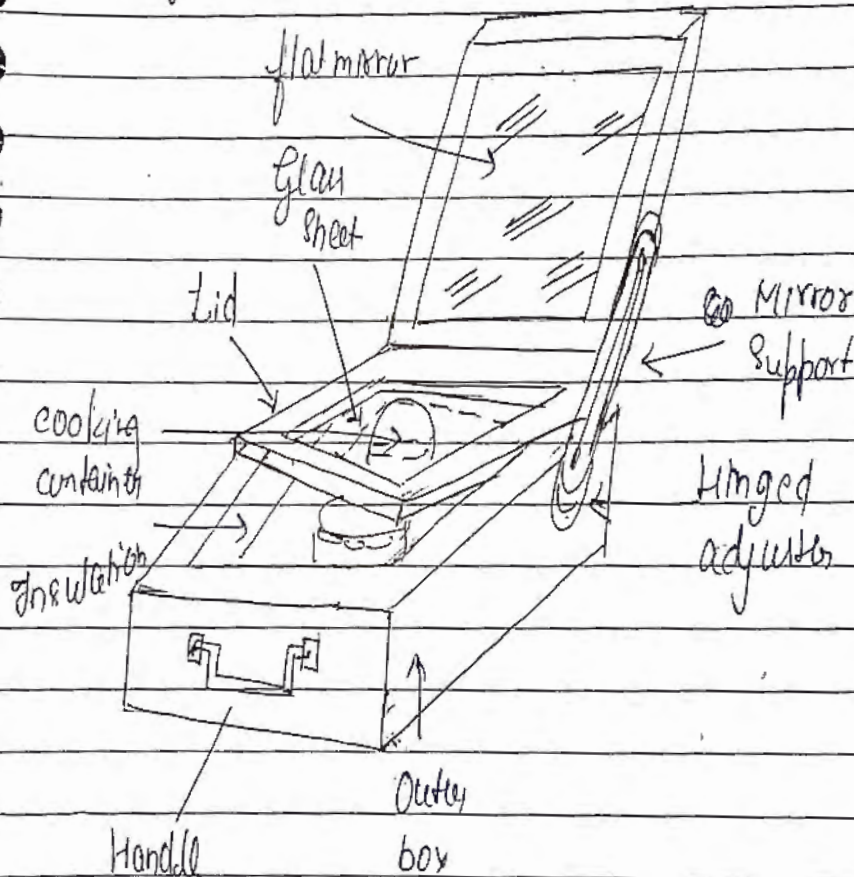
→ Application of solar energy →

Various uses of solar energy are found in following applications.

- Solar water heater, • Solar cooker, • Solar Green house etc.

⇒ Solar Cooker ⇒

It comprises of an Insulated metal Box fitted with a flat glass cover. The inner surfaces of the metal box are blackened and the cooking utensil also blackened from out side, It placed with in the metal Box. When the cooker is kept in Sun-light, the solar radiation penetrates through the glass-cover and is absorbed by blackened surface. the temperature rises in side and the food get's cooked.





Unit - Two

Wind energy -

Wind energy describes the process by which the wind is used to generate mechanical power or electricity. Wind turbine convert the kinetic energy in the wind into mechanical power.

Wind Mill :-

A wind mill is a building with long pieces of wood on the outside which turn around as the wind blows and provide energy for a machine. Wind mill is also a similar structure that is used to convert the power of the wind pumps, ~~tunnel~~ into electricity. It is also called wind pumps, wind turbines. The first wind mill was designed in year 1854 by Daniel Halladay from the United States.

Advantages :-

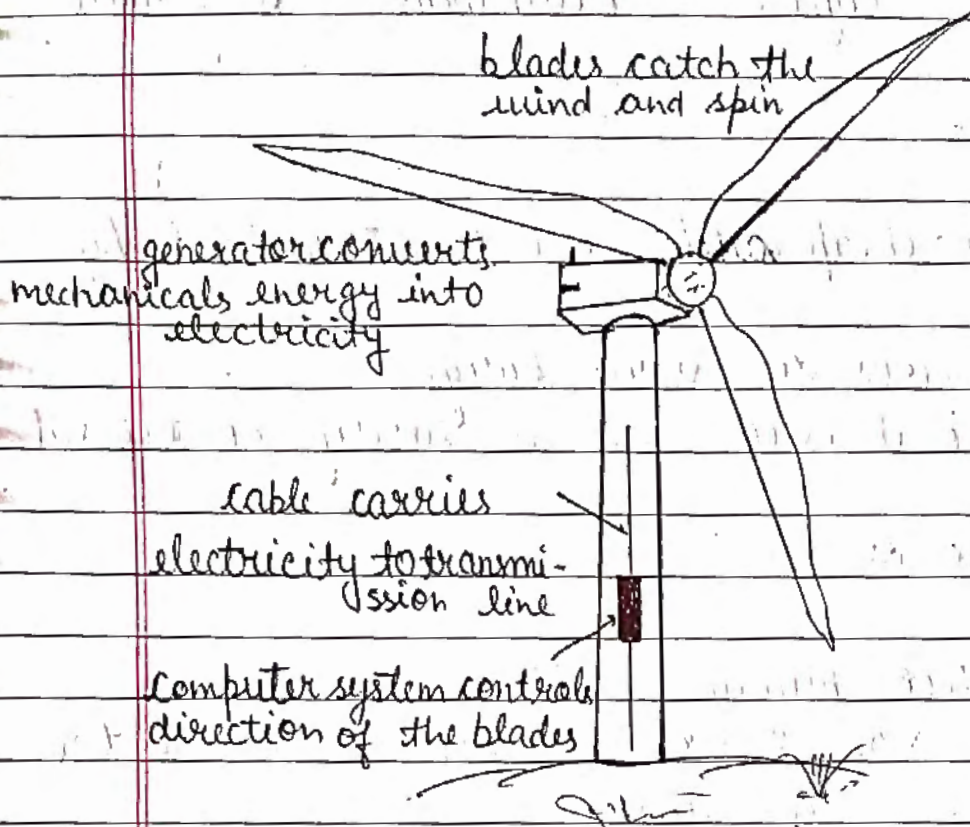
- (i) Non-polluting and ecofriendly.
- (ii) Abundant availability for no price.
- (iii) Cheaper installation cost.

Uses :-

- (i) Lifting water from the well.
- (ii) Battery charging.



- (iii) Water pumping.
- (iv) Operating a simple machine.



Conventional Energy

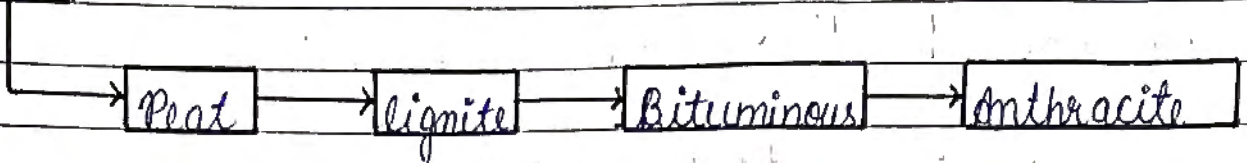
The energy sources that once exhausted, do not replenish themselves within a specific period are called conventional or non-renewable energy sources like coal, gas and oil.

Coal-

The coal is the most abundant conventional source of energy which could last for at least 200 years. It is a black brown sedimentary rock. formation of coal occurs when the remains of plants. Converts into lignite and then into anthracite. This involves a long process that takes place over a long period of time.



wood



Advantages :-

- (i) It is relatively cheap to mine and transport by rail.
- (ii) The coal reserves are very large.
- (iii) The rate of combustion can be easily controlled.

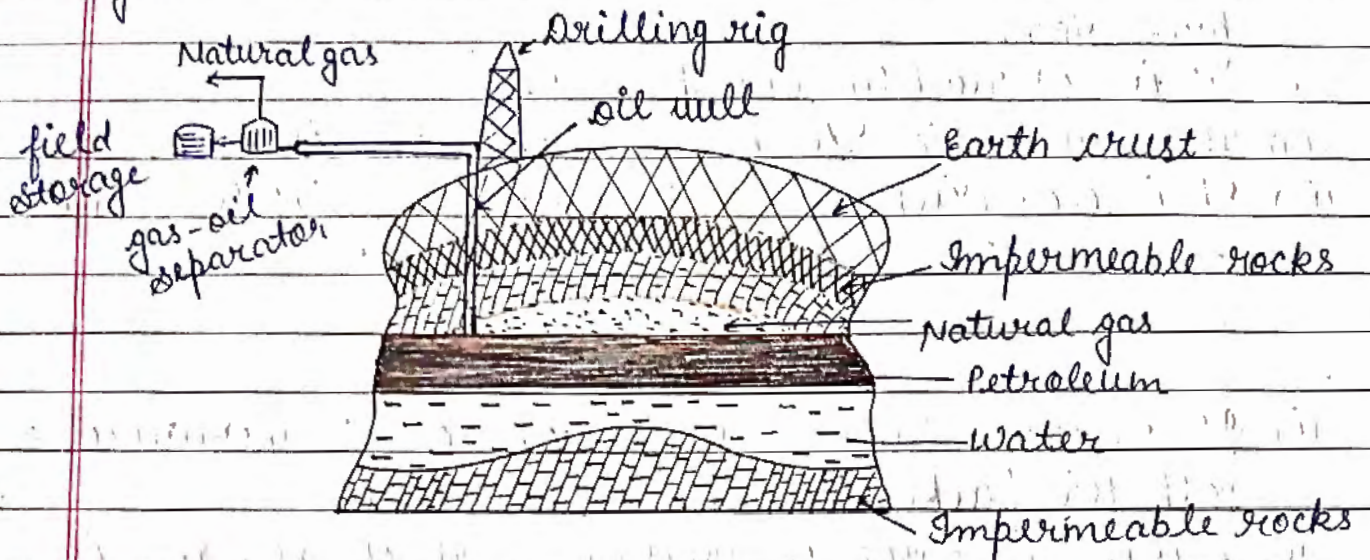
Disadvantages :-

- (i) Extraction^{of coal} affects human health.
- (ii) The emission of NO_2 , SO_2 from burning coal is the main source of acid rain.
- (iii) On burning, it fouls the air with SO_2 and soot, which contributes to respiratory problems.
- (iv) It is convenient to handle than petroleum.
- (v) Ash is produced in burning which causes health problems and pollution in the environment.

Petroleum :-

Liquid and gaseous fuels are basically derived from petroleum. Petroleum is a natural underground fossil energy resource. It is formed due to decomposition of dead plant and animals (microplankton), deposits upon the beds of sea, lakes and rivers over a span of millions of years. The decomposition

takes place by action of bacteria under lack of oxygen and also by catalytic cracking. Petroleum is extracted by digging an oil well under the ground, It is called crude oil.



Natural Gas :-

After coal and petroleum, natural gas is the third major source of fossil fuel. It contributes about 24% energy of the world requirement. It is fast emerging as an alternative fuel to oil (particularly diesel) owing to environment friendly character.

It is the mixture of hydrocarbon gases trapped beneath the earth surface. It mainly consist of Methane (CH_4), propane (C_3H_8) and butane (C_4H_{10}). Natural gas can be used in two different forms also.

- (i) Liquefied petroleum gas (LPG)
- (ii) Compressed natural gas (CNG)

Natural gas becomes liquid at $-160^\circ C$. CNG is obtained by compressing the natural gas to about



200 kg/cm².

Advantages :-

- (i) It is clean fuel, requiring little processing.
- (ii) It is be readily transported.
- (iii) Its contribution to smog formation is less.
- (iv) It is eco-friendly and causes negligible pollution.

Disadvantages :-

- (i) It requires high pressures or low temperature, or both for packing in a smaller space.
- (ii) Leakage of gases in general, and of methane in particular is of serious environmental concern.
- (iii) Methane is a greenhouse gas and has a long atmospheric lifetime.