Mineral and power resources are vital for the economic and industrial progress of a nation. Their distribution on the surface of the Earth is highly uneven. The presence or absence of mineral and power resources can have a powerful influence on the relative wealth and economic independence of a country. Naturally occurring substance that has a definite chemical composition is a mineral. Minerals are not evenly distributed over space. They are concentrated in a particular area or rock formations. Some minerals are found in areas which are not easily accessible such as the Arctic Ocean bed and Antarctica. Mineral are formed in different types of geological environments, under varying conditions. They are created by natural processes without any human interference. They can be indentified on the basis of their physical properties such as color, density, hardness and chemical property such as solubility. Minerals are rarely found in the pure state. They are usually found in rocks, combined with other elements. Most minerals are found in such low concentration or in inaccessible place, that their extraction become too expensive or technically difficult, to be profitable. A rock which contains enough mineral to make it economically suitable for mining is called an **ore.**

Ores are classified as high grade ores and low grade ores. In the high grade ores the mineral content is high and impurities are less. In the low grade ores mineral content is low and impurities are more.

Types of Minerals: On the basis of composition, minerals are classified mainly as metallic and non-metallic minerals.

Metallic: minerals contain metal in raw form. Metals are hard substances that conduct heat and electricity and have a characteristic luster or shine. Iron ore, bauxite, manganese ore, copper, silver and gold are some examples. Metallic minerals may be ferrous or non-ferrous.

Ferrous: minerals like iron ore, manganese and chromites contain iron.

A non-ferrous: A mineral does not contain iron but may contain some other metal such as gold, silver, copper or lead.

Non- metallic: minerals do not contain metals. Limestone, mica and gypsum are examples of such minerals. The minerals fuels like coal and petroleum are also non- metallic minerals. They are organic or inorganic by origin.

Extraction of minerals: Minerals can be extracted by mining, drilling or quarrying. The process of taking out minerals from rocks buried under the earth's surface is called mining. Open-cast mining: Minerals that lie at shallow depths are taken out by removing the surface layer; this is known as open- cast mining.

Deep bores, called shafts, have to be made to reach mineral deposits that lie at great depths. This is called shaft mining.

Drilling: Petroleum and natural gas occur far below the earth's surfaces. Deep wells are bored to take them out. This is called drilling.

Minerals that lie near the surface are simply dug out, by the process known as quarrying.

Distribution of Minerals: Minerals occur in different types of rocks. Metallic minerals are mostly found in metamorphic and igneous rocks. For example: iron-ore in Chhota Nagpur plateau in India, iron-ore in north Sweden, platinum and chromites in South Africa

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Sedimentary rocks: Sedimentary rocks formed along the plains and young fold mountains have deposits of non-metallic minerals which may be organic or inorganic in origin. Fossil fuels such as coal and petroleum are also found in between layers of sedimentary rocks.

Continental Distribution of Minerals:

Asia: China and India have large iron ore deposits. The continent produces more than half of the world's tin. China, Malaysia and Indonesia are among the world's leading tin producers. China also leads in production of lead, antimony and tungsten. Asia also has deposits of manganese, bauxite, nickel, zinc and copper.

Europe: Europe is the leading producer of iron-ore in the world. The countries with large deposits of iron ore are Russia, Ukraine, Sweden and France. The Ruhr valley of Germany is rich in coal deposits and today it is one of the most populated industrial regions in Europe. Minerals deposits of copper, lead, zinc manganese and nickel are found in Eastern Europe and European Russia.

North America: The mineral deposits in North America are located in three zones: the Canadian region north of the great lakes, the Appalachian region and the mountain ranges of the west. Iron ore, nickel, gold, uranium and copper are mined in the Canadian Shield region, coal in the Appalachians region. Western cordilleras have vast deposits of copper, lead, zinc, gold and silver. One of the world's largest deposits of bituminous and soft coals is found in West Virginia, western Pennsylvania.

South America: Brazil is the largest producer of high grade iron-ore in the world. Chile and Peru are leading producers of copper. Brazil and Bolivia are among the world's largest producers of tin. South America also has large deposits of gold, silver, zinc, chromium, manganese, bauxite, mica, platinum, asbestos and diamond. Mineral oil is found in Venezuela, Argentina, Chile, Peru and Columbia.

Africa: Africa is rich in mineral resources. It is the world's largest producer of diamonds, gold and platinum. South Africa, Zimbabwe and Zaire produce a large portion of the world's gold. The other mineral found in Africa are copper, iron ore, chromium, uranium, cobalt and bauxite. Oil is found the Nigeria, Libya and Angola.

Australia: Australia is the largest producer of bauxite in the world. It is a leading producer of gold, diamond, iron ore, tin and nickel. It is also rich in copper, lead, zinc and manganese. Kalgoorlie and coolgardie areas of Western Australia have the largest deposits of gold.

Antarctica: The geology of Antarctica is sufficiently well known to predict the existence of a variety of mineral deposits, some probably large. Significant size of deposits of coal in the Trans-Antarctic mountains and iron near the Prince Charles Mountains of east Antarctica is forecasted. Iron ore, gold, silver and oil ore also present in commercial quantities. However, mining for commercial reason is banned here. Only researchers continue to do some mining here in order find some answers to their scientific queries.

Distribution in India:

Iron-ore: India has deposits of high grade iron ore in Asia. The mineral is found mainly in Jharkhand, Odisha, Chhattisgarh, Madhya Pradesh, Goa, Maharashtra and Karnataka. Hematite and magnetite are the two main types of iron-ore found in India

Bauxite: The ore of the metal aluminum is called bauxite. Major bauxite producing areas are Jharkhand, Odisha, Chhattisgarh, Madhya Pradesh, Gujarat, Maharashtra and Tamil Nadu.

Mica: Mica deposits mainly occur in Jharkhand, Bihar, Andhra Pradesh and Rajasthan, India is the largest producer and exporter of mica in the world.

Copper: Copper is good conductor of electricity. It is an indispensable metal in the electrical industry as it is used for making wires, electric motors, transformers and generators. It is mainly produced in Rajasthan, Madhya Pradesh, Jharkhand, Karnataka and Andhra Pradesh.

Manganese: It is an important raw material for smelting of iron-ore. It is used in the iron and steel industry as it adds strength to the steel. India's manganese deposits lie in Maharashtra, Madhya Pradesh, Chhattisgarh, Odisha, Karnataka and Andhra Pradesh.

Limestone: Limestone is a major source of row material for the cement Industry. Major limestone producing states in India are Bihar, Jharkhand, Odisha, Madhya Pradesh, Chhattisgarh, Rajasthan, Gujarat and Tamil Nadu.

Gold: It is used for making jewellery. Precious gems, diamonds and pearls are set in various styles using gold. Kolar in Karnataka has deposits of gold in India. These mines are among the deepest in the world which makes mining of this ore a very expensive process.

Salt: It is used by food industry (as a preservative) and many chemical industries. Common salt (NaCl) is used by every household to make food tasty. it is obtained from seas, lakes and rocks. India is one of the world's leading producers and exporters of salt.

Silicon: it is another important mineral used in the computer industry and it is obtained from quartz. It is found near Una in Himachal Pradesh, and in Madhya Pradesh and Uttar Pradesh.

Uses of Minerals: Minerals are used in many industries. Minerals which are used for gems are usually hard. Copper is another metal used in everything from coins to pipes. Silicon, used in the computer industry is obtained from quartz. Aluminum obtained from its ore bauxite is used in automobiles and airplanes, bottling industry, buildings and even in kitchen cookware.

Conservation of Minerals: Minerals take a long time to develop, and so they cannot be replenished immediately at the time of need. Minerals are non-renewable resources. It takes thousands of years for the formation and concentration of minerals. The rate of formation is much smaller than the rate at which the humans consume these minerals. It is necessary to reduce wastage in the process of mining. Recycling of metals is another way in which the mineral resources can be conserved.

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