Natural Resources and Indian Heritage

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Concept 1: Natural Resources

Definition

Natural resources are materials provided by nature that are useful to humans and other living organisms.

Types of Natural Resources

1. Renewable Resources

Definition

Resources that can be replenished naturally in a short period of time.

Examples

Air

Water

Sunlight

Forests

Characteristics

Can be reused.

If managed properly, they do not get exhausted.

2. Non-Renewable Resources

Definition

Resources that take millions of years to form and cannot be replaced quickly.

Examples

Coal

Petroleum

Natural gas

Minerals

Characteristics

Limited supply.

Once used, cannot be replaced easily.

Based on Origin

Biotic Resources

Obtained from living organisms.

Examples: plants, animals, forests.

Abiotic Resources

Obtained from non-living things.

Examples: air, water, soil, minerals.

Based on Distribution

Ubiquitous Resources

Found everywhere.

Example: air.

Localized Resources

Found only in specific regions.

Example: petroleum.

Importance of Natural Resources

Provide food.

Provide shelter materials.

Provide energy.

Support life processes.

Conservation of Natural Resources

Definition

Careful use and protection of natural resources.

Methods

Reduce usage.

Reuse materials.

Recycle waste.

Afforestation.

Use renewable energy.

Sustainable Development

Definition

Using resources in a way that meets present needs without affecting future generations.

Common Examination Traps

All natural resources are unlimited. Incorrect. Many are limited.
Air is non-renewable. Incorrect. It is renewable.
Coal is renewable. Incorrect. It is non-renewable.
Concept Linkage
Natural resources support agriculture, industry and human survival.
Misuse leads to environmental imbalance.

Concept 2: Atmosphere and Properties of Air

Definition
Atmosphere is the blanket of gases surrounding the Earth.
Composition of Air
Nitrogen
Approximately 78 percent.
Oxygen
Approximately 21 percent.
Carbon dioxide
Very small amount.
Other gases
Argon, water vapor and trace gases.
Importance of Atmosphere
Provides oxygen for respiration.
Provides carbon dioxide for photosynthesis.
Protects Earth from harmful solar radiation.
Maintains temperature balance.
Properties of Air
Air occupies space.
Air has mass.
Air exerts pressure.
Air is colorless, odorless and transparent.
Proof that Air Occupies Space
When an empty glass is pushed upside down into water, water does not enter because air occupies space inside the glass.
Proof that Air Has Mass
Inflated balloon weighs more than deflated balloon.
Air Exerts Pressure
Air pressure acts in all directions.
When air is removed from inside a container, external air pressure can crush it.
Wind
Moving air is called wind.
Caused by uneven heating of Earth’s surface.
Uses of Air
Breathing.
Burning.
Flying aircraft.
Drying clothes.
Air Pollution
Definition
Contamination of air by harmful substances.
Sources
Vehicle exhaust.
Factories.
Burning fuels.
Dust.
Effects
Respiratory diseases.
Global warming.
Acid rain.
Prevention
Planting trees.
Using clean fuels.
Reducing vehicle use.
Common Examination Traps
Air has no weight. Incorrect. Air has mass.

Oxygen is highest component in air. Incorrect. Nitrogen is highest.
Air pressure acts only downward. Incorrect. It acts in all directions.
Advanced Understanding
Air pressure decreases with altitude.
Atmosphere is divided into layers such as troposphere and stratosphere.
Concept Linkage
Air is essential natural resource.
Maintains life and climate balance.

Concept 3: Water – Properties, Sources and Purification

Definition
Water is a natural resource essential for life. It is a universal solvent and exists in solid, liquid and gaseous states.
Sources of Water
Rain
Rivers
Lakes
Ponds
Groundwater
Glaciers
Water Cycle
Definition
Continuous movement of water between Earth's surface and atmosphere.
Processes
Evaporation
Water changes from liquid to vapor due to heat.
Condensation
Water vapor cools and forms clouds.
Precipitation
Water falls as rain, snow or hail.
Collection
Water collects in rivers, lakes and oceans.
Properties of Water
Colorless, odorless and tasteless.
Has definite volume but no fixed shape.
Dissolves many substances.
Changes state with temperature.
States of Water
Solid
Ice.
Liquid
Water.
Gas
Water vapor.
Importance of Water
Drinking.
Cooking.
Agriculture.
Industries.
Sanitation.
Water Pollution
Definition
Contamination of water bodies by harmful substances.
Causes
Industrial waste.
Sewage.
Agricultural chemicals.
Oil spills.
Effects
Waterborne diseases.
Harm to aquatic life.
Unfit for drinking.
Water Purification Methods

Sedimentation
Heavy impurities settle at bottom.
Decantation
Clear water poured off from top after sedimentation.
Filtration
Removal of insoluble impurities using filter.
Boiling
Kills germs.
Chlorination
Adding chlorine to kill microorganisms.
Distillation
Evaporation followed by condensation to obtain pure water.
Potable Water
Water safe for drinking.
Water Conservation
Use water carefully.
Repair leaks.
Rainwater harvesting.
Reuse water where possible.
Common Examination Traps
Boiling removes all impurities. Incorrect. It kills germs but does not remove dissolved salts.
Sedimentation removes dissolved impurities. Incorrect. It removes heavy insoluble particles.
Evaporation and condensation together form distillation.
Advanced Understanding
Water expands on freezing.
Ice floats due to lower density.
Groundwater is stored in aquifers.
Concept Linkage
Water supports agriculture and life.
Purification ensures health and prevents disease.

Concept 4: Soil – Formation, Composition and Conservation

Definition
Soil is the top layer of the Earth's surface that supports plant growth.
Formation of Soil
Soil is formed by weathering of rocks over long periods of time.
Weathering
Breaking down of rocks into smaller particles due to physical, chemical and biological processes.
Agents of Weathering
Water
Wind
Temperature changes
Living organisms
Soil Profile
Layers of Soil
Topsoil
Uppermost layer.
Rich in humus and nutrients.
Supports plant growth.
Subsoil
Below topsoil.
Contains minerals and less organic matter.
Bedrock
Hard rock layer below subsoil.
Components of Soil
Mineral particles
Humus
Air
Water
Humus
Dark organic matter formed by decomposition of dead plants and animals.

Improves soil fertility.
Types of Soil
Sandy Soil
Large particles.
Drains water quickly.
Less fertile.
Clayey Soil
Very fine particles.
Holds water for long time.
Less aeration.
Loamy Soil
Mixture of sand, clay and humus.
Best for plant growth.
Importance of Soil
Supports plant life.
Provides nutrients.
Habitat for organisms.
Used in construction.
Soil Erosion
Definition
Removal of topsoil by wind or water.
Causes
Deforestation
Overgrazing
Heavy rainfall
Floods
Effects
Loss of fertile soil.
Reduced crop yield.
Environmental imbalance.
Soil Conservation
Afforestation
Planting trees.
Contour ploughing
Ploughing along contours of land.
Terrace farming
Step-like fields on hills.
Avoid overgrazing.
Common Examination Traps
Humus is mineral. Incorrect. It is organic matter.
Clay soil is most fertile. Incorrect. Loamy soil is most suitable.
Soil forms in few years. Incorrect. It takes thousands of years.
Advanced Understanding
Topsoil is most important for agriculture.
Soil fertility depends on humus and nutrient content.
Concept Linkage
Soil supports agriculture.
Conservation ensures sustainable food production.

Concept 5: Rocks and Minerals

Definition
Rocks are naturally occurring solid masses made up of one or more minerals.
Minerals are naturally occurring inorganic substances with definite chemical composition and properties.
Types of Rocks

1. Igneous Rocks

Formed from cooling and solidification of molten magma or lava.
Intrusive Igneous Rocks
Formed inside Earth.
Example: granite.
Extrusive Igneous Rocks
Formed on Earth’s surface.

Example: basalt.
Characteristics
Hard and strong.
No layers.
No fossils present.

1. Sedimentary Rocks

Formed by deposition and compression of sediments over long time.
Examples
Sandstone
Limestone
Shale
Characteristics
Layered structure.
May contain fossils.

1. Metamorphic Rocks

Formed when existing rocks change due to heat and pressure.
Examples
Marble (from limestone)
Slate (from shale)
Characteristics
Hard and compact.
Crystalline structure.
Rock Cycle
Igneous rock → Weathering → Sediments → Sedimentary rock → Heat and pressure → Metamorphic rock → Melting → Magma → Igneous rock.
Minerals
Definition
Basic substances that make up rocks.
Examples
Iron
Copper
Gold
Quartz
Mica
Properties of Minerals
Color
Hardness
Luster
Density
Uses of Rocks
Granite
Used in construction.
Marble
Used in statues and buildings.
Slate
Used for roofing and writing slates.
Uses of Minerals
Iron
Making tools and machines.
Copper
Electrical wires.
Gold
Jewellery.
Common Examination Traps
Granite is sedimentary rock. Incorrect. It is igneous rock.
Marble is sedimentary rock. Incorrect. It is metamorphic rock.
Rocks are made of soil. Incorrect. Soil is formed from rocks.
Advanced Understanding
Sedimentary rocks provide fossil evidence.
Metamorphism changes structure but not basic chemical composition.
Concept Linkage
Rocks form soil through weathering.

Minerals are extracted as natural resources.

Concept 6: Forests and Wildlife

Definition
A forest is a large area covered mainly with trees and other vegetation.
Wildlife refers to animals, birds and insects living naturally in forests.
Types of Forests in India
Tropical Rainforest
High rainfall.
Dense trees.
Tropical Deciduous Forest
Trees shed leaves in dry season.
Example: teak forest.
Thorn Forest
Low rainfall areas.
Plants have thorns.
Example: cactus.
Mountain Forest
Found in hilly regions.
Example: pine.
Importance of Forests
Provide oxygen.
Absorb carbon dioxide.
Prevent soil erosion.
Maintain rainfall pattern.
Provide habitat to wildlife.
Provide timber and medicinal plants.
Wildlife
Definition
Animals living in natural habitats without human control.
Importance
Maintain ecological balance.
Help in pollination and seed dispersal.
Maintain food chains.
Food Chain in Forest
Plants → Herbivores → Carnivores.
Example
Grass → Deer → Tiger.
Deforestation
Definition
Cutting down trees on large scale.
Causes
Agriculture expansion.
Urbanization.
Industries.
Logging.
Effects
Soil erosion.
Floods.
Loss of biodiversity.
Climate change.
Conservation of Forests and Wildlife
Afforestation
Planting new trees.
Wildlife Sanctuaries
Protected areas for animals.
National Parks
Large protected forest areas.
Biosphere Reserves
Conserve entire ecosystem.
Examples in India
Jim Corbett National Park

Kaziranga National Park
Sundarbans Biosphere Reserve
Endangered Species
Species at risk of extinction.
Example
Tiger
Elephant
Common Examination Traps
All forests receive heavy rainfall. Incorrect. Thorn forests receive low rainfall.
Wildlife lives only in national parks. Incorrect. Wildlife lives in all natural habitats.
Deforestation increases rainfall. Incorrect. It reduces rainfall.
Advanced Understanding
Forests act as carbon sinks.
Biodiversity ensures ecosystem stability.
Concept Linkage
Forests depend on soil and water.
Wildlife depends on forests.
Conservation ensures sustainable natural resource use.