

Earth Science
Chapter 3



Mineral

- **is a naturally occurring, inorganic solid with a definite structure and composition**
 - **Minerals are inorganic**
 - **Minerals formed by natural processes**
 - **Minerals are solids**
 - **Minerals are elements or compounds with a chemical composition unique to that mineral**
 - **Atoms in minerals are arranged in repeating patterns**

The structure of minerals

- **Crystal – a solid in which the atoms or compounds are in repeating patterns**
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How Crystals Form



- Evaporates – when a liquid evaporates it leaves the crystal behind
- Precipitate - when crystals fall out of a solution because it becomes too concentrated

Crystal Shapes

- **Cubic,**
- **tetragonal,**
- **hexagonal,**
- **orthorhombic,**
- **monoclinic,**
- **triclinic**

hexagonal



Crystal forms



Galena Cubes



Pyrite Pyritohedrons



Hexagonal Beryl



Calcite Scalenohedrons



Tabular Wulfenite



Prismatic Stibnite

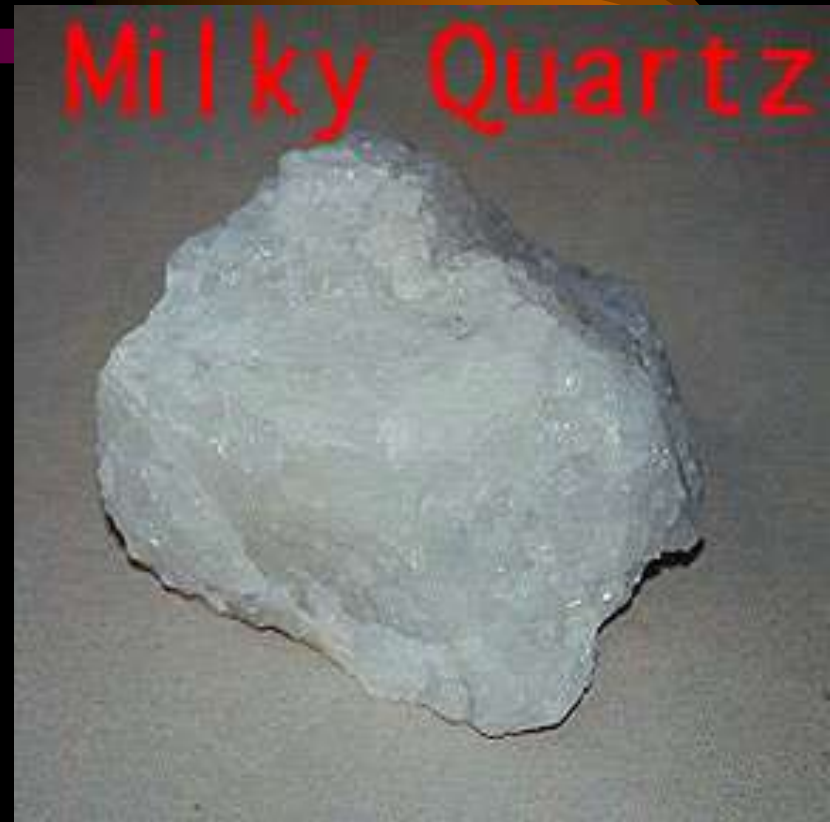
How minerals form



- **Magma – Molten rock**
- **Evaporate – water evaporates leaving behind the crystal solid**
- **Precipitates – the dissolved crystals become so concentrated that they fall out of the solution**

Mineral compositions and Groups

- **90 naturally occurring elements**
 - 8 elements make up 98 % of the earth's crust p. 66
 - 4000 known minerals
 - The most common rock forming mineral is SiO_2
 - Calcite is also a common rock forming mineral CaCO_3

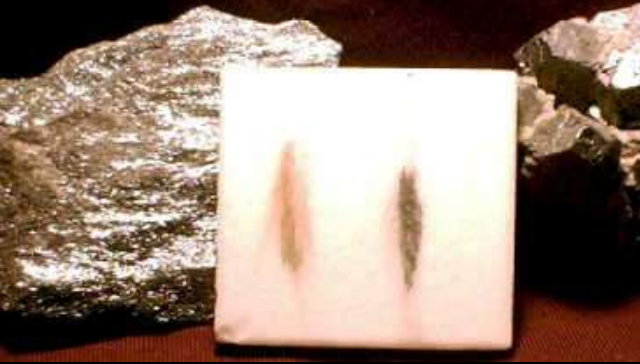


Mineral Identification

- **Minerals are identified by the following physical properties**
 - **Appearance**
 - **Texture and shape of minerals**
 - **Color**
 - **Cleavage and Fracture**
 - **Cleavage – breaking along smooth surfaces**
 - **Fracture – breaking with jagged edges**
 - **Texture**
 - **Shape of minerals**
 - **Luster**
 - **How shiny**
 - **Metallic luster**
 - **Streak – how it marks unglazed porcelain**
 - **Hardness**
 - a. **Scratch Test (mineral hardness scale p.68)**

Mineral ID

streak



color



fracture



cleavage



hardness



luster



More Examples of Cleavage



Fluorite



Halite



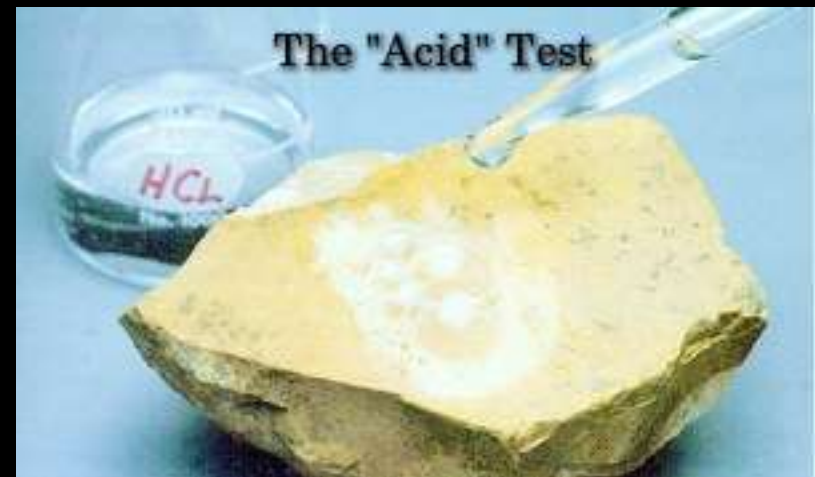
Calcite

Mohs scale of hardness

Diamond	10
Corundum	9
Topaz	8
Quartz	7
Orthoclase (feldspar)	6
Antite	5
Fluorite	4
Calcite	3
Gypsum	2
Talc	1

Other properties

- **Magnetic test**
- **HCl acid test**
- **Refraction of light**



Uses of Minerals

- **Gems**
 - Minerals that are rare and beautiful
- **Ores – minerals that contain a useful substance that can be mined for profit**
 - Iron, copper, zinc, aluminum, etc. . .
- **Mining p. 76**
- **Uses of Titanium p. 78**
- **[Internet Site](#)**

Every American Born Will Need . . .



$3\frac{3}{4}$ million pounds of minerals, metals, and fuels in a lifetime



Instructions: Answer the following questions as completely as possible in the space provided.

Earth Science Quiz

Chapter 3

• *Short Answer & Fill in the Blank:*

1. What is the shape of a halite crystal?
2. What are the three ways that minerals form?
3. What is the most common rock forming mineral?
4. Name five of the six mineral identification techniques in your chapter.
5. What is the difference between cleavage and fracture?
6. What unusual characteristic is found in the mineral magnetite?
7. Is coal considered a mineral? Why or why not?
8. How would a collector of minerals determine the hardness of an unknown mineral specimen?
9. Why is sugar not considered a mineral?
10. The color of a mineral's powder when it is scraped on porcelain is called _____
11. _____ is how light is reflected from a mineral.
12. _____ is a measurement of how easily a mineral can be scratched.
13. What is the hardest known mineral?