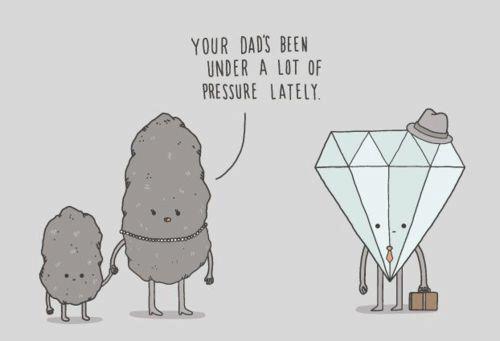
**Earth Science 11: Earth Materials**



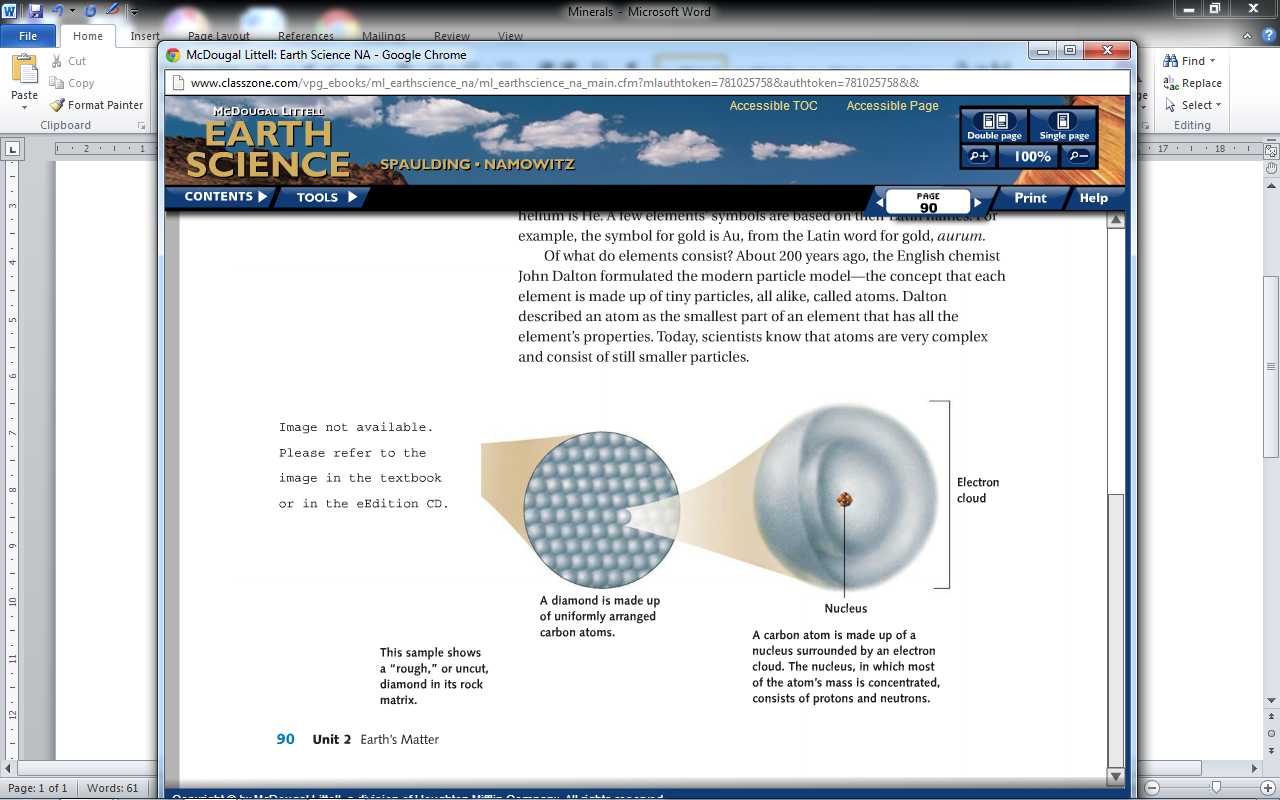
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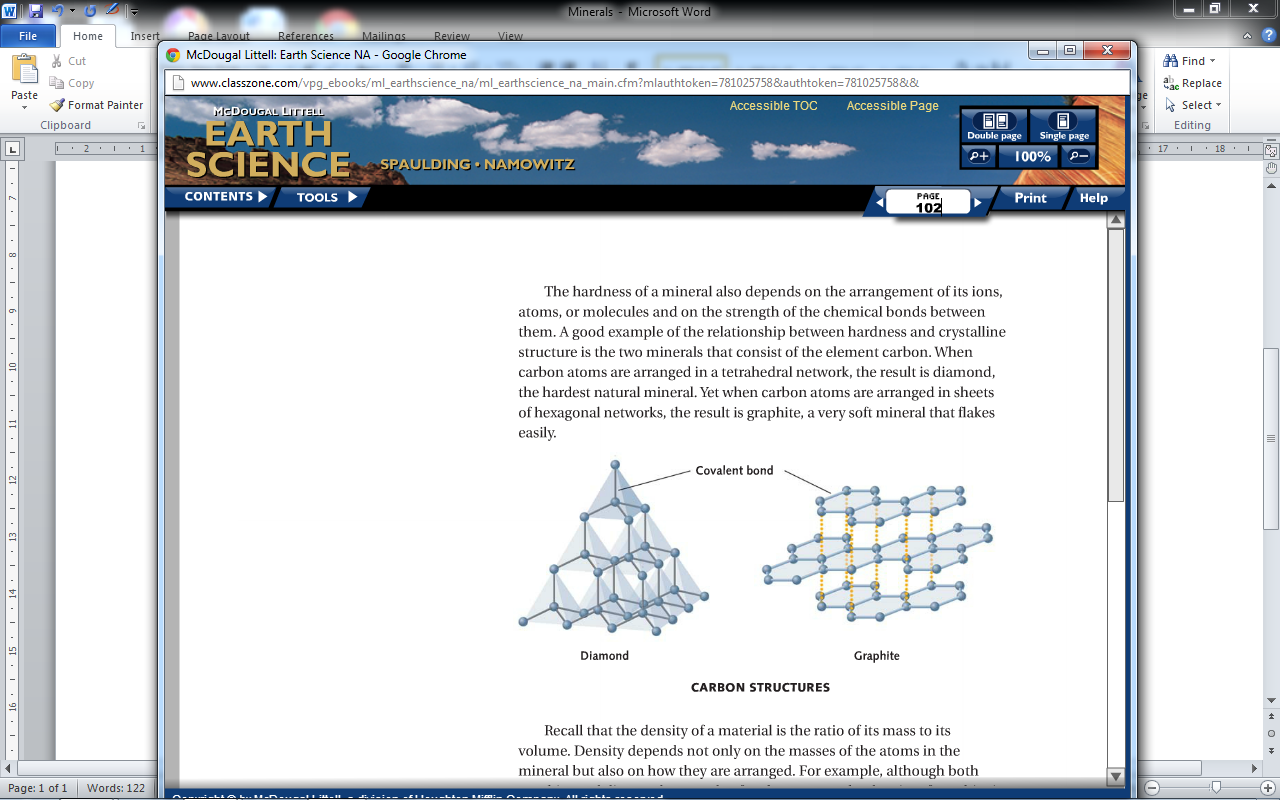
**Earth Science 11: Earth Materials: Minerals**

**Textbook: Chapter 1**

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| **1.1: Matter and Atoms** |

* Everything with mass and volume is called **MATTER** , which is made up of **ELEMENTS**.
* Elements are made up of particles called **ATOMS**.



*  the internal arrangement of atoms in a substance as this determines its properties.

**GRAPHITE AND DIAMONDS ARE MADE UP OF CARBON, BUT THE BONDS BETWEEN THE CARBON ATOMS AER DIFFERENT – DETERMINES HOW HARD EACH MINERAL IS**

**What is a Mineral?**

Minerals have the following characteristics:

1. **NATURALLY OCCURING**

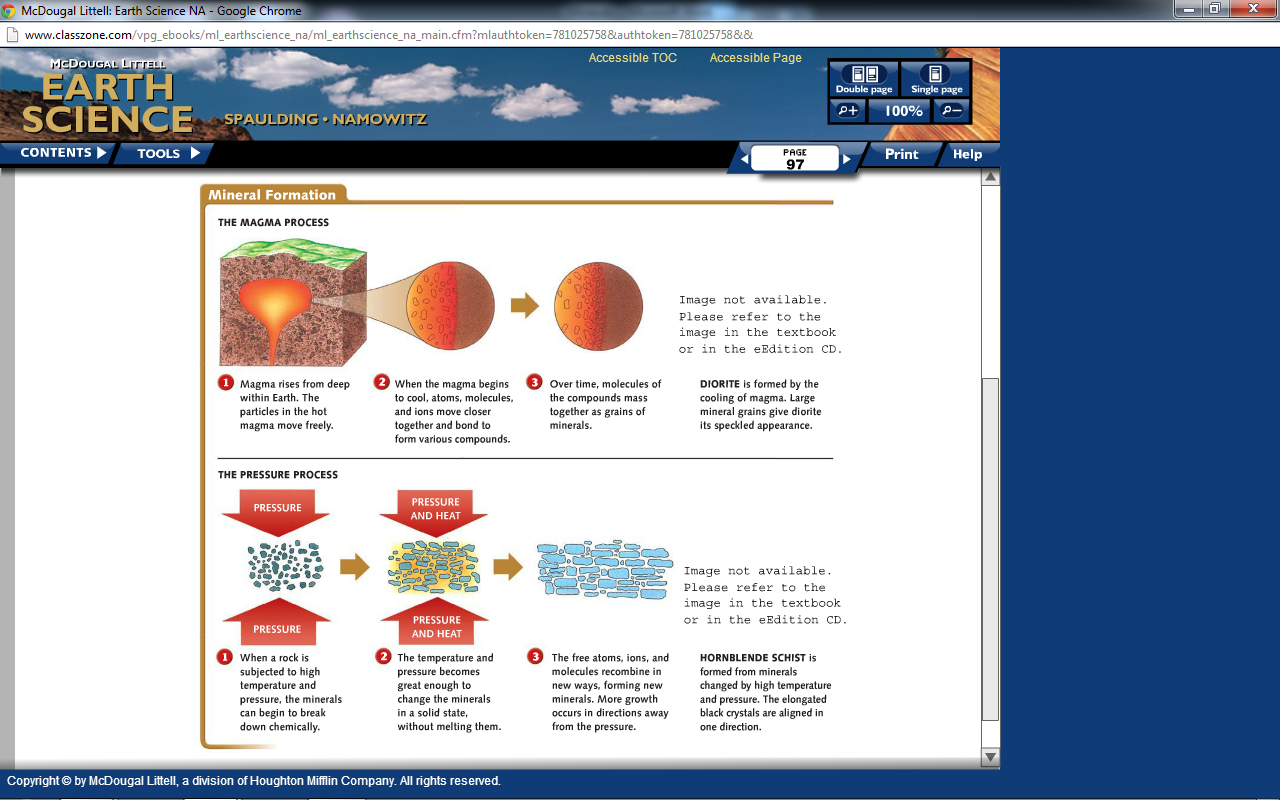
2. **SOLID**

3. **DEFINITE CHEMICAL COMPOSITION**

4. **INORGANIC (WAS NEVER ALIVE)**

5. **ATOMS ARRANGED IN AN ORDERLY PATTERN**  *Mexico’s Cueva de los Cristale*

**How do Minerals Form?**

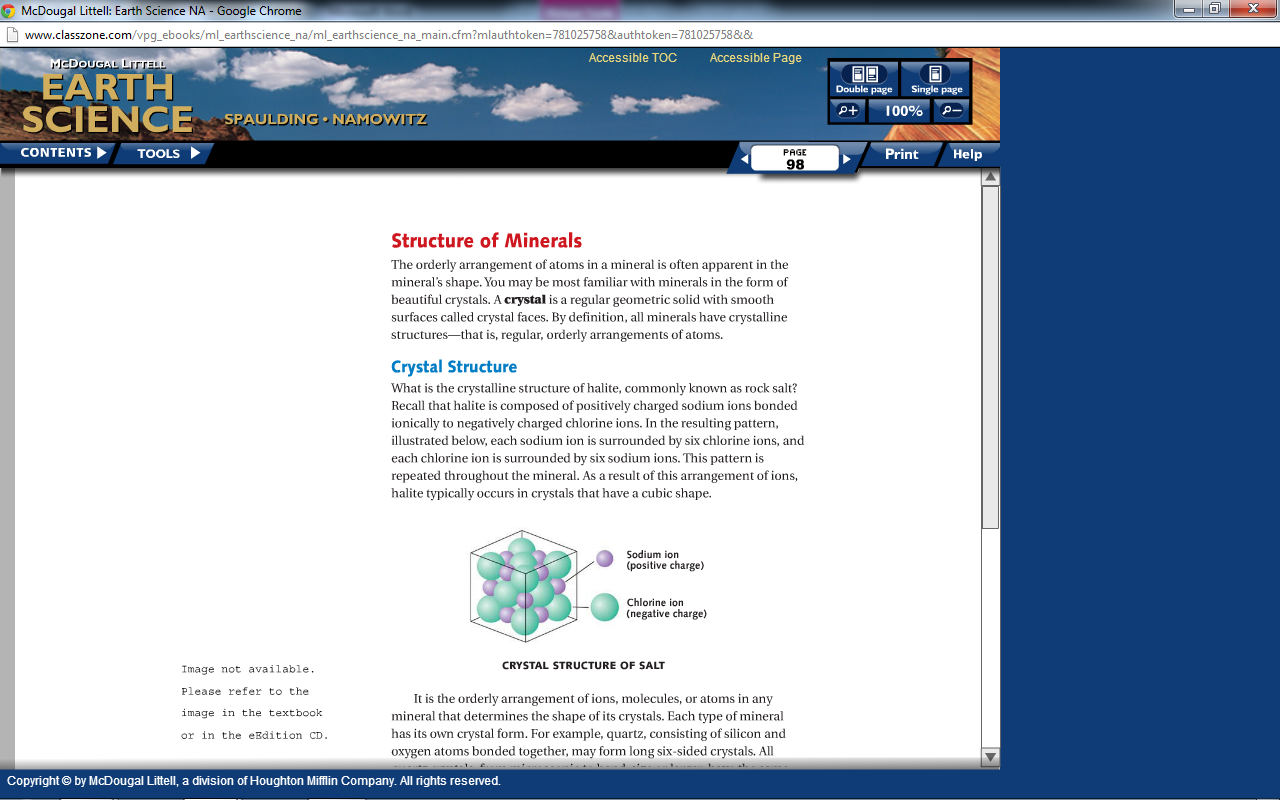


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| **1.4: Properties of Minerals** |

***\*Use workbook activities 1.1 – 1.5 (pg. 2 – 8) to investigate the properties used in mineral identification.\****

**Structure of Minerals: Crystal Faces**

* A crystal is a geometric solid with smooth surfaces called crystal faces.



* Ionic bonding between Na+ and Cl- ions results in a repeating pattern of each sodium ion being surrounded by six chlorine ions and each chlorine ion being surrounded by six sodium ions. Produces a cubic crystal (all Sodium Chloride crystals will have this shape!).
* Each mineral crystal has a unique shape that can be used to identify it.

Are crystal faces always present?

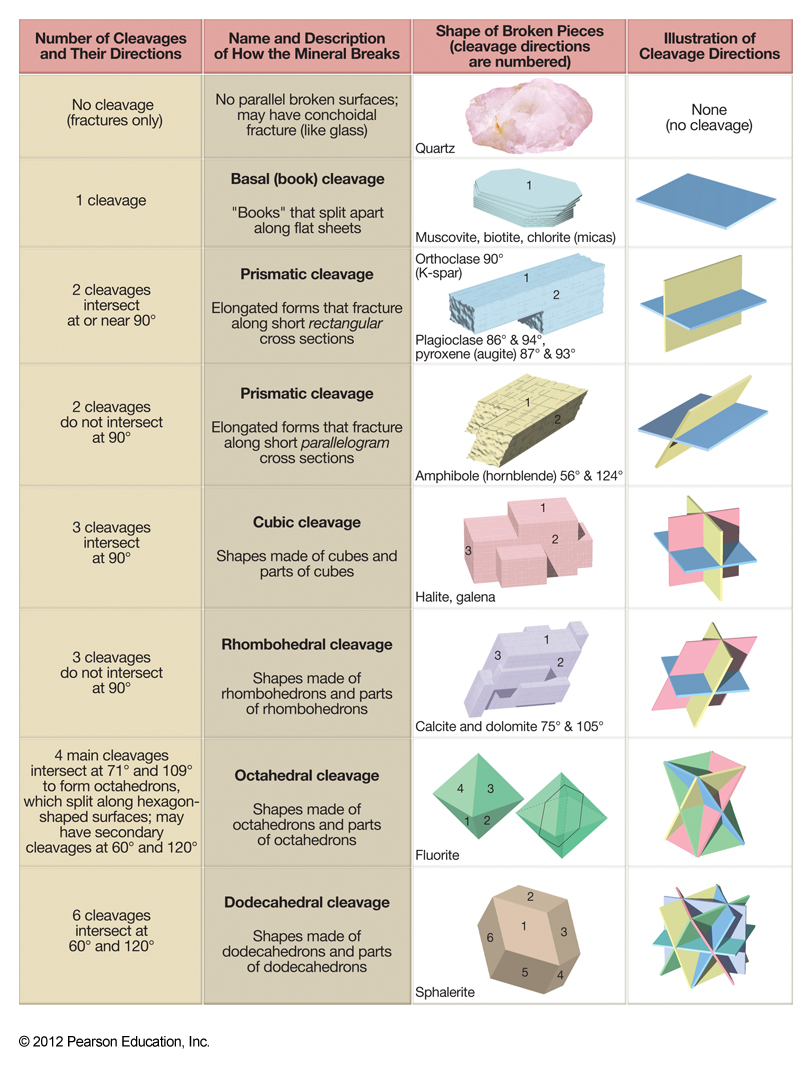
**NO, ONLY IF THERE IS ENOUGH ROOM FOR THE CRYSTAL TO GROW WHEN FORMING**

**Structure of Minerals: Mineral Cleavage**

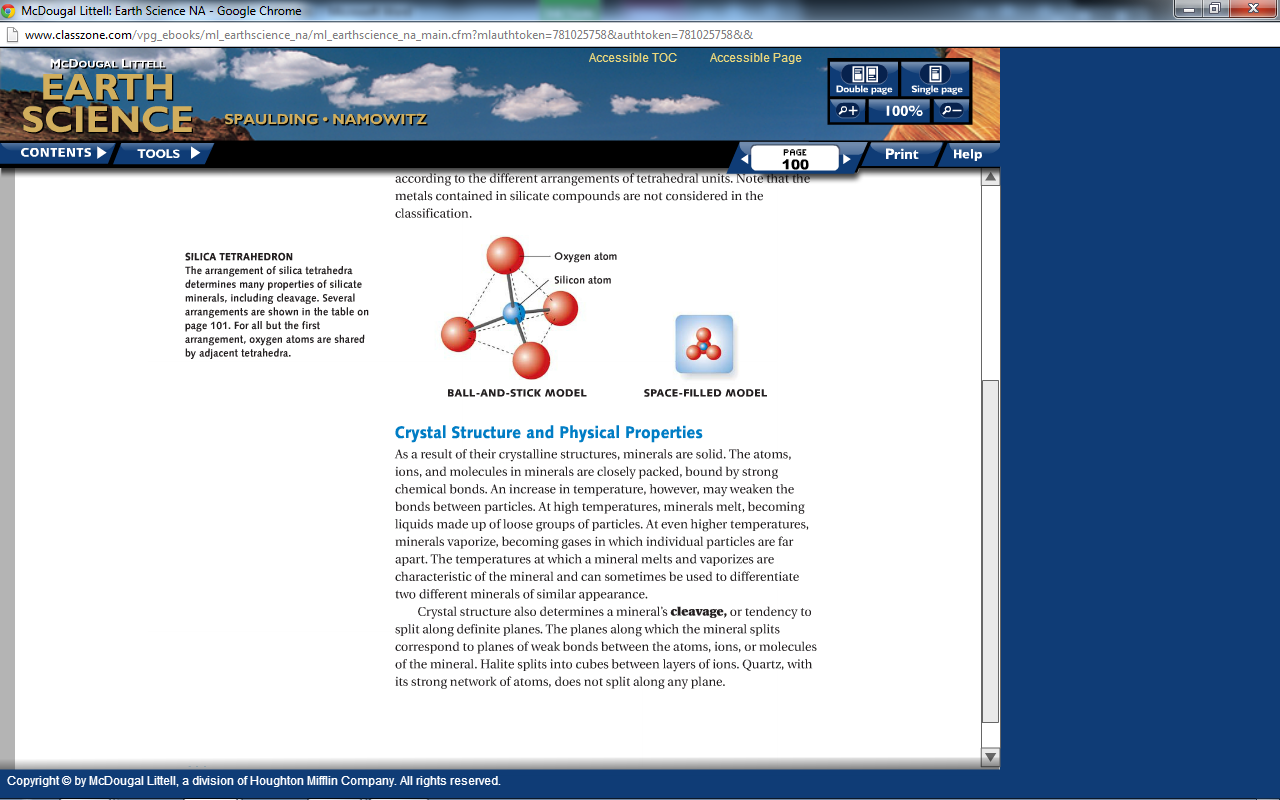
* Cleavage: **TENDENCY TO SPLIT ALONG PLANES OF WEAK BONDING**

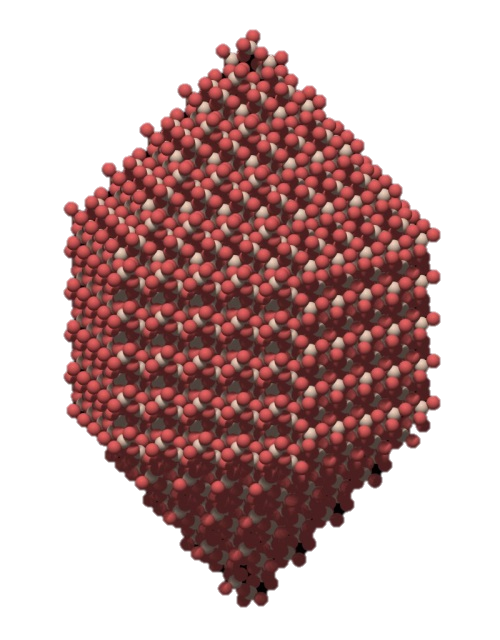
Halite (NaCl): Cubic cleavage Calcite (CaCO3): Rhombohedral cleavage.

***\*Complete Activity 1.6 (pg. 10 – 11) in your workbook***

*9 and 12 Mineral Structure: Silicates*

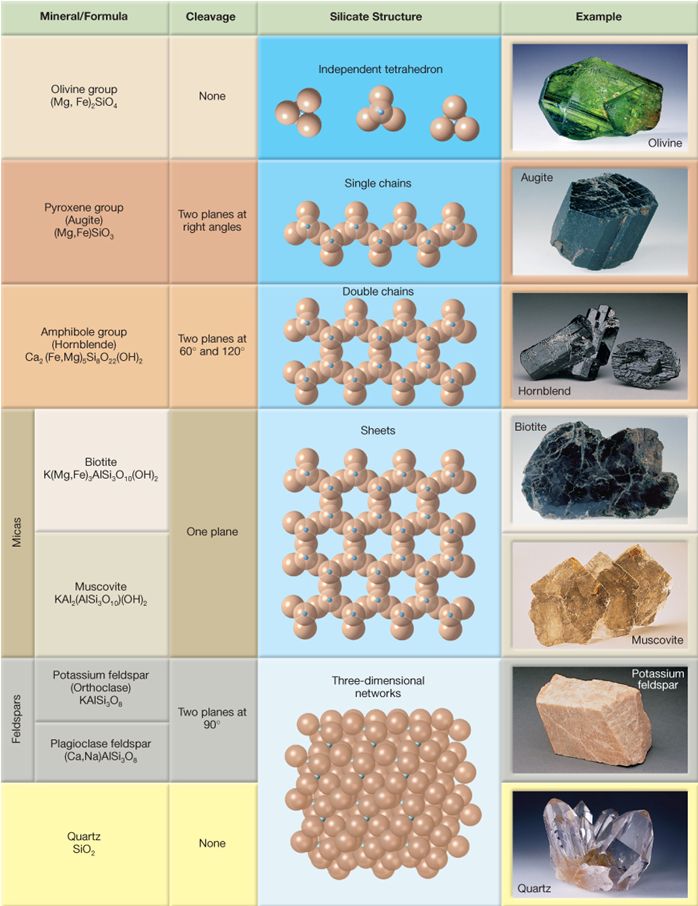
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| **1.5 Mineral Groups** |

* Minerals composed of **OXYGEN** and **SILICA** are called silicates.
  + More than **90** % of Earth’s crust are silicates
* Silica tetrahedrons are the **BASIC BUILDING BLOCKS** of silicates.





* Arrangement of silica tetrahedrons in a silicate determines many minerals characteristics such as melting point, cleavage, hardness and density.

***\*Complete Mineral ID Lab (Activity 1.9 pg.13)***