

Chapter Three: Minerals

Lesson 1: What is a Mineral?

Deodorant, shampoo, makeup, jewelry, or zippers are made of minerals.

Rocks are made of minerals, but minerals are not made of rocks

5 Questions we ask to determine if it is a mineral or not:

1. **Is it formed in nature?**
 - a. Minerals are formed in nature. There are 30 common minerals.
2. **Does it have a definite chemical composition?**
 - a. All minerals are made up of elements from the periodic table with their own definite chemical composition.
3. **Does it have a crystalline structure?**
 - a. Minerals are crystals with a repeating inner structure
4. **Is it a solid?**
 - a. Minerals can not be gases or liquids or solids without a crystal form.
5. **Is it nonliving material?**
 - a. Minerals are inorganic...meaning it isn't made of living things

Mineral: a naturally occurring, inorganic solid with a definite chemical composition and an orderly arrangement of atoms or ions (or with a crystalline structure)

- Have to answer “yes” to all five questions above

Crystals: a solid of a chemical substance with a regular, repeating arrangement of its atoms

- A crystals' shape is determined by the arrangement of the atoms

Types of minerals: based on the elements they are composed of:

1. **Silicate minerals:**

- a. Silicon (Si) and Oxygen (O)
- b. Two most common elements in the Earth's crust
- c. Ex. Feldspar, mica, quartz
- d. Feldspar is the most common silicate mineral in Earth's crust

2. **Nonsilicate minerals:**

- a. Do not contain Silicon (Si)
- b. Made up of Carbon, Oxygen, Iron, and/or Sulfur
- c. Several Classes
 - i. **Native Elements:** only composed of one element
 - Gold , platinum, diamond, copper, sulfur, and silver
 - ii. **Carbonates:** minerals with combinations of carbon and oxygen
 - Calcite (CaCO_3)
 - iii. **Halides:** compounds that form when atoms from Group 17 combine with Groups 1 or 2
 - Halite (NaCl)
 - iv. **Oxides:** compounds that form when Aluminum or Iron combine with oxygen
 - Corundum (Al_2O_3)
 - v. **Sulfates:** contain sulfur and oxygen (SO_4)
 - Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$)
 - vi. **Sulfides:** lead, iron, or nickel combined with sulfur
 - Galena (PbS)

Crystallization: occurs when particles dissolved in a liquid solidify and form crystals

Magma: molten rock beneath Earth's surface

Lava: molten rock on or near Earth's surface