



MINERAL RESOURCES

CLASS PLAN

- 1. IMPORTANCE
- 2. MINERAL & ORE
- 3. USES
- 4. STAGES IN MINING THREATS
- 5. OPEN CAST & CLOSED MINING: SAFETY CONSIDERATIONS
- 6. THREATS TO MINERAL RESOURCES
- 7. HOW TO CONSERVE
- 8. ENVIRONMENTAL PROBLEMS

1. IMPORTANCE

- 1. Helps in improving our comforts and quality of life.
- 2. Without these the Modern civilized life is a big question.

2.Mineral/ Ore

- Minerals are naturally occurring, inorganic, crystalline solids having a definite chemical composition with identifiable physical properties.
- Ore: is a combination of minerals from which a useful substance(such as metal) can be extracted and used to manufacture useful products.
- Ore : Mineral + gangue
- Hematite : Iron/steel
- Bauxite : Aluminum
- Crude oil : Petrol/diesel/kerosene etc.,
- Rutile : Titanium

- **Raw materials for industrial use:** Iron, aluminum, zinc, manganese and copper
- **Non-metallic resources:** Coal, Salt, Clay, Cement, and Silica
- **Minerals with aesthetic and ornamental value:** Diamond, emerald, ruby, gold, silver, platinum

3.Uses

- Development of industrial plants and machinery
- Generation of energy: Coal, Uranium etc
- Construction, housing, settlements
- Defense equipments: weapons, arnaments
- Transportation means
- Communication: wires, cables, electronic devices
- Medical systems
- Formation of alloys
- Agricultural uses: fertilizers, fungicides
- Jewellery: Gold, silver, platinum, diamond

Based on properties, minerals are of two types:

- Non-metallic (graphite, diamond, quartz, feldspar)
- Metallic (Bauxite, Laterite, Hematite)



Another type of classification:

- **Critical** (essential for economy of a nation): Fe, Al, Cu, Gold etc.
- **Strategic** (required for defense of a country): Mn, Co, Pt, Cr etc.

Major minerals of India

- **Coal** (W.B, Jharkhand, Orissa, A.P.,M.P)
- **Uranium** (Jharkhand, A.P-Nalgonda- Nellore, Meghalaya, Rajasthan-Ajmer)
- **Al (Bauxite):** (WB, OR, TN, MP)
- **Iron:** (JH, OR, MP,AP, TN, KA, MH, Goa)
- **Copper (Pyrites):** (RJ, BR, JH, MP, WB, AP, Uttaranchal)

4. MINING PROCESS/STAGES IN MINING

Mining: Extraction of minerals and their ores from the earth's crust

- **Prospecting:** Searching for minerals.
- **Exploration:** Assessing the size, shape, location and economic value of the deposit.
- **Development:** Preparing access to the deposit so that minerals can be extracted from it.
- **Exploitation:** Extracting the minerals from the mines.

5.Types of Mining-safety

- Surface (open-cast or strip) mines & metal mining : less hazardous
- Deep/closed/ shaft mining: more hazardous due to
 - Rock/roof falling
 - Water flooding
 - Less ventilation/fire hazards/explosions
 - Long/acute health problems for miners due to dust/nuclear radiations
- Selection of method: Depend on how maximum yield may be obtained under existing conditions at a minimum cost, with the least danger to the mining personnel.

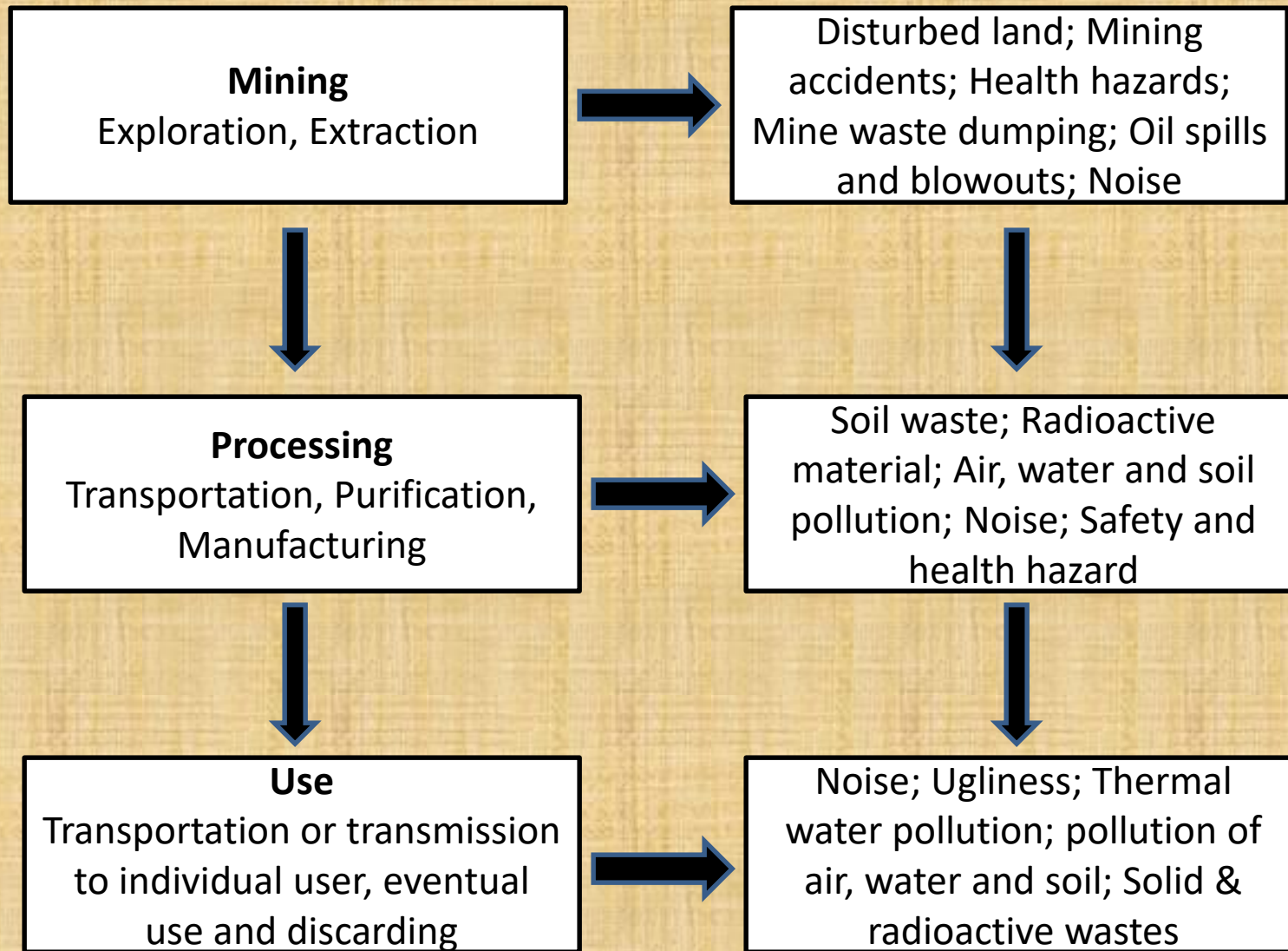
6. THREATS TO MINERAL RESOURCES

- 1. Increase in population/over exploitation to get high profits by contractors
- 2. Over exploitation also damages environment permanent(vegetation/biodiversity loss)

7. How to conserve

1. Industry should adopt 3 R's Principle
2. Computer designs will help us to consume optimum minerals (reduce size of equipment)
3. Creating awareness

8.Environmental impacts of Mining activities



Major Environmental Damages

- De-vegetation and defacing of landscape
- Subsidence of land
- Ground and surface water contamination
- Air pollution (particulate matter, SO_x, As, Cd, Pb etc.)
- Occupational health hazards (Asbestosis, Silicosis, Black lungs etc.)
- Radiation is a hazard in uranium mines.

Case study

1. Sariska Tiger Reserve, Rajasthan

- The Forest Department has leased land for mining in the Sariska Tiger Reserve area.
- The local people have fought against the mining lobby, and have filed a Public Interest Litigation in the Supreme Court in 1991.
- Rajendra Singh, secretary of TBS, points out that as many as 70 mines operate in close proximity to the forest.

2. Mining and quarrying in Udaipur:

- About 200 open cast mines and quarrying centers in Udaipur, about half of which are illegal - involved in stone mining including soap stone, building stone, rock phosphate and dolomite.
- These mines (spread over 15,000 hectares) in Udaipur have caused many adverse impacts on environment.
- About 150 tonnes of explosives are used per month in blasting.
- The overburden, wash off, discharge of mine water etc. pollute the water.
- The hills around the mines are devoid of any vegetation.
- The waste water flows towards a big tank of “Bag Dara”.
- Due to scarcity of water, people are compelled to use this effluent for irrigation purpose.
- The blasting activity has adversely affected the fauna and the animals like tiger, lion, deer and even hare, fox, wild cats and birds have disappeared from the mining area.

3. Uranium Mining in Nalgonda, A.P.

- The Uranium Corporation of India (UCIL) proposes to mine uranium from the deposits in Lambapur and Peddagattu villages of Nalgonda district in Andhra Pradesh and a processing unit at about 18 km from Mallapur.
- The plan is to extract the ore of 11.02 million tons in 20 years.
- The UCIL is trying its best to allure the villagers through employment opportunities.
- Experts charge the company for keeping silence on the possible contamination of water bodies in the area.

- The proposed mines are just 1 km from human habitation and hardly 10 km from Nagarjun Sagar Dam and barely 4 km from the Akkampalli reservoir which is Hyderabad's new source of drinking water.
- 20 years of mining would generate about 7.5 million metric tones of radioactive waste of which 99.9% will be left behind and the villagers are very likely to be affected.
- The proposed mines would cover about 445 ha of Yellapuram Reserve Forest and the Rajiv Gandhi Tiger Sanctuary.