Class 8 Chemistry Coal and Petroleum Resources

Resources

Nature facilitates us with the facilities that are necessary to lead a comfortable life. We are facilitated with the air we breathe, the water we drink, the food, sunlight, minerals, etc. by the nature. These are termed as resources. They can be classified as natural as well as man-made.

Canopy of Forest

Natural resources

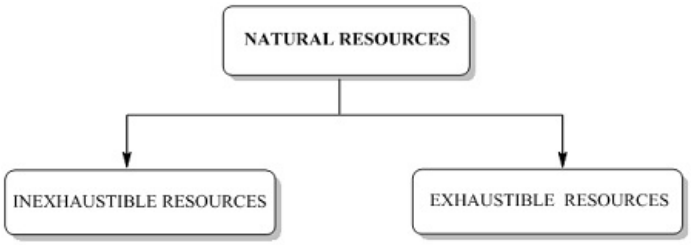
These resources are provided by the nature. These resources include air, water, energy, sunlight etc. and are derived from land, soil, animals, water and mines.

Man- made resources

These resources on the other hand are created by the activities of human beings. The resources facilitated by the nature come into use only when they undergo several processing developed by human advancements and technology.

For instance, the natural wind is of no use until they are processed to get wind energy with the help of wind mills.

Now the natural resources can be further categorised into two types- Inexhaustible and exhaustible natural resources as discussed in the topics below.



Class 8 Chemistry Coal and Petroleum Inexhaustible Natural Resources

Inexhaustible Natural Resources

The term inexhaustible itself depicts the availability of these resources. Probably they are not going to get exhausted by human deeds as they get renewed naturally in a very short span of time. These resources are always available in a limitless quantity in nature. For instance, air to generate wind energy, sunlight to generate solar energy, water to generate hydel power, soil, and geothermal energy etc..

Wind Energy Solar Energy

Class 8 Chemistry Coal and Petroleum Exhaustible Natural Resources

Exhaustible Natural Resources

As the term exhaustible suggests these resources are present in limited quantity in nature and hence are prone to get exhausted if not used in a sustained manner so that along with meeting the requirements of the present generation they can also meet the requirements of the future generation. For instance, forests, fossil fuels (coal, petroleum, natural gas), minerals, wildlife, etc

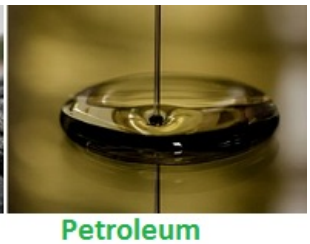
Class 8 Chemistry Coal and Petroleum

Fossil Fuels

Fossil Fuels

Fossil fuel refers to the deposits of organic materials, formulated from dead plants and animals under several thousand feet of silt. With the passage of time they decayed and have been converted to Petroleum or crude oil, coal, natural gas, on exposure to high heat and pressure deep inside the earth's crust over millions of years and hence they are also known as non-renewable energy source.

Coal



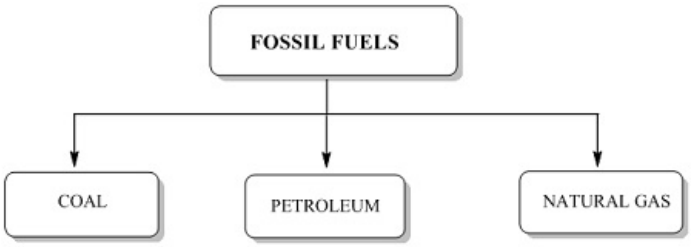
Petroleum

Diesel

Class 8 Chemistry Coal and Petroleum — Classification of Fossil Fuel

Classification of Fossil Fuel

Fossil fuel can be classified into Coal, Petroleum and Natural gas.



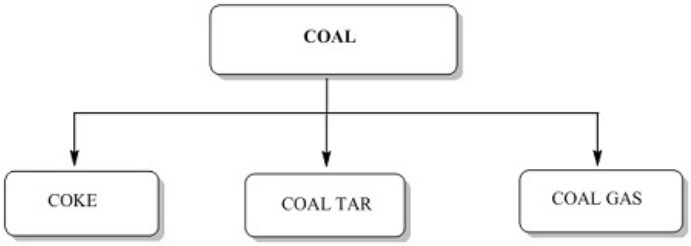
Class 8 Chemistry Coal and Petroleum Coal

Coal

Burning of Coal

- It a black coloured hard substance.
- It is it is composed of carbon, hydrogen, nitrogen, oxygen, minor amount of sulphur.
- Anthracite, bituminous, lignite are the major types of coal.
- Anthracite is the hardest coal with higher carbon concentration and energy.
- Lignite is the softest coal with low carbon concentration but high oxygen and hydrogen.
- Whereas bituminous is in moderate state.

Coal undergoes industrial processing to derive some useful derivatives like Coke, Coal Tar, Coal gas which are described in the topics below.



Formation of Coal

- Long-time back the dense forest cover present in low lying wetland areas of earth got buried down underneath the soil due to natural calamities like flooding, earthquakes, etc.
- With the passage of time they get compressed as more soil deposited over them.
- They encountered high temperature and pressure as they descended deeper and deeper.
- Under high temperature and pressure these dead plants slowly got converted to coal.
- The main constituent of coal is carbon therefore this process of conversion of dead plants into coal is termed as carbonisation.

Forest cover in low lying wetland areas

Natural Calamities like flood, earthquake etc destroyed forest

Plant becomes Dead

Dead plants are compressed as more soil deposit over them

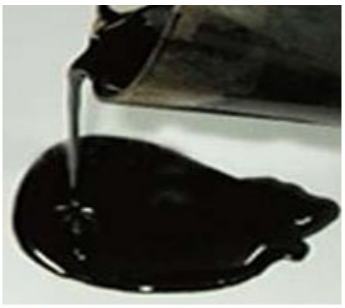
Dead plants Encounter High Temperature & pressure as compressed

Sowly convert into Coal

Coke

- It is hard, black coloured and porous derivative of coal.
- It is a pure form of carbon with less content of impurities.
- It has high carbon content.
- It is used as fuel in the metal industry for manufacturing steel and extracting many metals.

Coal Tar



Coal Tar

- It is nearly black, thick and viscous liquid.
- It possess a characteristic smell.
- It contains 42% carbon, 48% hydrocarbons and rest of the percentage is occupied by water.
- It is extensively used as a starting material in the industries for manufacturing synthetic dyes, explosives, drugs, paints, perfumes, photographic materials and many more.
- Naphthalene balls used as moth repellent in the storage areas are the derivatives of coal tar.
- Earlier coal tar were extensively used for metalling roads. But nowadays Bitumen has replaced coal tar to serve this purpose.

Class 8 Chemistry Coal and Petroleum

Coal Gas

Coal Gas

- It is a gaseous mixture of hydrogen, methane, and carbon monoxide
- It is formulated from the processing of bituminous coal used as a fuel to derive coke in the absence of air.
- Many a times steam is supplemented to react with the hot coke, thereby ascending the production of gas. Coal tar and coke are obtained as by-products.
- It was first used for lightning street lights in London and New York. But in the present era it is used as a source of heat.

Class 8 Chemistry Coal and Petroleum

Uses of coal

Uses of coal

- In the earlier days coal was used to produce steam in railway engines to make them run.
- It is used to produce heat to cook food.
- It is used in thermal power plants to generate electricity.
- It is used as fuel in many industries

Industry Train Engine Prepare Kabab

Petroleum

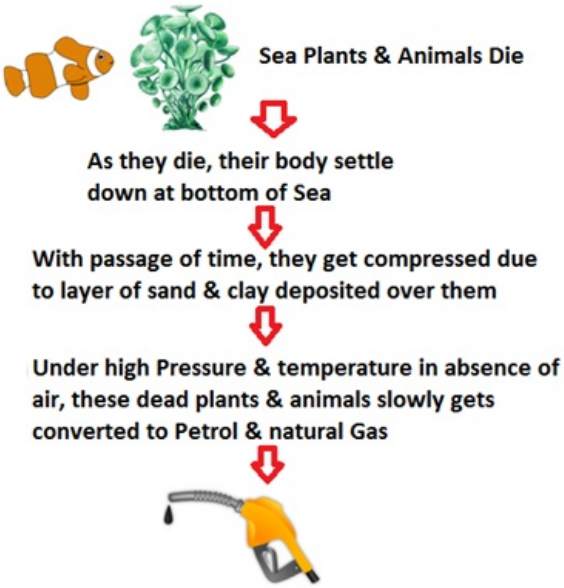
Extracting petroleum from oilfield

- It is a clear, green or black coloured oily liquid matter.
- It can be either thin like gasoline or thick like tar.
- It has a hostile smell.
- It is a mixture of petroleum gas, lubricating oil, diesel, petrol, paraffin wax and many other constituents.
- Due to its wide range of uses in several industries it is also known as Black Gold.

Class 8 Chemistry Coal and Petroleum — Formation of petroleum

Formation of petroleum

- This fossil fuel is formulated from the dead sea plants and animals.
- As they died their bodies settle down in the bottom surface of the sea.
- With the passage of time they get compressed as more layers of sand and clay deposited over them.
- Under high temperature and pressure along with the absence of air these dead plants slowly got converted to petroleum and natural gas.



Petroleum consists of several constituents as mentioned above. They need to be separated from the crude oil by a series of processes. This process of separation of the wide variety of constituents of petroleum is called **Refining of Petroleum** carried out in petroleum refinery

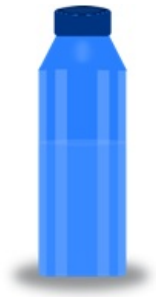
Class 8 Chemistry Coal and Petroleum

Uses of Petroleum

Uses of Petroleum

- Petroleum in the form of gasoline or petrol is used to power internal combustion engines.
- In its thickest form it is used for pavement of roads, as a water repellent and in roofing.

They are used in many manufacturing industries like in manufacturing detergents, fibres, polythene and man-made plastics



Class 8 Chemistry Coal and Petroleum

Natural Gas

Natural Gas

Natural gas in the form of CNG used in cylinders

- It is a very crucial fossil fuel.
- It is a clean and non-toxic energy sources.
- It is a colourless and odourless gas.
- It is very convenient to transport it through pipelines.
- It is under stored under high pressure as compressed natural gas (CNG).
- It is composed of many gases of which methane is the most significant.
- It is less polluting.
- It is inexpensive than any other fuel.

Class 8 Chemistry Coal and Petroleum — Uses of natural gas

Uses of natural gas

- Natural gas in the form of compressed natural gas (CNG) is used for power generation.
- It is also used as a fuel for automobiles and vehicles.
- It can be directly used for burning and hence finds extensive use at homes in cooking cylinders and industries for generating energy.
- It is used as a starting material in many industries like manufacturing chemicals and fertilisers.

Natural gas in the form of CNG used in cylinders

CNG driven Automobiles

Class 8 Chemistry Coal and Petroleum Initiatives to Conserve Natural Resources

Initiatives to Conserve Natural Resources

Fossil fuels are exhaustible and takes millions of years to renew themselves. Therefore it is our prime responsibility to use these fuels sustainably. Moreover excessive use of these resources pollutes the environment. Burning of excess carbon content fuels leads to air pollution which in turn has chain of adverse effects associated with it like global warming, acid rain, etc. Petroleum Conservation Research Association (PCRA) is a non-profit national government agency affianced in endorsing every recommending policies and tactics for conservation of petroleum, targeted at descending extensive requirement of oil

Petroleum Conservation Research Association (PCRA)

Their advice enables the individual to use these resources wisely and conserve them for future. It advises to:

- Drive at a constant or moderate speed.
- Turn off the engine at traffic lights or wherever you have to wait for a while.
- Regularly check tyre pressure.
- Regularly maintain the vehicle.