Name:_____ Date:_____ Block: _____

Unit 3: Minerals

There are _____ minerals found in the crust (pg. _____ of reference table will give common elements) but only a handful are commonly found!

- Minerals can be made of one element, _____ (ex: _____),or _____ meaning a Compound. (Example: _____)

Average Chemical Composition of Earth's Crust, Hydrosphere, and Troposphere

ELEMENT (symbol)	CRUST		HYDROSPHERE	TROPOSPHERE
	Percent by mass	Percent by volume	Percent by volume	Percent by volume
Oxygen (O)	46.10	94.04	33.0	21.0
Silicon (Si)	28.20	0.88		
Aluminum (Al)	8.23	0.48		
Iron (Fe)	5.63	0.49		
Calcium (Ca)	4.15	1.18		
Sodium (Na)	2.36	1.11		
Magnesium (Mg)	2.33	0.33		
Potassium (K)	2.09	1.42		
Nitrogen (N)				78.0
Hydrogen (H)			66.0	
Other	0.91	0.07	1.0	1.0

- **A Mineral:** _____

  _____

  _____

All common minerals and their properties are listed on page _____ of the reference table!

How Are Minerals Formed?

- 1.)_____: atoms arrange themselves as magma/lava cools

  Examples:_____
- *2.)*_____*:* Atoms rearrange themselves in already existing minerals when there is an increase in temperature and/or pressure.

  examples:_____
- 3.) _____*:* mineral comes out of solution in supersaturated water with dissolved elements

  Examples: evaporation of saltwater from oceans/lake beds form _____ _____ deposits form from supersaturated water in oceans and in caves

Minerals are identified by:

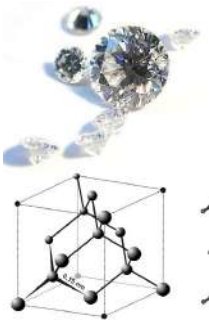
1.) Chemical Properties/Composition: _____

(Example: Graphite is made of _____)

2.) Physical Properties: _____

***A minerals physical properties are always determined by the _____**

_____!!!!!!! (Key concept)



Diamond and Graphite have the same _____ properties but have different _____ properties. This is because their internal arrangement (pictured left) is different.

Ex:

Color:

Hardness:

Mineral Identification by *Physical Properties*:

1.) Color- The problem with using color for identification is:

#1: _____

#2: _____

Examples:

2.) Luster- _____

The two types are:

1.) Metallic-

2.) Non metallic

a.)

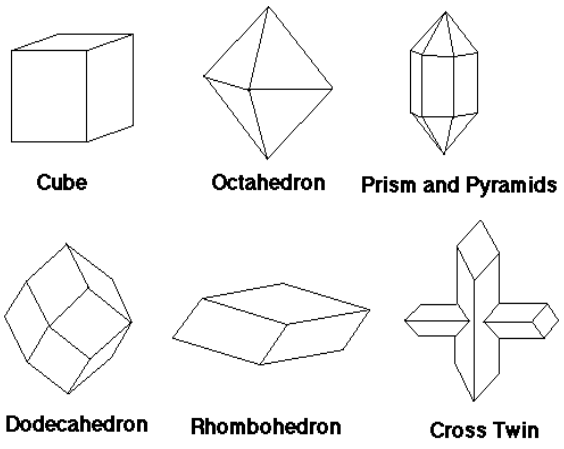
b.)

c.)

d.)

3.) Crystal "Habit" or Shape

Shape/Habit is _____ always shown by every mineral because minerals can grow in _____ conditions. This means _____ _____ and perhaps not enough _____ to grow!



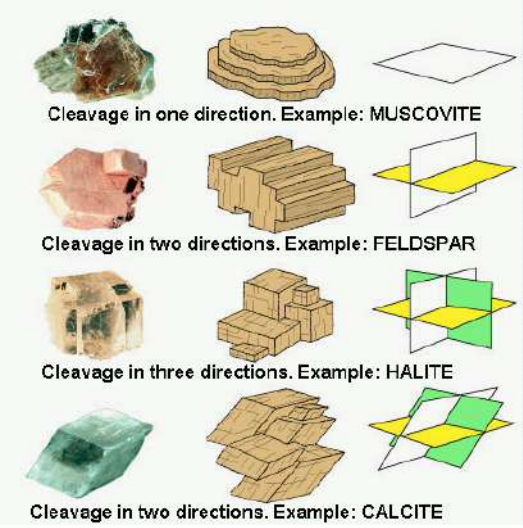
Example, Quartz:

Typically shows not habit, but if grown in a perfect environment will grow into a _____ shape.

4.) Streak- The _____ of a mineral's _____left behind after scratching a "_____" (unglazed porcelain tile)

Note: If a mineral is **harder** than the streak plate will it leave a color behind? _____

5.) Breakage of a Mineral: always look on the _____ of minerals to distinguish this property!



a.) Cleavage:

b.)Fracture:

*Note that some minerals will show both forms of breakage, _____ always dominates!

6.) Hardness (_____)

- A mineral's _____ to being _____
- Measured on a scale from _____ to _____
- A mineral is said to be _____if it scratches _____

(hardness equal to or greater than 5)

- A mineral is said to be _____if it can _____scratch glass *(hardness less than 5)*

Index Mineral	Scale	Common Objects
Diamond	10	
Corundum	9	
Topaz	8	
Quartz	7	Steel file (6.5)
Orthoclase	6	
Apatite	5	Glass (5.5) Knife blade (5.1)
Fluorite	4	Wire Nail (4.5) Penney (3.5)
Calcite	3	Fingernail (2.5)
Gypsum	2	
Talc	1	

Other special properties of minerals:

1.) **Reaction with Acid:** Some minerals will bubble with acid
Mineral Ex: _____

2.) **Fluorescence** which is when a mineral glows under black light
Mineral Ex:_____

3.) **Double Refraction** which is where light bends through a mineral causing the image to _____ Mineral Ex:

4.) **Smell:** Mineral Ex_____

5.) T**aste:** Mineral Ex:_____

6.) **Magnetism:** Some minerals contain iron which are magnetic and can be detected using a magnet

Mineral ex: _____

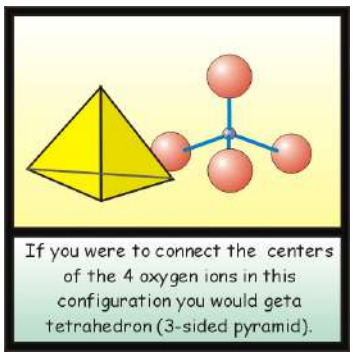
Mineral Groups:

1.) **Silicates-** are the most_____ mineral groups and are made of which two elements?

_____ & _____

These atoms combine to form the silica-oxygen _____

Common silicate minerals listed in the ESRT are:



2.) **Iron Oxides:** these are mineral groups which contain large amounts of what element? _____

When these minerals combine with _____ the result is_____ which is known as "rust," or looks reddish.

3.) Carbonates: Minerals containing a metallic element and a *Carbonate compound* _____

Ex: _____, or "*CaCO3"* Found in Limestone and Marble.

- These minerals break down with _____and acidic _____

How many common uses of minerals can you identify using your ESRT pg. 16?