Earth Science

With

Mr. Thomas

Minerals

All rocks & minerals on earth are made of elements.

Minerals have the following characteristics:

- Occurs Naturally
- It is Solid
- It has a definite chemical composition
- Its atoms are arranged in an orderly pattern
- It is inorganic (never living)

How is a rock different than an mineral?

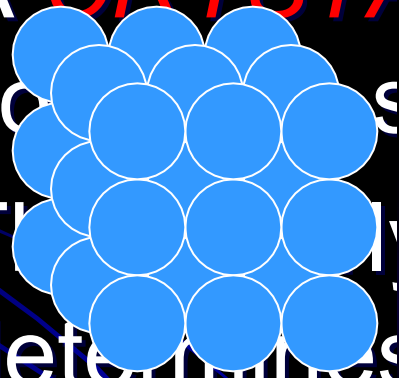
Rocks are made of minerals!!

How Do Minerals Form?

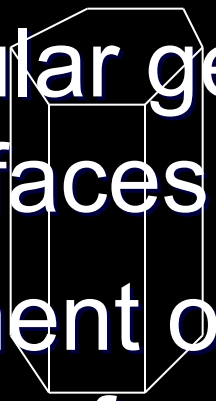
- **There are 3 ways:**
- From Molten Rock or Magma.
  - The faster it cools, the smaller the crystals!
- From Evaporating Water.
  - Forms Salts!
- From Immense Pressure.
  - Metamorphism – the changing of one rock type to another.

Mineral Structure:

- A mineral's structure is dependent upon the arrangement of the atoms.
- A *CRYSTA* gular geom
  s rfaces.
- T ment of th s determines be of a mineral's crystals:



Calcite



Quartz

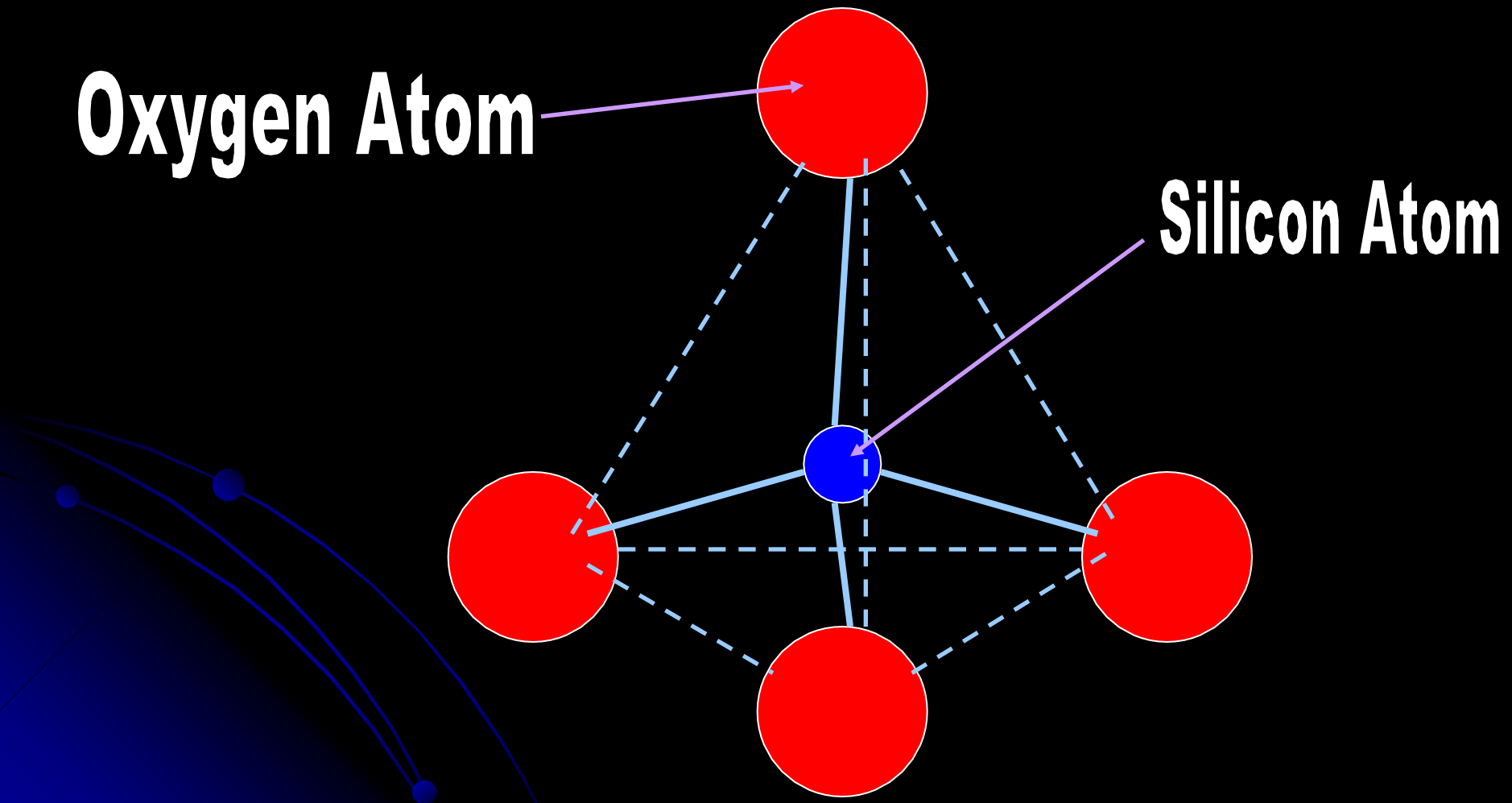
Mineral Structure:

- There are six basic crystal shapes (pg. 99 in text).

- Minerals that contain *Silicon & Oxygen* are called *Silicates.*
- These minerals have a specific crystalline structure:

Silica Tetrahedron

Silica Tetrahedron



Mineral Properties

- **Cleavage**: Tendency for a mineral to break along flat surfaces, or definite planes.
- **Fracture**: When a mineral breaks into uneven or chaotic surfaces. Opposite of cleavage.
- **Streak**: The color of a mineral's powder.
- **Hardness**: A mineral's resistance to being scratched.
- **Luster**: The way a mineral shines in light.

Metallic or Nonmetallic

Mineral Identification

- Identification by Inspection:
  - Mineral Color
  - Luster
  - Cleavage / Fracture
- Identification by Testing:
  - Streak
  - Hardness
  - Acid Test
  - Specific Gravity

Mineral Groups

- Major Silicates:
  - Over 90% of the minerals in earth's crust.
  - Compounds of oxygen, silicon, and a metal.
  - Formed via tetrahedrons.
- Carbonates:
  - Made of negatively charged carbonate ions bonded to positive metal ions. (Covalent Bonds)
- Oxides & Sulfides:
  - Contain significant amounts of IRON combined with either oxygen or sulfur.

Oxygen → Oxide

Sulfur → Sulfide

That's it