अभय | CLASS 10TH

SOCIAL SCIENCE

GEOGRAPHY | MINERALS AND ENERGY RESOURCES

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Minerals and Energy Resources

- Basics
- Mode of occurrence of minerals
- Conservation of mineral

Various minerals

- Ferrous minerals [Iron ore, Manganese]
- Non ferrous minerals [Copper Bauxite]
- Non metallic minerals [Mica]
- Rock minerals [Limestone]

Energy Resources ➡

Conventional sources
[coal, petroleum, natural gas, electricity]

Non Conventional sources
[Nuclear, solar, wind, biogas, tidal energy and geothermal]

Conservation of energy resources

What is a Mineral? ➡ Indispensable part of our lives. Minerals are defined as a homogenous, naturally occurring substance with a definable internal structure. 🤔

Mode of occurrence of minerals ➡ Various ways in which minerals are found. 🤔

- Occur in the cracks, crevices, faults or joints called veins and lodes. For example: copper, tin and zinc.
- Occur in beds or layers as a result of deposition, accumulation and concentration in horizontal strata. For example: coal and iron ore.
- Formed by decomposition of surface rocks, and the removal of soluble constituents, leaving a residual mass of weathered material containing ores. (Minerals may also occur as alluvial deposits, called placer deposits For example: Gold, silver and platinum.
- Ocean waters contain traces of Minerals. e.g. Common Salt

India have fairly rich and varied mineral resources, but these are unevenly distributed

Classification and distribution of minerals

Ferrous

- **Iron :** backb… of iron up to… between 50… Durg-Bastar… belt.
- **Manganese** … powder, ins…

Non Ferrous

- **Copper :** Us… Pradesh, Kh… copper.
- **Bauxite :** Alu… with extrem… in Amarkant… Odisha.

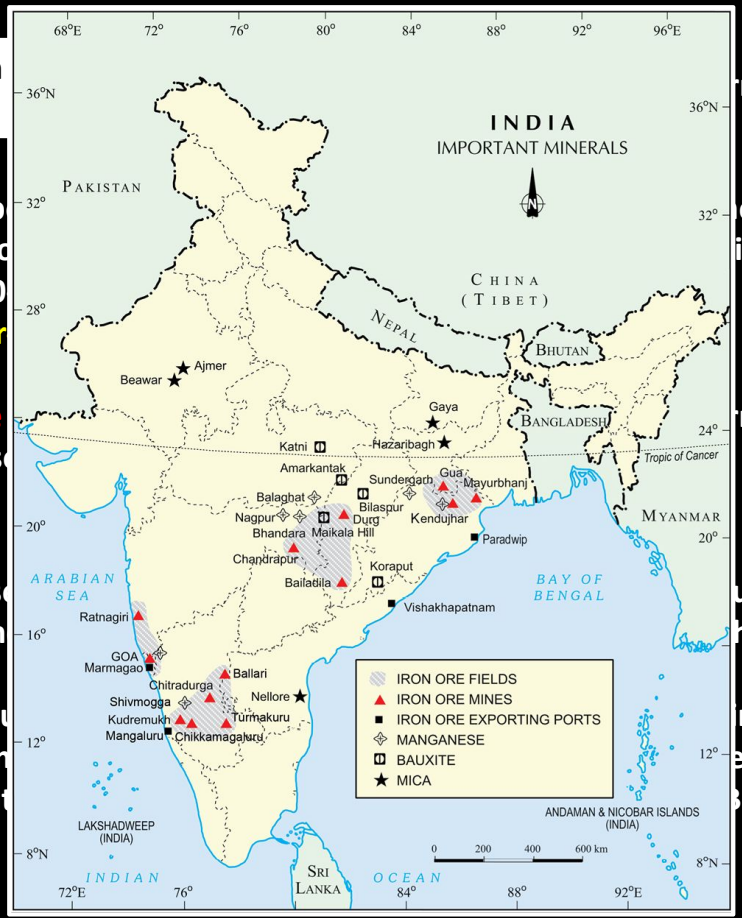
…rn ghats, Rajasthan 🤔

…est iron ore with a very high content …industrial iron ore, content iron … Odisha-Jharkhand belt, … Tumkur belt, and Maharashtra-Goa

…ro-manganese alloy, bleaching

…ustries. The Balaghat mines in Madhya …harkhand are leading producers of

…nes the strength of metals such as iron, …eat malleability. Bauxite is mainly found …ilaspur-Katni. It is majorly found in



Next Toppers

Which one of the following is the highest 'bauxite' producing state of India?

CBSE Board Paper 2024 - Set [32/5/2]

a. Maharashtra

b. Jharkhand

c. Gujarat

d. Odisha

Non Metallic

- **Mica :** Most indispensable minerals used in electric and electronic industries. Mica deposits are found in the Chota Nagpur plateau, Koderma Gaya - Hazaribagh belt of Jharkhand, Ajmer in Rajasthan and Andhra Pradesh.

Rock mineral

- **Limestone :** Found in association with the rocks composed of calcium carbonates or calcium and magnesium carbonates. Used as basic raw material for the cement industry and smelting industry.

Conservation of Minerals → **Need?** →

- Negative impact on miners and environment → "Killer industry"
- The rates of replenishment are infinitely small in comparison to the present rates of consumption.

↓

Recycling of metals, using scrap metals and other substitutes are steps in conserving our mineral resources for the future.

Energy resources ➡

- **Conventional :** Traditional source which are not renewable
- **Non conventional :** Clean and safe energy resources which are renewable.

Conventional Sources

Coal ➡

- Coal is an extremely important source of energy. It is used for power generation, to supply energy to industry as well as for domestic needs.
- Coal is found in variety of forms. Decaying plants in swamps produce peat. Lignite is a low grade brown coal which is soft with high moisture content. Bituminous is the most popular coal in commercial use. Anthracite is the highest quality hard coal.
- Gondwana coal [200 Million years old] and tertiary coal [55 million year old] are the classification on the basis of age.

Petroleum ➡

- Petroleum or Mineral oil provides fuel for heat and lighting, lubricants for machinery and raw materials for various manufacturing industries.
- Petroleum refineries acts as a nodal industry.
- Occurrence of petroleum - anticlines and fault traps.
- Mumbai High, Gujarat and Assam are major petroleum production areas in India.

Natural Gas ➡

- Natural Gas is found with petroleum deposits and is released when crude oil is brought to the surface. It is used as fuel in power sector to generate electricity, in chemical, petrochemical and fertilizer industries, as transport fuel and as cooking fuel.
- Krishna- Godavari basin, the Gulf of Cambay Andaman and Nicobar islands. Hazira-Vijaipur - Jagdishpur cross country gas pipeline

The per capita consumption of Electricity is considered as an index of development. 🤔

Electricity ➡

- Hydro electricity : Generated by fast flowing water, and by multi-purpose projects like the Bhakra Nangal, Damodar Valley Corporation, the Kopili Hydel Project, etc., producing hydroelectric power.
- Thermal electricity : Generated by using coal, petroleum and natural gas in 310 thermal power plants.

Non Conventional Sources ➡ **Non-Conventional Energy sources are becoming the preferred sources of energy.**

Nuclear or Atomic energy

- Energy obtained by altering the structure of atoms
- Uranium and thorium available in Jharkhand and in Rajasthan are used for generating atomic or nuclear power. The Monazite sands of Kerala is also rich in Thorium.

Solar Energy

- India has enormous possibilities of tapping solar energy. Photovoltaic technology converts sunlight directly into electricity. 🤔
- It will minimise the dependence of rural household on firewood and dung cakes.

Wind Power

- Wind farms are located in Tamil Nadu, Andhra Pradesh, Karnataka, Rajasthan, Gujarat, Kerala, Maharashtra and Lakshadweep.

Bio Gas

- Shrubs, farm waste, animal and human waste are used to produce biogas.
- Gobar gas plants and twin benefits.🤔

➔ Energy to the farmers

➔ Improved quality of manure.

Tidal energy

- Oceanic tides can be used to generate electricity. The Gulf of Khambhat, the Gulf of Kachchh in Gujarat on the western coast and Gangetic delta in Sunderban regions of West Bengal provide ideal conditions for utilising tidal energy.

Geothermal energy

- Refers to the heat and electricity produced by using the heat from the interior of the Earth.
- The Parvati valley near manikaran in HP and Puga valley Ladakh

Conservation of energy resources

- Judicious use of limited energy resources.
- Minimise wastage of minerals.
- Use of modern technology for the exploitation of energy resources.
- Minimise the export of energy resources.
- Use of substitutes.
- Encourage recycling.
- Need to develop a sustainable path of energy development.

Choose the correctly matched pair.

CBSE Board Paper 2024 - Set [32/1/3]

a. Ferrous - Natural Gas

b. Non-Ferrous - Nickel

c. Non-Metallic Minerals - Limestone

d. Energy Minerals - Cobalt

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Key Words

GEOGRAPHY | MINERALS AND ENERGY RESOURCES

Mineral : Minerals is a homogeneous, naturally occurring substance found in the crust of the earth, that has a definable internal structure.

Rat Hole Mining: It is a type of Mining that is done by digging long, narrow tunnels to reach the coal deposits under the ground. It is practiced in jowai and cherrapunji.

Ore : An ore is a natural material that contains a valuable mineral mixed with other substances. The mineral is present in a high enough amount that it is worth extracting for commercial use. How easy or difficult it is to mine depends on the structure of the ore and how it was formed.

Veins and lodes : Veins and lodes are places where minerals are found in cracks or openings in rocks. Veins are smaller, and lodes are larger. These minerals form when hot, liquid, or gas minerals move upward through the cracks and harden as they cool. Important metals like tin, copper, zinc, and lead come from veins and lodes.

Placer deposits : Placer deposits are minerals found in the sand of valley floors or at the base of hills, where they have been naturally deposited by water. These minerals, like gold, silver, tin, and platinum, don't corrode easily in water.

Ferrous minerals : Ferrous minerals are metals that contain iron and make up about three-fourths of the total value of metallic mineral production. They are important for building the metallurgical (metal-processing) industries. India produces enough ferrous minerals to meet its needs and also exports a large amount. Example: Iron and Manganese.

Magnetite : Magnetite is the best quality iron ore, containing up to 70% iron, and has strong magnetic properties, making it useful in the electrical industry.

Haematite : Hematite, though slightly lower in iron content (50-60%), is the most commonly used iron ore in industry due to its abundance. Both are key resources for industrial development.

Next Toppers

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Key Words

GEOGRAPHY | MINERALS AND ENERGY RESOURCES

Non-Ferrous Minerals : Non-ferrous minerals are minerals that do not contain iron. They include minerals like copper, bauxite, lead, zinc, and gold. These minerals are important because they play a vital role in various industries, such as metallurgical, engineering, and electrical industries. However, in India, the reserves and production of non-ferrous minerals are not very satisfactory.

Conventional sources of energy: Conventional sources of energy are traditional, widely-used energy sources that have been in use for a long time. They are typically non-renewable and include fossil fuels like coal, oil, and natural gas. These sources are finite and can cause environmental issues such as pollution.

Non-conventional sources : Non-conventional sources of energy are renewable energy sources that are environmentally friendly and can be replenished naturally. These include solar energy, wind energy, tidal energy, biomass, and energy from waste materials. Unlike fossil fuels, they don't run out and help reduce pollution. India has abundant resources like sunlight, water, and wind, making it ideal for using these clean energy sources.

Nuclear or atomic energy: It is generated by changing the structure of atoms. When atoms are altered, a large amount of heat energy is released, which is then used to produce electricity. In India, uranium and thorium—found in places like Jharkhand, the Aravalli ranges in Rajasthan, and the monazite sands of Kerala—are the main materials used to generate nuclear power.

Gobar gas plants : Gobar gas plants are biogas plants that use cattle dung along with other organic materials like shrubs, farm waste, and human waste to produce biogas for domestic use in rural areas. Through the decomposition of this organic matter, the plants generate gas that is more efficient for cooking and heating than traditional fuels like kerosene, dung cakes, and charcoal.

These plants benefit farmers by providing a source of energy and enhancing the quality of manure, while also reducing the need to burn fuel wood and cow dung cakes, which helps conserve trees.

Describe the importance of minerals in human life.

Importance of minerals in human life-

- Minerals are an indispensable part of human life. Almost all things we use are made of minerals.
- Human beings use minerals for their livelihood, decoration, festivities, religious and ceremonial rites.
- Buildings, ships, railway lines, cars, buses, aeroplanes, various implements etc. are manufactured from minerals and run on power resources derived from the earth.
- Our food too contains minerals. Life processes cannot occur without minerals. In toothpaste, fluoride which is used to reduce cavities, comes from a mineral fluorite.

How do minerals occur? Explain with examples.

Minerals occur in different forms depending on how they are formed and the type of rocks they are associated with. Here are the main ways minerals occur.

- **In the Form of Veins and Loads :** In Cracks of Igneous and Metamorphic Rocks minerals can be found in cracks or gaps in rocks. When hot, melted minerals rise through these cracks and cool down, they harden into solid minerals. Examples are tin, copper, zinc, and lead.
- **In the Form of Beds and Layers :** In Layers of Sedimentary Rocks some minerals form in layers in sedimentary rocks over long periods of time. They occur in horizontal strata, examples include coal and iron ore. Other minerals, like gypsum and salt, form when water evaporates in dry areas.
- **In the Form of residual mass of weathered material :** When rocks on the surface break down over time, some parts are washed away, leaving the residual part of weathered material behind. Bauxite, used to make aluminum, is formed this way.
- **In the Form of Placer deposits:** Minerals like gold, silver, tin, and platinum can be found in the sand of riverbeds or at the base of hills. These minerals don't easily wear away in water.
- **In Oceans:** Oceans have a lot of minerals, but they are usually spread out. However, some useful minerals like salt, magnesium, and bromine are taken from ocean water. The ocean floor also has manganese nodules.

What are the major iron ore belts in India?

The major iron ore belts in India are:

- Odisha-Jharkhand Belt: High-quality iron ore is found in Odisha's Badampahar mines and Jharkhand's Gua and Noamundi areas.
- Durg-Bastar-Chandrapur Belt: This belt is in Chhattisgarh and Maharashtra. The Bailadila hills in Chhattisgarh have very high-grade iron ore, which is exported to Japan and South Korea.
- Ballari-Chitradurga-Chikkamagaluru-Tumakuru : Located in Karnataka, this belt has large iron ore reserves. Kudremukh mines are one of the biggest and the iron ore is exported via a pipeline to Mangaluru port.
- Maharashtra-Goa Belt: Found in Goa and Ratnagiri district, the iron ore here is of lower quality but is still mined and exported through Marmagao port.

What are the impacts of mining on the health of the miners and the environment?

- **Health of Miners:** Miners are vulnerable to pulmonary diseases due to inhaling dust and toxic fumes, and they face risks like collapsing mine roofs, floods, and fires.
- **Environmental Impact:** Mining contaminates water sources, degrades land, and increases pollution in streams and rivers due to the dumping of waste and slurry.
- **Need for Regulation:** Stricter safety measures and environmental laws are essential to prevent mining from causing severe harm to both miners and the environment.

Why is Conservation of mineral resources essential? Explain any three methods to conserve them.

Conservation of mineral resources is essential because these resources are finite, non-renewable, and take millions of years to form. As we continue to consume them at a rapid pace, the depletion of these resources could severely impact industries and agriculture, which are highly dependent on them.

Three methods to conserve them.

i) Technological Improvements: Advancing technology allows for the use of low-grade ores at lower costs, which means more efficient extraction processes and better utilization of available mineral resources.

ii) Recycling of Metals: By recycling and reusing metals, the need for fresh extraction is reduced, conserving existing mineral deposits.

iii) Use of Substitutes: Finding alternative materials to replace minerals in certain applications reduces the pressure on finite resources. For example, using synthetic materials in place of metal components where possible helps conserve minerals.

What are the four main types of coal found in India?

The four main types of coal found in India are:

Peat: This is the first stage of coal formation with low carbon content, high moisture, and low heating capacity.

Lignite is a low-grade, soft, brown coal with high moisture content and low heating capacity. It is mainly used for generating electricity, with significant reserves in Neyveli, Tamil Nadu.

Bituminous coal is a higher-quality coal formed from deeper burial and higher temperatures. It is the most commonly used coal for commercial purposes. A special type of bituminous coal, metallurgical coal, is valuable for smelting iron in blast furnaces.

Anthracite is the highest quality, hard coal, known for its high carbon content and excellent heating efficiency.

Why is there a pressing need to use non-conventional energy resources? Explain.

There is a pressing need to use non-conventional energy resources for the following reasons:

i) Limited Fossil Fuels: India relies heavily on fossil fuels like coal, oil, and gas, but these resources are finite and could face shortages, threatening the country's energy security.

ii) Rising Costs: The increasing prices of oil and gas make it expensive to rely on these fuels, which can harm the economy by raising production and transportation costs.

iii) Environmental Impact: Fossil fuel use causes significant environmental problems, such as pollution and climate change. Shifting to renewable energy sources like solar, wind, and biomass helps reduce this damage.

Why is energy conservation important for India, and what measures can be taken to conserve energy?

Energy conservation is crucial for India because energy is essential for all sectors of the economy, including agriculture, industry, transport, commercial, and domestic uses.

To conserve energy, India must focus on:

Promoting energy conservation: This includes reducing unnecessary energy use by switching off electrical devices when not in use, using energy-efficient appliances, and adopting power-saving technologies.

Increasing the use of renewable energy sources: Shifting towards non-conventional energy sources like solar, wind, and biomass can reduce dependence on fossil fuels and help achieve long-term energy security.

Encouraging public transport: Citizens can contribute by using public transport instead of personal vehicles to reduce fuel consumption and promote efficient energy use.

How is energy a basic requirement for economic development ? Explain with examples.

Energy is a basic requirement for economic development because every part of the economy depends on it.

- **Agriculture:** Energy is needed to power machines like tractors and pumps for irrigation, which help increase agricultural production.
- **Industry:** Factories and manufacturing units need a lot of energy to run machines and produce goods. Without energy, industrial activities would come to a halt, slowing economic growth.
- **Transport:** The movement of goods and people, essential for trade and daily activities, relies on energy in the form of fuel for vehicles like cars, trucks, and trains.
- **Commercial and Domestic Use:** Businesses and households need energy for lighting, heating, cooling, and running electrical appliances. This supports daily life and economic activities.
- **Sustainable Growth:** As energy demand rises, using renewable energy sources and conserving energy are necessary to support long-term economic development without depleting resources.

CBSE Board Paper 2020 - Set [32/1/1]

In which of the following States is Kalpakkam Nuclear Power Plant located? 1

A. Gujarat

B. Odisha

C. Kerala

D. Tamil Nadu

CBSE Board Paper 2020 - Set [32/2/1]

In which of the following states Kaiga Nuclear Power plant is located? 1

(a) Karnataka

(b) Kerala

(c) Tamil Nadu

(d) Telangana

CBSE Board Paper 2020 - Set [32/4/1]

In which of the following States is Narora Nuclear Power Plant located? 1

(A) Karnataka Kerala

(B) Kerala

(C) Tamil Nadu

(D) Uttar Pradesh

CBSE Board Paper 2020 - Set [32/2/1]

Choose correct option from Column A and Column B. 1

Column - A	Column - B
(a) Mayurbhanj Iron Ore Mines	(i) Gujarat
(b) Chandrapura Thermal Power Plant	(ii) Jharkhand
(c) Bauxite Mines	(iii) Odisha
(d) Kalol Oil Fields	(iv) Amarkantak

CBSE Board Paper 2020 - Set [32/4/1]

Choose the correctly matched pair from the following: 1

(A) Kalol Oil-fields	–	Gujarat
(B) Bauxite Mines	–	Maharashtra
(C) Chandrapur Thermal Power Plant	–	Odisha
(D) Mayurbhanj Iron Ore Mines	–	Jharkhand

CBSE Board Paper 2020 - Set [32/2/1]

Fill in the blank: 1

_____ is well known for effective use of wind energy in Rajasthan.

CBSE Board Paper 2020 - Set [32/5/1]

"Minerals are an indispensable part of our lives." Support this statement with examples. 3

CBSE Board Paper 2020 - Set [32/5/1]

"Minerals occur in various forms." Support this statement with examples. 3

CBSE Board Paper 2020 - Set [32/3/1]

"A concerted effort has to be made in order to use mineral resources in a planned and sustainable manner." Suggest and explain any three measures. 3

CBSE Board Paper 2023 - Set [32/4/1]

Which one of the following is an example of the Ferrous Metal ? 1

(a) Copper

(c) Bauxite

(b) Tin

(d) Nickel

CBSE Board Paper 2023 - Set [32/5/1]

Why is there a pressing need to use non-conventional energy resources? Explain. 2

CBSE Board Paper 2023 - Set [32/5/1]

'Energy saved is energy produced.' Support the statement. 2

CBSE Board Paper 2023 - Set [32/2/1]

"Energy is required for all activities." Explain the statement with examples. 3

CBSE Board Paper 2023 - Set [32/1/1]

35. Read the given case and answer the questions that follow: 4

CONSERVATION OF ENERGY RESOURCES

Energy is a basic requirement for economic development. Every sector of the national economy agriculture, industry, transport, commercial and domestic needs inputs of energy. The economic development plans implemented since independence necessarily required increasing amounts of energy to remain operational. As a result, consumption of energy in all forms has been steadily rising all over the country. In this background, there is an urgent need to develop a sustainable path of energy development. Promotion of energy conservation and increased use of renewable energy sources are the twin planks of sustainable energy. India is presently one of the least energy efficient countries in the world. We have to adopt a cautious approach for the judicious use of our limited energy resources. For example, as concerned citizens we can do our bit by using public transport systems instead of individual vehicles; switching off electricity when not in use, using power-saving devices and using non- conventional sources of energy. At last "Energy Saved is energy produced"

(35.1) Why is sustainable energy a key to sustainable development ? 1

(35.2) Why is consumption of energy rising in all over India? 1

(35.3) Explain 'Energy saved is energy produced'. 2

CBSE Board Paper 2024 - Set [32/1/3]

Choose the correctly matched pair. 1

(a) Ferrous - Natural Gas

(b) Non-Ferrous - Nickel

(c) Non-Metallic Minerals - Limestone

(d) Energy Minerals - Cobalt

CBSE Board Paper 2024 - Set [32/4/1]

Choose the correct option for the following States' share (in percentage) in the production of 'manganese' in India from the highest to the lowest order. 1

(A) Madhya Pradesh, Maharashtra, Karnataka, Odisha

(B) Madhya Pradesh, Maharashtra, Odisha, Karnataka

(C) Maharashtra, Madhya Pradesh, Karnataka, Odisha

(D) Maharashtra, Odisha, Madhya Pradesh, Karnataka

CBSE Board Paper 2024 - Set [32/2/2]

Choose the correct option to fill the blank.

Non Metallic Mineral: Mica

Energy Mineral: .....

(A) Natural Gas

(B) Bauxite

(C) Manganese

(D) Platinum

CBSE Board Paper 2024 - Set [32/2/2]

Match Column-I with Column-II and choose the

Column-I (Minerals)	Column-II (Examples)
I. Ferrous	a. Coal
II. Non-Ferrous	b. Granite
III. Non-Metallic	c. Bauxite
IV. Energy	d. Cobalt

Options:

	I	II	III	IV
(A)	b	d	c	a
(B)	d	c	b	a
(C)	a	b	d	c
(D)	c	d	b	a

CBSE Board Paper 2024 - Set [32/1/3]

(B) 'Minerals generally occur in different rocks. Examine the statement. 5

CBSE Board Paper 2024 - Set [32/2/2]

How do minerals occur? Explain with examples. 5

CBSE Board Paper 2024 - Set [32/1/3]

Analyse the advantages of Natural Gas as a source of energy. 5

CBSE Board Paper 2024 - Set [32/2/2]

How is energy a basic requirement for economic development ? Explain with examples. 5

CBSE Board Paper 2024 - Set [32/5/2]

"Minerals occur in igneous and metamorphic rocks." Explain the statement with example. 2

CBSE Board Paper 2024 - Set [32/5/2]

"The ocean waters contain vast quantities of minerais." Explain the statement with example. 2

CBSE Board Paper 2024 - Set [32/4/1]

How is energy a basic requirement for economic development of a country ? Explain with examples. 2

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