METAL OR NON METAL LAB

**Purpose**:

In this activity you will investigate the properties of 7 elements in order to classify them as a metal, non-metal, or semi-metal. The identity of the elements (in no particular order) is as follows:

silicon, tin, carbon, sulfur, magnesium, iron, zinc

You will examine the physical properties of color, luster, malleability, and electrical conductivity. You will examine the chemical properties of each element by reacting it with hydrochloric acid (HCl) and cupper (II) chloride (CuCl2). Most metals react with hydrochloric acid to produce hydrogen gas. Most metals react with copper chloride to produce copper. The original element may change form, shape, or color during a chemical reaction.

**Pre** **Lab Questions**:

1. How will you know if a substance has reacted with acid or another chemical compound?
2. How will you know if a substance is able to conduct electricity?

**Procedure**:

1. Obtain 2 pieces of each element and place in a separate area of the well plate. Be sure to organize each element with appropriate letter. You should have 14 pieces in total.
2. Draw a colored picture of each element in the appropriate column next to the corresponding letter.
3. Observe and record the appearance of each element. Include physical properties such as color, luster, as well as form.
4. Read the results of crushing which is already provided for you in the data table.
5. Test conductivity by touching both electrodes to one element sample. DO NOT ALLOW THE ELECTRODES TO TOUCH EACH OTHER. Use the conductivity meter chart and the light bulbs to determine if the element has high, medium, low, or no conductivity. Record the results in the data table.
6. Test for reactivity by adding 15-20 drops of hydrochloric acid (HCl) to each well containing the first 7 samples. Observe and record what happens in each well plate in the data table. If no reaction occurs, write no reaction in the data table.
7. Test for reactivity by adding 15-20 drops of cupper (II) chloride (CuCl2) to each well containing the second 7 samples. Observe and record what happens in each well plate in the data table. If no reaction occurs, write no reaction in the data table.
8. Discard all materials by placing in the trash can and rinsing the well plate. NO SOLIDS IN THE SINK!

**Data and Observations:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ELEMENT LETTER AND PICTURE | APPEARANCE DESCRIPTION | RESULT OF CRUSHING | CONDUCTIVITY | REACTION WITH ACID | REACTION WITH COPPER (II) CHLORIDE | METAL/  NON-  METAL/  SEMI-METAL |
| A |  | Crumbles into small pieces |  |  |  |  |
| B |  | Bends, flattens, does not crumble, stays in one piece |  |  |  |  |
| C |  | Crumbles into small pieces |  |  |  |  |
| D |  | Bends, flattens, does not crumble, stays in one piece |  |  |  |  |
| E |  | Crumbles into dust |  |  |  |  |
| F |  | Bends, flattens, does not crumble, stays in one piece |  |  |  |  |
| G |  | Breaks into smaller pieces but does not crumble |  |  |  |  |

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ have a luster, are malleable, and are good conductors of heat and

electricity. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are dull in appearance, brittle, and do not conduct electricity.

Most \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ will not react with acid or with copper (II) chloride. Elements that

have properties of both metals and non-metals are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Based on the information above, classify each element as a metal, non-metal, or semi-metal. Record your answer in the data table.
2. Classify each element as metal, non-metal, or semi-metal:

Ge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Ti \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

H \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Cs \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Hg \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Al \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_