Chemistry Hour\_\_\_\_ Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
Dr. Wexler
Lab: Reaction of Magnesium with Hydrochloric Acid (HS-PS1-2)
Date assigned\_\_\_\_\_\_\_\_

**Objectives:**Observe and understand the reaction between magnesium metal and hydrochloric acid.

**Special Materials:**Magnesium ribbon, hydrochloric acid, wood splint, aluminum foil

**Procedure:**
1. Pipette 5 ml of 1M HCl into a test tube.
3. Drop a small piece of magnesium ribbon into the acid and cover the test tube with aluminum foil.
4. Observe the reaction.
5. Immediately after the reaction stops, light a wood splint, remove the aluminum foil and hold the lit splint over the test tube.

**Questions:**1. What happened when you placed the magnesium ribbon in the acid?

2. How did you decide when the reaction of magnesium with the acid was complete?

3. What did you observe when you placed the burning splint over the test tube?

4. What gas must have been released by the reaction of magnesium with HCl? How do you know?

5. What was the purpose of covering the test tube with aluminum foil during the reaction of magnesium with HCl? Try doing the experiment without the aluminum foil. Is there a difference?

6. Write a balanced equation for the reaction of magnesium with HCl showing the two reactants and the two products.
*Note: A balanced equation will have the same number of moles of each element on both the left and right sides of the equation. For instance, CH4 + O2 🡪 CO2 + H2O is unbalanced. The balanced equation is CH4 + 2O2 🡪 CO2 + 2H2O.
Note: A mole is a type of unit that reflects the number of particles of an element or molecule.*

7. Draw the Bohr models for magnesium and chlorine:

 Mg Cl

8. Based on your Bohr models, which element will lose electrons and which will gain electrons in order to become stable? How many electrons?
A. \_\_\_\_\_\_\_\_\_\_\_\_\_ will gain \_\_\_\_\_\_electrons

B. \_\_\_\_\_\_\_\_\_\_\_\_\_ will lose \_\_\_\_\_\_ electrons

9.

| ***Successive molar ionization energies (ionization potentials) in***[**kJ**](http://en.wikipedia.org/wiki/Joule)**/**[**mol**](http://en.wikipedia.org/wiki/Mole_%28unit%29) |
| --- |
| **Element** | **First** | **Second** | **Third** | **Fourth** | **Fifth** | **Sixth** | **Seventh** |
| [**Mg**](http://en.wikipedia.org/wiki/Magnesium) | 738 | 1,450 | 7,730 |  |  |  |  |
| [**Cl**](http://en.wikipedia.org/wiki/Chlorine) | 1,256 | 2,295 | 3,850 | 5,160 | 6,560 | 9,360 | 11,000 |

Based on the above table:

1. How many kJ (kilojoules) are required to remove two electrons from 1 mole of Magnesium? \_\_\_\_\_\_\_\_ kJ
(Hint: add up the first and second ionization energies)
2. How many kJ are required to remove two electrons from 1 mole of Chlorine? \_\_\_\_\_\_\_\_ kJ
(Hint: add up the first and second ionization energies)
3. Based on your comparison of Mg and Cl, which element has a much stronger tendency to **lose** electrons? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_