Academic/ELL Earth Science AGENDA

**January 11,Thursday: B Day**

* **Be sure I have your GIZMOs lab on tides!!**
* **Turn in your Elliptical Orbits lab – be sure your name is on this (I have some labs)**

**WARM-UPS: you will work individually on this and on your reading guide**

* ***On a separate sheet of paper,* write the question and the answer to #1- #5. YOU WILL TURN THIS INTO THE SUBSTITUTE before beginning the reading guide**

1. **Define ellipse**
   1. Diagram and label the parts of an ellipse (foci, focal distance, major AND minor axes)
   2. How is an ellipse DIFFERENT from a circle?
2. **Define “eccentricity”**
   1. What is the eccentricity of a circle?
   2. What would be the eccentricity of a straight line?
   3. Do MOST of the planets have an orbit that LOOKS LIKE an ellipse *OR* a circle?
3. **In the solar system, what object is at the position of ONE focus for the planets’ orbits?**
4. **What happens to the speed of a planet in its orbit if it is closest to the sun? WHY?**
   1. What point is this called?
5. **What happens to the speed of a planet in its orbit if it is farthest from the sun? WHY?**
   1. What is this called?

**OBJECTIVES: ASTRONOMY to Geology: Elliptical Orbits to Minerals**

***5th BLOCK: Today YOU will do the following*** ***after you turn in your warm-up questions***

1. ***GROUP 1 (See student list on the back of this agenda)***
   1. **Reading guide – CH #5:** 
      1. Use the **textbook** to complete the study guide **– WRITE YOUR NAME ON YOUR GUIDE - YOU WILL TURN IT INTO THE SUBSTITUTE AT THE END OF CLASS**
      2. Read through the mineral notes(attached)
      3. Use the Reading Guide AND the notes to **complete the mineral review at the END of the notes**
   2. **Group 2: NOTES on Minerals**
      1. **Ms. Hutson’s substitute will give these students their instructions**

***7th BLOCK*: Today you will COMPLETE THE FOLLOWING, *after you turn in your warm-up questions*:**

**1. *GROUP 1* (*student list on the back of this agenda)***

***i.*** Use **the textbook (located on the top of the cabinet on the left wall as you enter the class)** to complete the study guide **– WRITE YOUR NAME ON YOUR GUIDE - YOU WILL TURN IT INTO THE SUBSTITUTE AT THE END OF CLASS**

1. Read through the mineral notes(attached)
2. Use the Reading Guide AND the notes to **complete the mineral review at the END of the notes**

**HOMEWORK:**

1. **Review the MINERAL NOTES attached to this agenda**
   1. **Complete the 2 page MINERAL Notes Review if you did not do this during class**
2. **Complete the “Mystery Word” AND “Mineral Percentage” worksheets attached at the end of this agenda**

**Notes: Minerals**

**ALL Minerals have 5 characteristics**:

1. Must be **solid** at normal temperatures and pressures at Earth’s SURFACE
   1. Minerals can melt beneath Earth’s surface – temperatures 3,000 – 7,000° C
2. **Occur naturally**
   1. Found in nature – not man-made in a lab
3. Are **INORGANIC**
   1. Not made from living material
   2. Not made BY living things
4. Have a **definite crystal shape**
   1. Atoms arranged in a pattern
5. Have **a definite chemical composition**
   1. The elements will ALWAYS form in the same proportion
      1. Si02
      2. NaCl
      3. CaCO3

**A substance MUST have ALL 5 characteristic to be a mineral**

* List 3 substances that are NOT minerals and tell WHY they are not minerals
* Identify why the following are NOT Minerals
  + Coal
  + Pearl
  + Window glass
  + Plastic

2. **Mineral PROPERTIES** are used to identify **the NAME of the mineral**

3. Properties can be grouped by identification by **INSPECTION** or **SIMPLE TESTS**

A. Properties determined by **INSPECTION**

* Just **LOOK** at the mineral
  + Color
  + Luster
  + Crystal shape

B. Properties determined by **SIMPLE TEST**

* Need to physically test the mineral
* Need tools
  + Hardness
  + Cleavage/Fracture
  + Streak
  + Specific Gravity

C. Special Properties

* Carbonates like calcite are positive in the acid test
* Halite (table salt) tastes salty
* Magnetite is magnetic
* Iceland spar (type of clear calcite) has double refraction
* Sulfur is BRIGHT YELLOW

D. **Interesting Mineral Facts**

* Pyrite is known as “Fool’s Gold”
  + During the gold rush, many who found pyrite (looks like gold) tried to turn it in for money – thinking it WAS gold
  + The specific gravity test (determines the “weight” or ‘heft’ or density) was used to tell the difference.
    - ALSO – Gold is VERY soft and Pyrite is very hard
      * This is why you sometimes see people “biting” gold
    - Gold has one of the highest specific gravities = 19
  + Metallic minerals have specific gravities of 5+
  + Non-metallic minerals have specific gravities of 3 or less
* Iceland Spar (a type of clear calcite) has double-refraction

#### **What is** [**specific gravity**](http://www.mineralab.com/Specific%20Gravity.htm)**?**

It is the density of a substance compared to the density of water.  This means, the weight or density of a substance is compared to the weight or density of an equal volume of water. As an example, when we say that the specific gravity of quartz is 2.65, we mean the weight of quartz is 2.65 times that of an equal volume of water.  There are a number of ways to write the equation for the specific gravity (SG) of a mineral.  Here is the most common:

#### Weight of Mineral in Air SG = ------------------------------------------------------------------------------          Weight of Mineral in Air  -  Weight of Mineral in Water

So from this equation, using a spring scale, you need to weigh the mineral in air (which means the same as "weighing it"), then suspend the mineral in water and weigh it again.  Since Archimedes discovered that the weight of the mineral in air minus its weight in water is equals the weight of the water displaced by the mineral, the equation can also be written as follows:

#### Weight of Mineral in Air SG = ---------------------------------------------------------            Weight of Water Displaced by Mineral

And since the weight of 1 cubic centimeter of water equals 1 gram, the equation can then also be written as follows:

#### Weight of Mineral (in grams) SG = ------------------------------------------------           Volume of Mineral (in cubic cm)

**ACID TEST: What is the Acid Test?** <http://www.youtube.com/watch?v=Lw3bWR0Ws7M>  
  
To most geologists, the term "acid test" means placing a drop of dilute (5% to 10%) hydrochloric acid on a rock or mineral and watching for bubbles of carbon dioxide gas to be released. The bubbles signal the presence of carbonate minerals such as [calcite](http://geology.com/minerals/calcite.shtml), [dolomite](http://geology.com/minerals/dolomite.shtml) , siderite, azurite, or malachite.  
  
The bubbling release of carbon dioxide gas can be so weak that you need a [hand lens](http://geology.com/store/hand-lens/) to observe single bubbles slowly growing in the drop of hydrochloric acid or so vigorous that a flash of effervescence is produced. These variations in effervescence vigor are a result of the type of carbonate minerals present, the amount of carbonate present, the particle size of the carbonate and the temperature of the acid.

### **What Causes the Fizz?** Carbonate minerals are unstable in contact with hydrochloric acid. When acid begins to effervesce (fizz) on a specimen a reaction similar to the one shown below is taking place.

**hydrochloric acid reaction with calcite**

**On the left side of this reaction the mineral calcite (CaCO3) is in contact with hydrochloric acid (HCl). These react to form carbon dioxide gas (CO2), water (H2O), dissolved calcium (Ca++) and dissolved chlorine (Cl--). The carbon dioxide bubbles that you observe are evidence that the reaction is taking place. When that occurs, calcite or another carbonate mineral is present.**

**NAME: CH #5 Minerals**

**Notes Review**

1. Complete the Chart:

|  |  |
| --- | --- |
| Characteristics of Minerals | **Example of a non-mineral that violates the characteristic** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

1. Differentiate between characteristics of all minerals and mineral identification properties.
2. Explain HOW to test Mineral Hardness.
   1. List the 10 Minerals of Moh’s Scale
   2. Identify the “field tools” and identify the Moh’s scale value associated with each tool.

**HOW to test:**

**Moh’s Scale:**

**Field test tools:**

1. Explain why Color is not the best test for mineral identification.
2. Identify the 8 Most Common Elements in Earth’s Crust. List from MOST to LEAST abundant:
3. Are most minerals elements or compounds?
   1. Which elements would you expect to combine to form the majority of minerals?  ***Explain!***

Complete the Table on Mineral Identification Properties:

|  |  |  |  |
| --- | --- | --- | --- |
| **Name of Identification Property** | **Definition** | **How to determine the property (or equation used)** | **Property of Inspection OR Simple Test?** |
| **Color** |  |  |  |
| **Luster** |  |  |  |
| **Crystal Shape** |  |  |  |
| **Cleavage** |  |  |  |
| **Fracture** |  |  |  |
| **Streak** |  |  |  |
| **Hardness** |  |  |  |
| **Specific Gravity** |  |  |  |