Minerals in India

Minerals

Minerals are naturally occurring, homogeneous substances with definite chemical composition. Based on chemical and physical properties, minerals can be divided into metallic and non-metallic minerals. Differences between metallic and non-metallic minerals are

Metallic Minerals	Non-metallic Minerals
Metallic minerals contain metal in the raw form.	Non-metallic minerals do not contain metals.
These metals are generally associated with igneous rocks.	These metals are generally associated with sedimentary rocks.
They are usually hard and have a shine of their own.	They are not usually hard and have no shine of their own.
Examples: Iron, copper, bauxite, tin	Examples: Salt, coal, mica, clay

Characteristics of Minerals

Main characteristics of minerals are

- Minerals are not evenly distributed on the surface of the Earth.
- Minerals are exhaustible. Because they cannot be replenished immediately, they need to be conserved.
- All minerals do not have uniform properties. They have different chemical compositions.
- Minerals differ with each other in colour, lustre and texture.

Minerals in India

India is rich in many minerals because of its varied geological structure. Some commonly found minerals in India are coal, bauxite, mica, iron ore and manganese.

Coal

- Coal occurs in the sedimentary rocks. It was formed when plants and ferns were buried in the swamp forests. Heat and pressure exerted by many layers which were formed over these decayed plants resulted in many physical and chemical changes.
- Coal contains carbon, hydrogen, oxygen, nitrogen and small amounts of phosphorus and sulphur.
- Depending on the amount of carbon, moisture and volatile matter present, coal can be classified into four categories—anthracite, bituminous, lignite and peat.

Anthracite

- It is the hardest and highest quality coal as it has a carbon content of over 90% and burns slowly without smoke.
- It leaves very little ash behind and has a high heating value.

Bituminous

- Its carbon content varies from 50% to 80%.
- It is hard and black. It makes up about 80% of the total coal output in the world.
- It is widely used for household purposes.
- It is popularly used in various industries. High grade bituminous coal is used in blast furnaces for smelting iron.

Lignite

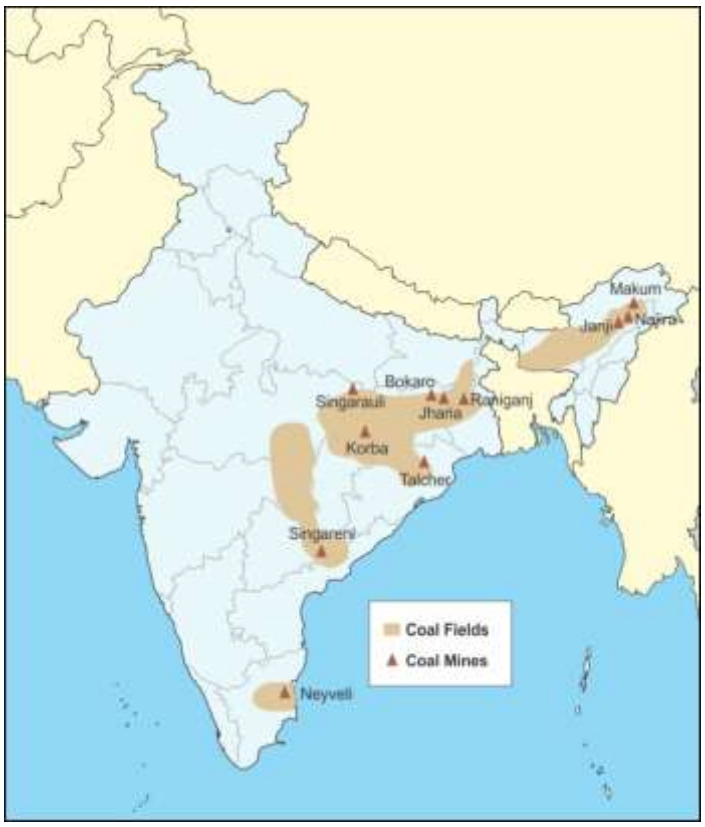
- It is a low grade coal also known as brown coal.
- It is soft with high moisture content.

Peat

- It has the least carbon content and is inferior to the other three varieties of coal.
- It represents the first stage of transformation of wood into coal.

Uses of Coal

- It is used in thermal power plants for generating electricity.
- It is used as a source of heat and energy for domestic purposes.
- It is used for manufacturing iron and steel. It is used as raw material in many industries.
- Chemicals such as ammonia and benzol are obtained as by-products from the gases which are released when the coal is burnt in a closed chamber to get metallurgical coke.



Map showing major coal fields and coal mines in India

Distribution

In India, coal is found in two main fields—Gondwana coalfields and tertiary coalfields. Bituminous coal is generally found in India.

Gondwana Coalfields

- It accounts for 98% of the total coal reserves in India. It is nearly free of moisture.
- It is found in the river valleys of Damodar, Mahanadi and Godavari.
- Gondwana coal deposits are found in West Bengal, Jharkhand, Odisha, Chhattisgarh, Madhya Pradesh, Uttar Pradesh and Andhra Pradesh.

Tertiary Coalfields

- The coal found in the tertiary coalfields has high moisture content.
- These fields are generally found in Assam, Arunachal Pradesh, Meghalaya and Nagaland.

Petroleum

Petroleum is a mixture of hydrocarbon compounds. It is found in underground reservoirs in sedimentary rock formations such as sandstone, shale and limestone. Petrol, diesel, tar, kerosene, LPG and paraffin wax are some products which are obtained during the refining process.

Uses of Petroleum

- It is used as a fuel and plays a major role in land, sea and air transport.
- After refining, petroleum is used in the production of various petrochemicals such as gasoline, lubricating oil and printing ink.
- It is used for power generation.

Distribution

- It is found in Mumbai High which is about 176 km off Mumbai in the Arabian Sea.
- Digboi oil field in Assam is the biggest oil field in India.
- Khambhat basin in Gujarat is the main oil field. Other important oil field reserves are Kalol, Koyali, Kosamba, Sanand, Kathana, Ankleshwar and Navgaon.

There are 21 oil refineries in India. The Reliance Petroleum Limited at Jamnagar in Gujarat was the first oil refinery in the private sector. The Digboi oil refinery is the oldest refinery in India.

Iron Ore

Names of iron ores and their characteristics:

Varieties of Iron Ore	Characteristics	Distribution
Hematite	It is known as 'red ore'. It contains 60–70% of pure iron.	Odisha, Jharkhand, Chhattisgarh, Karnataka and Maharashtra
Magnetite	It is known as 'black ore'. It is the best quality of iron ore as it contains more than 70% of iron. It possesses magnetic property and hence is called magnetite.	Tamil Nadu and Karnataka
Limonite	It is of inferior quality as it contains 35–50% of iron. It is yellow brown.	Garhwal in Uttarakhand, Mirzapur district in Uttar Pradesh and Kangra Valley in Himachal Pradesh

Distribution

Main iron ore deposits in India:

States	Regions	Utilisation
Chhattisgarh	Bailadilla in Dantewada and Durg district	Supply deposits to the Bhilai Iron and Steel Plant
Odisha	Keonjhar, Mayurbhanj, Sambalpur, Sundergarh, Cuttack, Koratpur	Supply deposits to steel plants located at Durgapur, Bokaro, Jamshedpur, Asansol and Rourkela
Karnataka	Bababudan Hills in Chikmaglur, Sandur, Bellary, Hospet, Shimoga and Chitradurga districts	Supply raw materials to Bhadravati iron works
Goa	North Goa	-
Andhra Pradesh	Anantapur, Khammam, Krishna, Kurnool, Kadapa and Nellore	-
Tamil Nadu	Salem, North Arcot, Tiruchirappalli, Coimbatore and	-

	Madurai	
Maharashtra	Ratnagiri and Chandrapur districts	-
Rajasthan	Moriza in Bhilwada and Udaipur districts	-

Manganese

It is a black, hard metal which is mainly used as a raw material for smelting iron ore and is used for manufacturing ferro alloys.

Uses of Manganese

- It is an important raw material in the iron and steel industry as it is used for hardening steel and prevents it from rusting.
- It is used in dry cell batteries.
- It is used in forming many alloys.
- It is used in chemical, glass and electrical industries.

Distribution

Main deposits of manganese in India are located in the following states:

States	Regions
Andhra Pradesh	Adilabad, Vishakhapatnam and Vizianagaram
Goa	Sanguem
Jharkhand	Singhbhum, Palamau and Chaibasa
Karnataka	Sandur, Shimoga, Chitradurga, Bellary, North Kanara, Tumkur, Belgaum and Davangere
Madhya Pradesh	Chhindwara, Balaghat, Mandla, Jabalpur
Maharashtra	Nagpur and Bhandara
Odisha	Keonjhar, Mayurbhanj, Talcher, Sundargarh, Bonai and Koratpur
Rajasthan	Banswara, Udaipur and Pali

Bauxite

It is an oxide of aluminium.

Uses of Bauxite

- Aluminium is extracted from bauxite. It is lightweight, strong and rust-resistant metal.
- Aluminium is used in aircraft, automobiles, shipping industry and household appliances.
- Because aluminium is a good conductor of electricity, it is used in the electrical industry.

Distribution

Main deposits of bauxite in India are located in the following states:

States	Regions
Goa	Mopa and Pernem
Odisha	Kalahandi and Sambalpur
Gujarat	Jamnagar, Kaira, Surat and Kachchh
Madhya Pradesh	Jabalpur, Balaghat, Shahdol, Mandla and Amarkantak Plateau
Chhattisgarh	Durg, Bilaspur, Raigarh
Jharkhand	Palamau, Ranchi

Maharashtra	Thane, Kolhapur, Ratnagiri, Satara
Karnataka	Belgaum, mainly at Karle Hills
Tamil Nadu	Salem, Nilgiri, Madurai, Coimbatore

The largest integrated aluminium plant is located at Renukoot in Uttar Pradesh. It gets its supply of bauxite from Amarkantak Plateau and Ranchi.

Limestone

It is a non-metallic mineral. It is formed by the deposition and hardening of skeletons, remains of animals and shells. It is found in almost every state of India.

Uses of Limestone

- It is used as a flux in the iron and steel industry.
- It is mainly used in the cement industry.
- It is used in manufacturing quicklime and slaked lime.
- It is used to suppress methane explosions in underground coal mines.
- It is used in the production of chemicals, paper, glass and fertilisers.