Name _____ Block #_____

Unit 4 Periodic Trends
Classifying Elements Lab

Purpose: To investigate the physical and chemical characteristics of different elements in order to classify each as a metal, nonmetal, or metalloid.

Materials: Several different elements, test tubes, conductivity tester, wire connectors, 9 volt batteries, voltmeter, alligator clamps, sand paper, mortar and pestle, 0.1 M hydrochloric acid (HCl), chemical sample wells, scoopula, paper towels and goggles

Procedure: Prior to class the teacher will place elements in test tubes and label each tube with a different # designation. Students will investigate the identity of each element based on the following physical and chemical characteristics:

a) **Appearance:** Observe and record the appearance of each element, including physical properties such as color, luster, and shape (sharp, smooth, round, irregular, etc.).

b) **Conductivity:** Set the voltmeter to 20 DC. Attach one side of an alligator clamp to the red (+) terminal of the voltmeter. Connect the other end to the (+) side of the 9 volt battery. Connect a second alligator clamp to the (-) side of the 9 volt battery. Using the black (-) terminal from the voltmeter and the (-) alligator clamp, carefully touch each end of the element sample. Observe whether or not it conducted electricity. (***Warning***: *If element looks cloudy white, you may need to use sandpaper to expose the pure atoms underneath the surface in order to conduct electricity.)*

c) **Malleability:** Obtain a small chunk of an element. Place it in the mortar. Use the pestle to crush or grind the element. Record whether or not the element broke or stayed whole. When you are done, use a scoopula to scrape out any large pieces into the waste container. Wipe the mortar with a paper towel to clear out any remaining residue. Throw away towel.

d) **Reactivity with acid:** Place a tiny sample of each element into different chemical wells. Transfer 3 – 4 drops of 0.1 HCl into each well. Record whether or not the elements reacted with the acid. When done, use the scoopula to scrape element pieces into waste container. Rinse chemical wells under tap water and dry with a paper towel.

Analysis: Classify each property as either a physical property or a chemical property.

Activity	Physical or Chemical
Appearance	
Conductivity	
Malleability	
Adding Acid	

Name _____ Block #_____

Data Table:

Element	Appearance	Conductivity	Malleability	Adding Acid
1				
2				
3				
4				
5				
6				
7				

Results: Classify each element tested as a metal, nonmetal, or metalloid.

- **Metals** have luster, are malleable, conduct electricity, and react with acid.
- **Nonmetals** are dull in appearance, brittle, do not conduct electricity, and unreactive.
- **Metalloids** have a mixture of properties of metals and nonmetals.

#	Metal, Nonmetal, or Metalloid	Best Guess of Identity	Actual Element
1			
2			
3			
4			
5			
6			
7			