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S1 New Curriculum chemistry

Theme: Earth and space

S1 New Curriculum Chemistry Chapter 9 – Rocks and minerals

Rocks

Rocks are solid, natural substances composed of minerals. They make up Earth's crust and come in different types based on how they form:

1. **Igneous Rocks** – Formed from cooled magma or lava. Examples include granite and basalt.
2. **Sedimentary Rocks** – Created by the accumulation and compression of sediments over time. Examples include limestone and sandstone.
3. **Metamorphic Rocks** – Formed when existing rocks undergo extreme heat and pressure, changing their structure. Examples include marble and slate.

Examples of Igneous Rocks



Granite



Basalt

Examples of Sedimentary Rocks



Limestone



Sand stone

Examples of Metamorphic Rocks



Marble



Slate

Uses of rocks

Construction – Used in buildings, roads, bridges, and dams.

Jewelry & Decoration – Precious stones like diamonds, rubies, and emeralds are cut and polished for jewelry.

Manufacturing – Limestone is used in cement production, while granite and marble are used for countertops and flooring.

Energy Production – Some rocks, like coal, are burned for fuel, while others contain minerals used in nuclear energy.

Agriculture – Crushed rocks improve soil quality and drainage.

Tools & Equipment – Hard rocks like flint were historically used for making tools.

Water Filtration – Certain porous rocks help purify water.

Landscaping – Used for pathways, garden features, and erosion control.

Some Examples of uses of rocks



Decoration made out of rocks



Dining set of rocks

Minerals

Minerals are naturally occurring substances with a **specific chemical composition** and **crystalline structure**. They are the building blocks of rocks and are essential for various industries and biological functions.

Characteristics of minerals

- **Inorganic** – Minerals are not formed by biological processes.
- **Solid** – They exist in solid form under normal conditions.
- **Naturally Occurring** – Found in nature, not artificially created.
- **Definite Composition** – Each mineral has a unique chemical formula.
- **Crystalline Structure** – Their atoms are arranged in an orderly pattern.

Examples include **quartz, feldspar, calcite, gold, diamond, and hematite**.

Minerals are used in construction, technology, jewelry, and even nutrition (like calcium and iron in the human body).

Differences between Rocks and Minerals

Minerals and rocks are closely related but have distinct differences. Here's how they compare:

- **Composition** – Minerals are pure substances with a definite chemical formula, while rocks are made up of multiple minerals and other materials.
- **Structure** – Minerals have a crystalline structure, meaning their atoms are arranged in a specific, orderly pattern. Rocks, on the other hand, can have varied textures and structures depending on how they form.
- **Formation** – Minerals form through natural processes like crystallization, evaporation, or cooling. Rocks are classified into igneous, sedimentary, and metamorphic types based on how they are formed.
- **Identification** – Minerals have specific properties such as hardness, color, and luster, while rocks are identified based on their mineral content and texture.
- **Uses** – Minerals are used in jewelry, industry, and nutrition, whereas rocks are primarily used in construction, sculptures, and historical artifacts.

Weathering

Weathering is the process by which rocks and minerals break down due to natural forces like wind, water, temperature changes, and biological activity. It plays a crucial role in shaping landscapes and forming soil.

Types of weathering:

- (i) **Physical Weathering** – Breakdown of rocks without chemical changes, caused by temperature fluctuations, freeze-thaw cycles, and abrasion from wind or water.
- (ii) **Chemical Weathering** – Changes in the chemical composition of rocks due to reactions with water, oxygen, acids, or other substances. This can lead to the formation of new minerals.
- (iii) **Biological Weathering** – Caused by living organisms like plants, fungi, and bacteria. Roots can grow into cracks, breaking rocks apart, while microbes produce acids that dissolve minerals.

Revision questions

1. (a) What is a rock?

(b) Name three major types of rocks and explain how they are formed
2. Distinguish between rocks and minerals.
3. Give the various uses of rocks and minerals

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Thanks

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