Class-X ch-5 [Geography] Minerals and Energy Resources

- Introduction

→ Minerals, energy resources and we.

→ Minerals are an indispensable part of our lives. [Pin to ship]

"Homogenous naturally occurring substance with a definable internal structure"

Rocks → Minerals [one or more than one]

↑ Depends upon the physical and chemical conditions.

Class-X ch-5 (Geography) Minerals and Energy resources

Classification of Minerals

Geographers v/s Geologists

- Geographers: → Study Minerals as a part of earth crust. → Above the earth
- Geologists: → study formation of minerals, their age physical and chemical composition → Below the earth

Minerals

- **Metallic**
  - **ferrous**: e.g Iron ore, Manganese, Nickel, Cobalt
  - **Non-ferrous**: eg Copper, lead, tin, lead
  - **precious**: eg gold, Silver, Platinum
- **Non-Metallic**: e.g Mica, Salt, Potash, Sulphur, granite
- **Energy Minerals**: eg Coal, Petroleum, Natural gas.

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Mode of Occurrence of Minerals

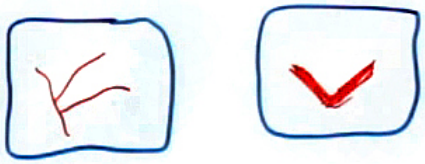
→ found in "ores" → [Minerals mixed with other element]

↓

Commercially viable extraction

(v). Ocean water e.g [salt, magnesium and bromine]

(i) Veins and lodes

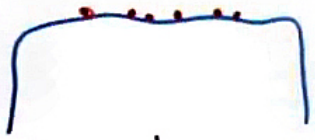


e.g. Tin, Copper Zinc and lead.

(ii). Beds and layers

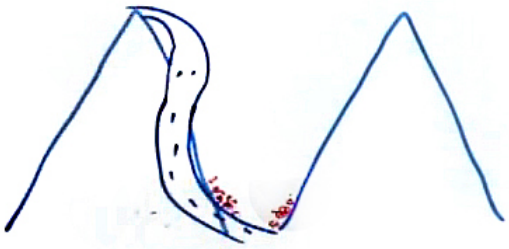
e.g. Coal, gypsum potash etc

(iii). Residual mass of weathered Material



e.g. Bauxite

(iv) Alluvial deposits



e.g. Gold, Silver, tin

[Minerals not Commoded By water]

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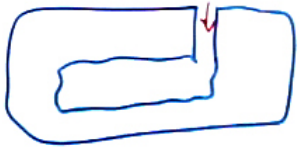
Types of Mining and Distribution of Minerals

i). Open pit Mining

ii). quarrying

iii). Underground Mining with shaft



→ Some facts :

- Minerals are nationalised
- Mining by tribal group [Rat hole]

→ Peninsular rocks

- Coal, Metallic minerals, Mica and many other non-Metalic Minerals

→ East and west of Peninsula

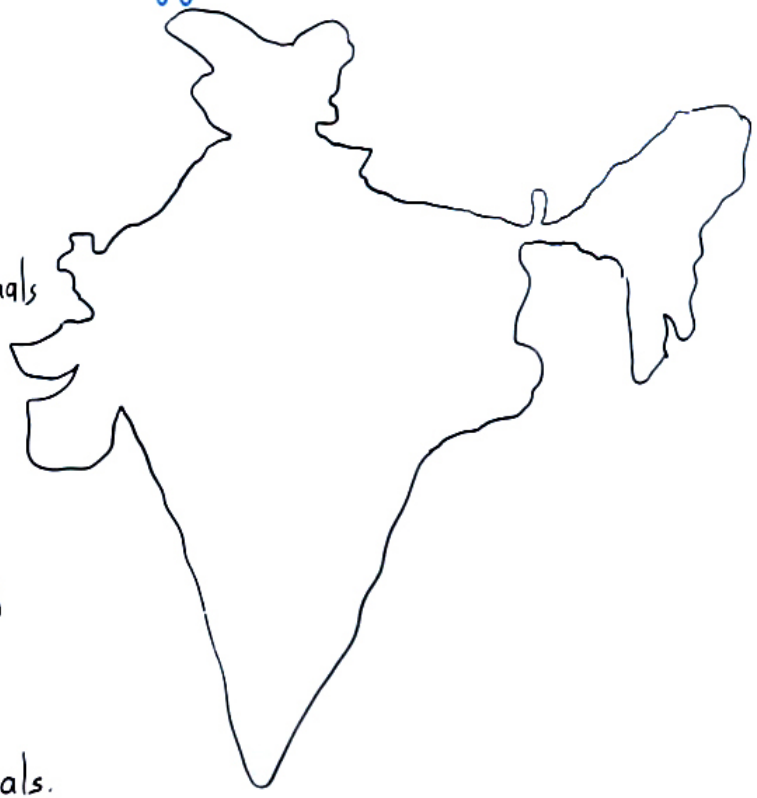
- Petroleum

→ Rajasthan

- Non-ferrous Minerals [Copper]

→ North India

- Devoid of Ecommic Minerals.



* How a "deposit" or "Reserve" turn into Mine ??

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Ferrous Minerals

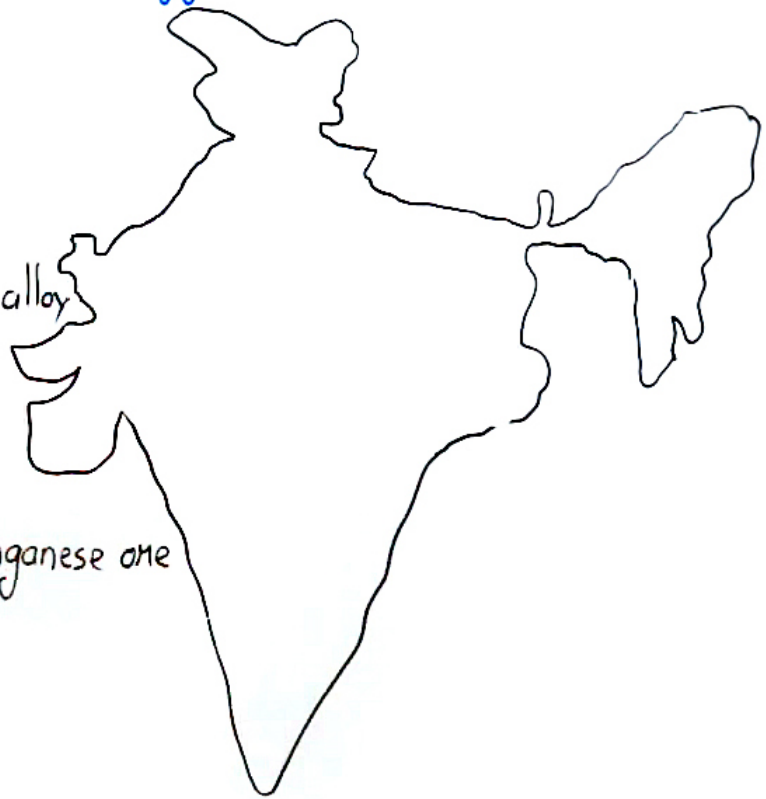
→ 3/4 of total metallic minerals, Base for Metallurgical industries

Iron ore

- → Back bone of Industrial Development.
- → Magnetite [70% of Iron Content]
  - Excellent magnetic qualities
- → Hematite [50-60% of Content]
  - Industrial iron

Manganese

- → used in making steel and ferro-manganese alloy
- → 10 kg in 1 tonne of steel
- → used in manufacturing bleaching powder Insecticides and paints
- → Orissa is the largest producer of manganese ore



✳ How a "deposit" or "Reserve" turns into Mine??

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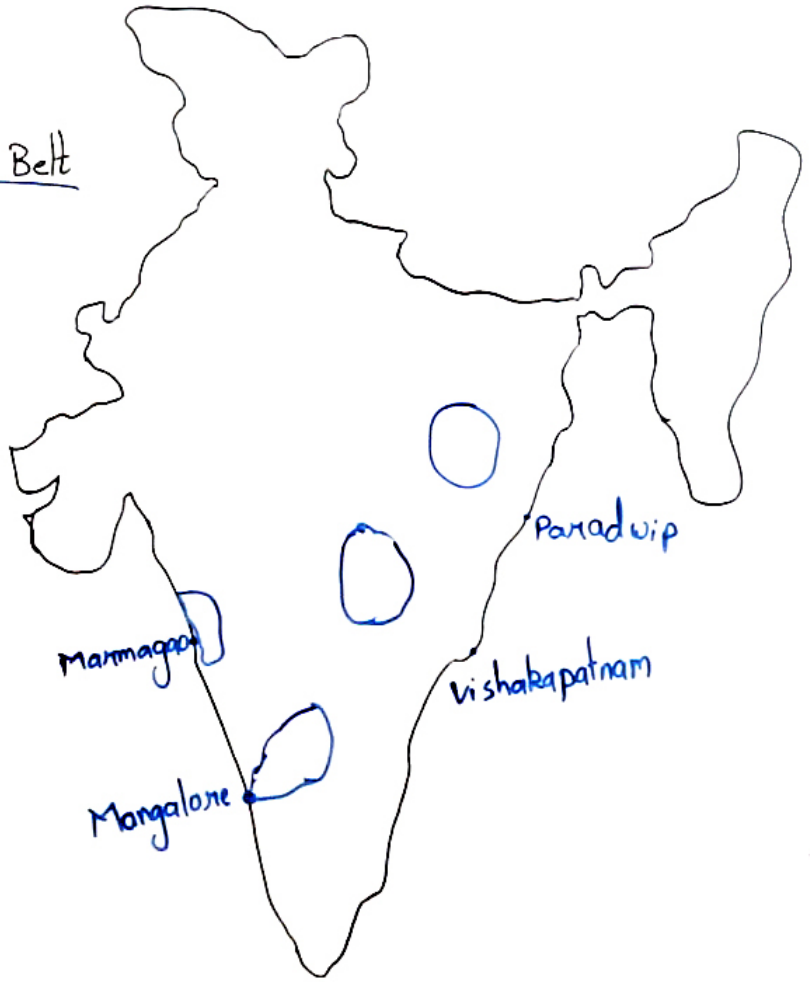
Major iron ore belts in India

(i) Orissa - Jharkhand belt
- → Hematite ore found in Badampahar, Gua and Noamundi
- → Port → Paradwip port

(ii) Durg - Bastar - chandrapur
- → Chhattisgarh and Maharashtra
- → Hematite ore found in Bailadila range of Bastar district
- → Port → Vishakapatnam [Japan and South Korea]

(iii) Bellary - chitradurga - Chikmaglur - Tumkur
- → kudermukh Mines is 100% export unit
- → Port - Manglore [Through Pipe line]

(iv) Maharashtra - Goa Belt
- → Goa and Ratnagir District of Mah.
- → Port - Marmagao



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Non-ferrous Minerals

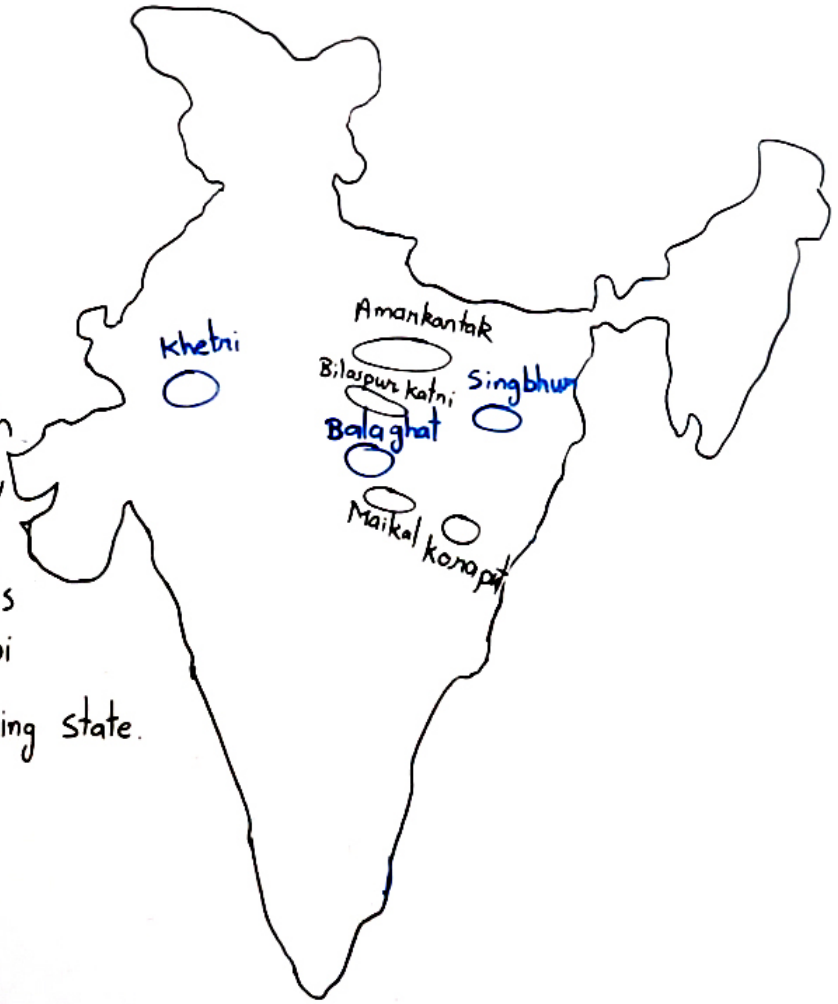
- Not Sufficient
- Minerals such as Copper, bauxite, lead, Zinc and gold
- Used in metallurgical, engineering and electrical Indusdies.

(i) Copper

- India is Critically deficient in Copper production
- Malleable, ductile and a good Conductor. Therefor have high demand.
- Balaghat Mine produces 52% of total Copper
- Singbhum district and Khetri mines

(ii) Bauxite

- Bauxite → alumina → aluminium
- Strength of metals e.g iron with Extreme lightness, Good Conductivity and great malleability.
- Amarkantak plateau, maikal hills plateau region of Bilaspur - katni
- Orissa → largest Bauxite producing state.



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Non-Metallic Minerals and Rock Minerals

(i) Mica

→ Mode of Series of plates.

→ used in electronic industries due to di-electric strength, low power loss factor, insulating properties and resistance to high voltage.

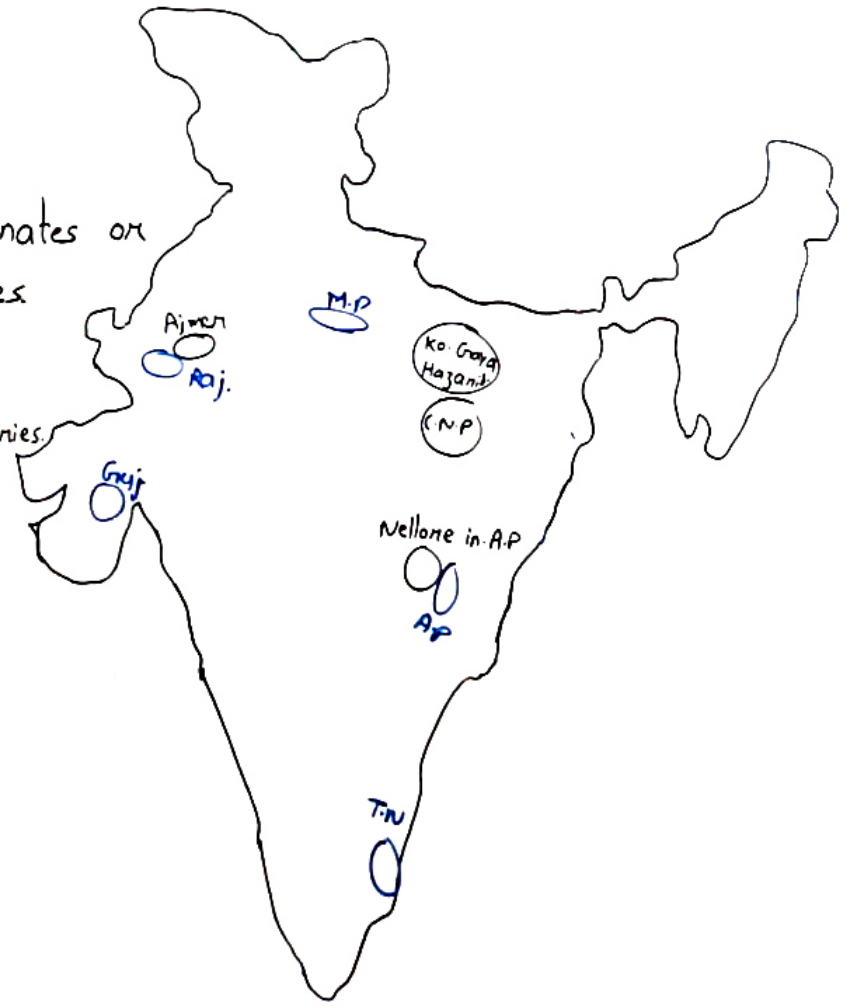
→ Chota nagpur plateau, Kaderma Gaya-Hazaribogh, Ajmer, Rajasthan and Nellore Mica belt of A.P

(ii) Limestone

→ Rock Composed of Calcium Carbonates or Calcium and magnesium Carbonates

→ Essential for Smelting iron ore in Blast furnaces and Cement Industries.

→ A.P, M.P, Rajasthan, Gujrat T.N and Many more.



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Hazards of Mining :

(i) Impact on Miners

- Risk of Collapsing Mine roofs
- Inundation and fire in Coalmines
- Health issues (why ??)
  - Dust and noxious fumes are inhaled.
    - Vulnerable to pulmonary diseases

(ii) Impact on Environment

- Water Source get Contaminated
- Dumping of waste and slurry
  - Degradation of land, soil and river pollution.

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Conservation of Minerals

→ Our dependence on minerals and its availibility to us.

⊙ 1 % of the earth's Crust.

→ Replenishment and mineral formation (↓) = (↑) Consumption

∴ finite and non - renewable

→ Continued extraction = (↑) Costs [[↓ Greater Depths / Decreased quality]]

→ Step for Conservation

• Improved technology, Recycling of Metals, using other alternatives and Substitutes.

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Energy Resources :

→ Nessicity of energy ??

e.g. fuel Minerals like coal, petroleum, natural gas, uranium and electricity.

• Conventional Source •

- ordinary, following the traditional way

e.g : firewood
cattle dung cake] ☆
coal
petrokum

• Non-Conventional Source •

- Not ordinary, other than traditional way

e.g : solar
wind
tidal
geothermal.

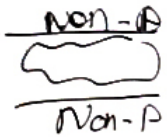
Class - X ch-5 [Geography] Minerals and Energy Resources

Conventional Sources of Energy : Natural Gas

→ Source of Energy as well as an industrial raw material.

- found in association with or without petroleum.

→ Environment friendly → low Carbon dioxide emissions



- Krishna - Godavari basin, Mumbai High, Gulf of Cambay.

→ HVJ Pipeline [Hazira - Vijaipur - Jagdishpur] = Artery to Indian Gas production

→ Power and fertilizer Industries are key users.

→ CNG [Compressed Natural Gas] is used in vehicals is replacing liquid fuels.

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Conventional Sources of Energy : Coal

→ formation ??
• Degree of Compression, Depth and time of burial.

Coal → Bulky
∴ Industries are near Coal fields.

• On the basis of quality

(i) Peat
↓ Low Carbon
↑ High Moisture
∴ Low Heating Capacity

(ii) Lignite
• Low grade brow Coal
• Soft with high moisture Content.

(iii). Bituminous
↓ Deep Inside the Earth
↑ Temprature
∴ Commercial use, Smelting

(iv). Anthracite
• Highest quality
• Hard Coal.

• On the basis of age :

(i) Gondwana Coal
→ 200 Million Coal
→ Damodar valley, Jharia, Raniganj, Bokaro

ii Tertiary Coal
→ 55 Million years ago
→ North eastern states.

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Conventional Sources of Energy : Petroleum

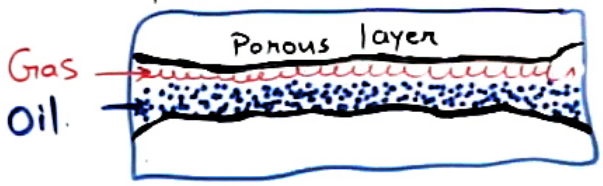
→ Petroleum Industry as a "Nodal Industry".

- Synthetic textile, fertiliser and numerous chemical Industries

→ Occurrence ??

- anticlines and fault traps in Rocks formed during tertiary age.

- Porous and non-porous layer and Gas being lighter usually occurs above the oil.



→ found In : Mumbai High, Gujrat [Ankeleshwar], Assam [Digboi].

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Conventional Sources of Energy : Electricity

→ It's Importance ??

- Per Capita Consumption is Considerd as index of development

Hydro Electricity

- Produced by Running water.
- use renewable resources
- Multipurpose river projects like Bhakra nangal, Damodar valley Corp.

Thermal electricity

- By Burning Coal, petroleum and natural gas
- use non-renewable fossil fuels.

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Non-Conventional Source of Energy : Nuclear or Atomic Energy

→ Need for it ??

- ↑ Consumption of fossil fules
  ↓
  Depletion of Resources
  ↓
  ↑ Price Rise

→ uncertinaties in future and Environmental problems.

∴ we must use renewable source of Energy
e.g solar energy, wind energy, tide and biomass.

⇓

→ obtained by altering the structure of atoms

- Uranium and thorium are used.
- found In Jharkhand, The Aravalli ranges of Rajasthan and The monazite sand of kerala [rich in Thorium].

Class - X ch-5 [Geography] Minerals and Energy Resources

Non-Conventional Source of Energy : Solar Energy & Wind Energy

→ Photovoltic technology Converts Sunlight directly into electricity.

→ The largest Solar plant of India is located at Madhopur, near Bhuj [Sterliseing milk Cans]

→ Relife for rural households

⇓

Firewood and Cowdung Cakes ↓

⇓

Environmental Conservation

Supply of Manure ↑

→ Potential of wind.

→ largest wind farm cluster Nagarcoil to madurai [T.N]

→ A.P, karnataka, Gujrat, kerala Maharashtra etc.

Class-X ch-5 [Geography] Minerals and Energy Resources

Non-Conentional Sources of Energy : Bio gas

→ Shrubs, farm waste, animal and human waste is used to make biogas.

→ Decomposition of organic matter ⟶ Gas ⟶ Higher efficiency as Compared to kerosene, dung cake and charcoal.

→ Plants using cattel dung are known as "gobar gas plants".

Twin Benifits

↙ Source of Energy

↘ quality of Manure (+) prevents the loss of trees.

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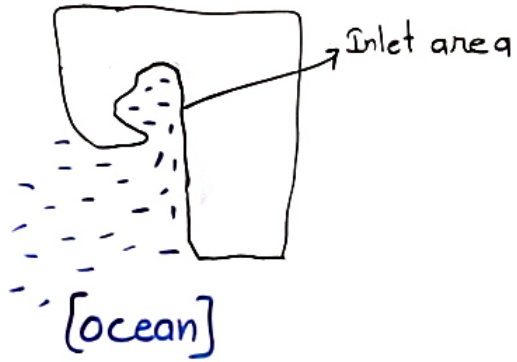
Non-Conentional Sources of Energy : Tidal Energy

→ Energy produced by tides.

(i).



(ii).

(iii).

→ Gulf of kuchchh, provides ideal Condition for utilising tidal energy.

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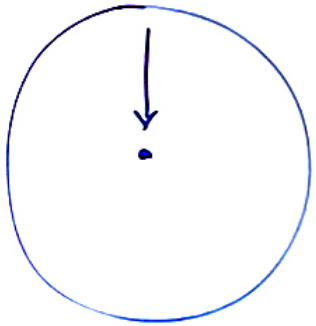
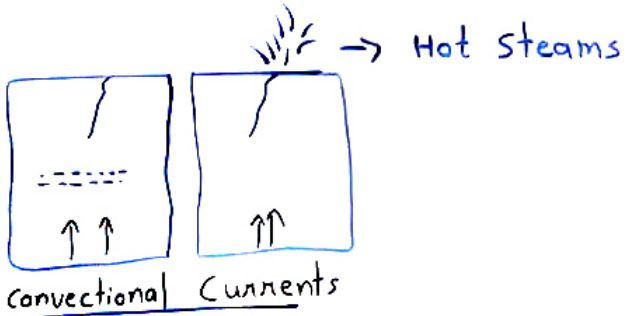
Non-Conentional Sources of Energy : Geo thermal Energy

→ Elecricity produced by the heat from the Interior of the earth



Temprature ↑

[Increase in temp. with depth]



- Two Experimental Projects :

1. Puga valley, ladakh
2. Parvati valley near manikaran, H.P

→ Water turns into steam and steam is used to rotate turbine and generate electricity

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→ Conservation of Energy resources

↑ Development = Need for the energy ↑

∴ Consumption of Energy is also Increasing.

→ we should use Sustainable energy.

- use public transportation.
- switch off electricity when not in use.
- using power saving devices.
- using non-Conventional Sources of Energy.

※ Energy Saved is Energy produced

CLASS-X (Geography) CHAPTER-5 Minerals and Energy Resources

Frequently asked questions

→ various mode of occurrance of Minerals? [specific]

→ Ferrous and Non ferrous Minerals?

→ Iron ore? Magnetite and Hematite? Iron ore belt?

→ Specific Minerals? [Bauxite, Copper, Manganese and other]

→ Hazards of Mining? Conservation of Minerals?

→ Energy Resources? [Specific Resources - Petroleum, Natural Gas, Electricity, Solar, wind etc]

→ Coal? on the basis of quality? on the basis of Age?

→ Conventional and Non-Conventional Source of energy?

→ Conservation of Energy?