Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_ Block \_\_\_\_\_\_\_\_\_

**Mineral Identification**

**Activity**

**Minerals** are pure substances that are made up of only one type of matter through the process of **crystallization**, the process by which atoms are arranged to form a material with a crystal structure.

The crystallization of a melted material, lava or magma, can be drastically different depending on where the cooling process took place; deep, shallow or at Earth’s surface. Magma cooling deep within a volcano will cool at very slow rates thus forming large crystals. Magma forming within a vent of a volcano will cool faster and have smaller crystals. Lava cooling at Earth’s surface will cool so fast that no crystals will have time to form.

Crystallization can also occur from materials dissolved in water. Calcite is a mineral that forms from the chemical weathering process by carbon dioxide and oxygen.

Characteristics of all minerals are naturally occurring, inorganic and have a chemical composition. Minerals can consist of a single atom, **element**, like gold (Au), silver (Ag) or Iron (Fe) or they can consist of two or more elements combined, **compound,** calcite (CaCO3) or Talc (Mg3Si4O10(OH)2). A mineral can be identified using a series of tests to determine the mineral’s hardness, streak, luster and cleavage. **Hardness** is the mineral’s resistance to being scratched, 1 = softest (talc) and 10 = hardest (diamond). **Streak** is the color of the powder left after the mineral is rubbed onto a piece of porcelain tile. **Luster** is the ability of the mineral to shine or reflect light; shiny or dull. **Cleavage** is the tendency of the mineral to break along regular surfaces in one or more directions.



Using the box of minerals provided, identify each of the minerals by putting it through the tests listed in the data table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Luster****(Shiny or Dull)** | **Cleavage****(1 directional or multiple)** | **Streak****Color** | **Hardness** | **Mineral Name** |
|  |  |  |  | 1. Talc
 |
|  |  |  |  | 1. Selenite
 |
|  |  |  |  | 1. Calcite
 |
|  |  |  |  | 1. Fluorite
 |
|  |  |  |  | 1. Apatite
 |
|  |  |  |  | 1. Microline
 |
|  |  |  |  | 1. Quartz
 |
|  |  |  |  | 1. Topaz
 |
|  |  |  |  | 1. Corundum
 |

**Analysis**:

1. What are minerals? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What are the three characteristics of all minerals?
	1.
	2.
	3.
2. Define **element** - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Define **compound** - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Matching** – Put the letter of the correct answer in the space provided.

\_\_\_\_\_ 5. Streak A. The tendency of a mineral to break along regular

 surfaces.

\_\_\_\_\_ 6. Luster B. The resistance of a mineral to being scratched.

\_\_\_\_\_ 7. Hardness C. The color of the powder left after being rubbed on a

 tile.

\_\_\_\_\_ 8. Cleavage D. The ability of a mineral to shine or reflect light.

**Multiple Choice** – Put the letter of the correct answer in the space provided.

\_\_\_\_\_ 9. The process by which atoms are arranged to form a material with a crystal

 structure:

 a. cleavage b. element c. crystallization d. luster

\_\_\_\_\_ 10. Which of the following is NOT an example of an element?

 a. CaCO3 b. Au c. Ag d. Fe

\_\_\_\_\_ 11. CaCO3 and Mg3Si4O10(OH)2 are both examples of a:

 a. element b. mineral c. compound d. both B & C

\_\_\_\_\_ 12. A mineral that can be scratched by salt but not by plastic is:

 a. calcite b. topaz c. talc d. diamond

\_\_\_\_\_ 13. A mineral that can be scratched by a porcelain streak plate but not a glass plate

 is:

* 1. apatite b. microline c. selenite d. calcite

**Making Connections** – Use the diagram to answer the questions that follow.



14. This mineral is silver to black, has a metallic luster and is hard: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a. Its density is: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Would it sink or float in water, Why? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15. This mineral is soft, has a white streak and is white in color: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

16. What characteristic, other than density, separates galena from graphite? \_\_\_\_\_\_\_\_\_\_\_\_