CHAPTER 2 Content Outline for Teaching

Minerals

Underlined words and phrases are to be filled in by students on the Note-taking Worksheet.

Section 1 Minerals

A. Mineral—four characteristics
   1. Naturally occurring—formed by processes on or inside Earth with no input from humans
   2. Inorganic—not made by life processes
   3. Element or compound with a definite chemical composition
   4. Orderly arrangement of atoms; all minerals are crystalline solids.

B. Crystal—solid with atoms arranged in orderly, repeating patterns
   1. Some crystals form from **magma**, hot melted rock below the Earth's surface.
      a. When magma cools slowly, crystals are large.
      b. When magma cools quickly, crystals are small.
   2. Crystals can form from solutions as water evaporates or if too much of a substance is dissolved in water.

C. Mineral groups are defined by their composition.
   1. **Silicates** contain silicon, oxygen, and one or more other elements; they include most common rock-forming minerals.
   2. Silicon and oxygen are the two most abundant elements in Earth's crust; they form the building blocks of many minerals.

Discussion Question

What processes can cause crystals to form? Crystals form from cooling magma, from evaporating solutions, and from solutions in which too much of a substance is dissolved.

END

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Section 2 Mineral Identification

A. Color and appearance are not enough to distinguish most minerals.

B. **Hardness** is a measure of how easily a mineral can be scratched; the Mohs scale compares mineral hardness.

C. The way a mineral reflects light is its **luster.**

1. Can be metallic or nonmetallic
2. Nonmetallic lusters include dull, pearly, silky, and glassy.

D. **Specific gravity** is the ratio of a mineral's weight to the weight of an equal volume of water; expressed as a number.

E. **Streak** is the color of a mineral in powdered form, but the streak test is useful only for minerals softer than the streak plate.

F. The way a mineral breaks can be a distinguishing characteristic.

1. Minerals with **cleavage** break along smooth, flat surfaces.
2. Minerals with **fracture** break with uneven, rough, or jagged surfaces.

G. Some minerals have unique properties that involve light or magnetism.

Discussion Question

What are five properties that could be examined to identify a mineral? hardness, luster, specific gravity, streak, cleavage, and fracture

END

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Section 3 Uses of Minerals

A. Gems—rare and beautiful minerals that are highly prized
   1. The Cullinan diamond and the Hope diamond are famous historical gems.
   2. Gems have industrial applications in abrasives, lasers, and electronics.

B. Minerals can contain other useful elements.
   1. An ore is a mineral or rock containing a substance that can be mined at a profit.
   2. Elements must be refined, or purified, from ores.
   3. Some elements dissolve in fluids, travel through weaknesses in rocks, and in those weaknesses form mineral deposits called vein mineral deposits.
   4. Titanium is a useful element derived from the minerals ilmenite and rutile.

Discussion Question

What are three industrial applications for gems? abrasives, lasers, electronics

END