Minerals and Power Resources | Easy Notes for Class 8th

Introduction:-

We use many things in our daily life that come from the earth, like iron, salt, and petrol. These come from **minerals and power resources**. Minerals are found in rocks and deep inside the earth. Power resources give us energy to do work. Some of these resources are limited, so we must use them wisely. Let's learn more! *(Important Note:- It is a deleted chapter of class 8th NCERT and only for deep learners)*

Meaning of Mineral:-

A mineral is a natural substance found in rocks and soil. It has a **definite chemical composition**, which means it is always made of the same elements.

For example, salt (halite) is always made of sodium and chlorine. And iron ore (like hematite) is always made mainly of iron and oxygen."

- Some minerals lie deep in hard-to-reach places, like the Arctic Ocean bed and Antarctica.
  - *For Example:-* Mineral deposits like **oil and natural gas** are found beneath the Arctic Ocean bed, while **coal and iron ore** exist in Antarctica.
- Minerals form in different geological environments under varying conditions.
  - They can form in several ways:
    - **when magma and lava cool**,
    - Also, **when water evaporates**,
    - **when heat and pressure change rocks**,
    - and **when dissolved substances settle from water** over millions of years.
- We can identify them on the basis of their physical properties and chemical Properties.
  - *For Example:-* colour, density, hardness (physical properties).
  - Solubility (Chemical Property).

Types of Minerals:-

- There are over three thousand different minerals.
- The classification of minerals on the basis of composition is as follows..
  - **Metallic Minerals:-** They contain **metals** and are usually **shiny** and **hard**.
    - They are good conductor of heat and electricity.
    - *For Example:-* Iron ore, bauxite, manganese ore etc.
    - **Note:-** An **ore** is a rock that contains **a useful metal or mineral** in large amounts.
    - **Non-metallic Minerals:-** Non-metallic minerals **do not contain metals**. They are usually **soft, dull, and break easily**.
      - *For Example:-* **Limestone** – Used in cement, **Mica** – Used in electrical appliances, **Salt (Halite)** – Used in food, **Coal & Petroleum** – Used as fuel and **Gypsum**

for POP, Fertilizers.

- *Metallic Minerals* further divides into *Ferrous* and *Non-Ferrous minerals.*
- **Ferrous Minerals:-** They **contain iron** and are important for making steel and machinery.
  - They are strong, hard, and magnetic.
  - *For Example:-* **Iron ore** – Used to make iron and steel, **Manganese** – Helps in making steel and batteries & **Nickel** – Used in stainless steel and coins
- **Non-Ferrous Minerals:-** They **do not contain iron** but other Metals.
  - They are lightweight, resistant to rust, and used in many industries.
  - *For Example:-* **Copper** – Used in electrical wires and utensils, **Bauxite** – Used to make aluminium for aircraft and cans , **Gold & Silver** – Used in jewelry

Extraction of Minerals:-

1. **Mining:-** It is a process in which people **dig the Earth** to extract **minerals and ores**. It includes:
   - **Open-cast Mining** – Workers **remove minerals from the surface**.
   - **Shaft Mining** – Miners **dig a vertical tunnel (shaft)** to reach deep minerals like coal, gold, or diamonds. They **use lifts and elevators** to go down and bring minerals up.
2. **Drilling:-** Workers **bore deep wells** to **extract petroleum and natural gas** from land or ocean.
3. **Quarrying:-** People **cut and remove stones, sand, or marble** from the surface for construction.

Distribution of Minerals:-

Minerals occur in different types of rocks. These rocks can form due to :-

1. **Cooling of Magma and Lava** ? **Igneous Rocks**
   - **Magma cools slowly inside the Earth**, forming **intrusive igneous rocks** (e.g., granite).
   - **Lava cools quickly on the surface**, forming **extrusive igneous rocks** (e.g., basalt).
2. **Sedimentation** ? **Sedimentary Rocks**
   - **Sand, clay, and minerals settle and press together** over time, forming rocks like limestone and sandstone.
3. **Heat and Pressure** ? **Metamorphic Rocks**
   - *Example:* **Limestone changes into marble, and shale changes into slate.**
   - **High heat and pressure change existing rocks**, forming new ones.

- **Note:-** Metallic minerals mostly exist in **igneous** and **metamorphic rocks** found in large ***plateaus.***
  - *For Example:-* Iron ore in North Sweden, copper and nickel deposits in Ontario, Canada, iron, nickel, chromites and platinum in South Africa. (Source:- NCERT)
- Non-Metallic minerals exist mainly in **sedimentary rocks** found in ***plains*** and ***fold mountains.***
  - *For Example:-* Limestone
- And Mineral fuels exist in **sedimentary rock layers**.
  - *For Example:-* Coal and petroleum

Continents and Minerals:-

The highlighted details are the most important below.

Asia:-

- **Asia** produces over half of the world's tin.
  - China, Malaysia, and Indonesia are among the world's ***leading tin producers***.
  - **Note:-** China is the *leading producer of tin* in the world. Also, It leads in production of lead, antimony and tungsten.
- Additionally, China and India have large iron ore deposits.
- Also, the continent has deposits of manganese, bauxite, nickel, zinc, and copper.

Europe:-

- **Europe** is the ***leading producer of iron-ore*** in the world.
  - Russia, Ukraine, Sweden and France have large deposits of iron-ore.
- There are other mineral deposits also in the continent.
  - *For Example:-* copper, lead, zinc, manganese, and nickel (found in eastern Europe and European Russia)

North America:-

- This continent has three major zones for mineral deposits.

1. Area north of the Great Lakes in Canada or **The Canadian region**	2. **The Appalachian region**	3. **The mountain ranges of the west** or Western Cordilleras
Iron ore, nickel, gold, uranium and copper	coal	copper, lead, zinc, gold and silver

South America:-

- South America has large deposits of gold, silver, zinc, chromium, manganese, bauxite, mica, platinum, asbestos and diamond.
- **Brazil** is the largest producer of high grade **iron-ore** in the world.
- And, **Brazil** & **Bolivia** are among the world's largest producers to **tin**.
- Moreover, **Chile** and **Peru** are leading producers of **copper.**
- Additionally, Venezuela, Argentina, Chile, Peru, and Colombia produce **mineral oil.**

Africa:-

- **Africa** is rich in **mineral resources.**
- It is the world's **largest producer of diamonds, gold** and **platinum**.
- Moreover, South Africa, Zimbabwe, and Zaire produce a significant portion of the world's **gold**.
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There are some other minerals also in Africa.
    - Copper, iron ore, chromium, uranium, cobalt and bauxite.
- Lastly, Nigeria, Libya and Angola have **oil reserves.** *(based on NCERT details)*

Australia:-

- Australia is the **largest producer of bauxite** in the world.
- It is a leading producer of gold, diamond, iron ore, tin and nickel.
- Also, It is is rich in copper, lead, zinc and manganese.
- It has **largest deposits of gold** in Kalgoorlie and Coolgardie (in western Australia).

Antarctica:-

- Antarctica has a variety of mineral deposits.
- *For Example:-* Coal, iron ore, gold, silver and oil.

Uses of Minerals:-

Minerals support many industries :-

- **Construction** requires **limestone and gypsum** to make cement and plaster.
- **Manufacturing industries** use **iron, copper, and aluminum** for machines and vehicles.
- **Power generation** depends on **coal and uranium** for electricity.
- **Jewelry making** uses **gold, silver, and diamonds** for ornaments.
- **Daily life** relies on **salt for food** and **graphite for pencils**.

Conservation of Minerals:-

- Minerals are a *non-renewable resource.*
- It takes thousands of years for the formation and concentration of minerals.
- Therefore, we need to conserve minerals by using ‘triple R’ stretegy.
    - **Reduce, Reuse,** and **Recycle**
        - Turn off lights and fans when not needed to save electricity, which reduces the need for coal.
        - Use old metal containers or glass bottles instead of throwing them away.
        - Melt and reuse scrap iron to make new tools and machines.

Power Resources:-

- Power resources are sources that provide energy for various activities like cooking, transportation, industries, and electricity generation.
- They are mainly of two types:
    - **Conventional Sources**

(Traditional or old sources)
    - Used for a long time, like coal, petroleum, natural gas, and hydropower.
- **Non-Conventional Sources** (Modern sources)
    - Newer and renewable sources like solar energy, wind energy, tidal energy, and geothermal energy.

Conventional Sources	Non Conventional Sources
Traditional energy sources used for a long time.	Newer and sustainable energy sources.
For Example:- Firewood and fossil fuels (Coal, petroleum, natural gas), and hydroelectricity.	*For Example:-* Solar energy, wind energy, tidal energy, geothermal energy and Biogas.
These sources are limited and exhaustible.	These sources are renewable and unlimited.
They cause pollution and global warming.	They are eco-friendly and does not harm the environment.
Conventional sources are cheaper initially but costly in the long run due to scarcity.	Non-conventional sources are expensive initially but cheaper and more efficient over time.

Conventional sources:-

Firewood:-

- It plays a major role in cooking and heating.
- In our country, villagers get more than 50% of their energy from firewood.

Fossil fuels:-

- These are natural fuels like coal, petroleum, and natural gas, formed from the remains of plants and animals over millions of years.
    - **Coal:-** Coal is the most abundant fossil fuel.
        - It is used as a domestic fuel.
        - Industries like iron and steel rely on it for smelting.
        - Steam engines use coal for operation.
        - It generates electricity, known as thermal power.
        - Moreover, **coal is refered to as buried Sunshine** because it comes from ancient plants that stored sunlight and got buried over millions of years.

Note:- India's major coal-producing regions are – Raniganj, Jharia, Dhanbad, and Bokaro in Jharkhand.

Globally, **China, the USA, Germany, Russia, South Africa, and France** are among the top coal producers.

Petroleum (Rock Oil):-

- Petroleum is a **fossil fuel** formed from the remains of ancient marine organisms buried under sedimentary rocks for millions of years.
    - It contains impurities, so refineries clean it before producing fuels like petrol, diesel, and kerosene.
    - Also, It is widely used in **transport, industries, and electricity generation**.
    - **Petroleum is known as black gold** because it is black in color and highly valuable like gold due to its widespread use in fuels and industries.

Note:- In India, the major producers of petroleum are Digboi (in Assam), Bombay high (Mumbai), and deltas of Krishna and Godavari rivers.

The chief petroleum producing countries are **Iran, Iraq, Saudi Arabia** and **Qatar.**

Natural Gas:-

- Natural gas is a gaseous fossil fuel found with petroleum.
- It is used in compressed form (CNG) for vehicles, piped form (PNG) for cooking and heating, and in power plants for electricity generation.

Note:- India's natural gas reserves are in Jaisalmer, Krishna-Godavari Delta, Tripura, and offshore Mumbai.

The major producers of natural gas are Russia, Norway, UK and the Netherlands.

Hydel Power or Hydroelectric Power:-

- It generates electricity using flowing water.
- Dams store water, and its force drives turbines to produce energy.
- Interestingly, Norway was the world's first country to develop hydroelectricity.

Note:- India has major hydel power stations like **Bhakra Nangal, Gandhi Sagar, Nagarjunsagar,** and **Damodar Valley.**

Paraguay, Norway, Brazil, and China are the world's leading producers of hydel power.

Non Conventional Source of Energy:-

Solar Energy:-

- Solar energy comes from the Sun and is used for electricity, heating, and cooking.

- It powers homes, heats water, runs solar cookers, irrigates farms, and lights streets.
- **Note:-** Scotland is home to the world's first solar- and wind-powered bus shelter.

Wind Energy:-

- Wind energy is the power generated by moving air using wind turbines.
- It generates electricity, pumps water, and powers windmills.
- The Netherlands, Germany, Denmark, the UK, the USA, and Spain have major wind farms for wind energy production.

Nuclear Power:-

- Nuclear power is energy generated from radioactive elements like uranium and thorium.
- It is used for electricity production in nuclear power plants.
- The USA and Europe lead in nuclear power production.
- Moreover, India has large uranium deposits in Rajasthan and Jharkhand, while Kerala's monazite sands hold a significant amount of thorium.

Note:- In India, nuclear power stations are in Kalpakkam (Tamil Nadu), Tarapur (Maharashtra), Rana Pratap Sagar (Rajasthan), Narora (Uttar Pradesh), and Kaiga (Karnataka).

Geothermal Energy:-

- Geothermal energy is the heat energy from inside the Earth.
- It is used for generating electricity and heating buildings.
- When geothermal energy escapes through openings, it forms hot springs.
    - *For Example:-* Tapovan (Uttarakhand), Surajkund (Jharkhand) and Manikaran (Himachal Pradesh)

Note:- In India, **Manikaran (Himachal Pradesh)** and **Puga Valley (Ladakh)** have geothermal power plants.

USA has the world's largest geothermal power plants.

Tidal Energy:-

- **Tidal energy** means **electricity generated from the movement of ocean tides**.
- It uses the rise and fall of seawater to turn turbines and produce power.
- Interestingly, France **built** the world's first tidal energy station.

Note:- India **develops tidal energy** in the **Gulf of Kutch (Gujarat)**.

Russia and France also have huge tidal farms.

Biogas:-

- Biogas is a clean fuel produced by the decomposition of organic waste like animal dung and plant remains in the absence of oxygen.
- It serves as a fuel for stoves and heaters in homes and industries.
- Also, it produces huge amount of organic manure.

The chapter is now complete! I hope each concept was easy for you to understand and you feel confident about the material. Feel free to share your feedback and comments on the notes posted. Your thoughts are always welcome!

Category

1. Class 8th

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