Name:

Period:

LAB 17 - MAGNESIUM OXIDATION

BACKGROUND

We have been investigating different elements of the periodic table. We have seen sodium (Na) react with plain water and we understand that this is because the one electron in its valence shell is easily stripped away in a chemical reaction. This empties the outer shell, turning the inside orbit into the valence shell (which is full). It is much easier to take away that one electron (giving the sodium atom a +1 charge) than it is to add seven electrons (giving it a -7 charge).

Magnesium has two electrons in its outer (valence) energy level. We will investigate how this difference will affect the reactivity of a magnesium atom.

In the spaces below, draw a diagram of a Na atom and a Mg atom. Be sure to label the different subatomic particles.

Na	Mg

Now draw the atoms with their valence shell full.

Na^{+}	Mg^{2+}

PROBLEM
How will the reaction of magnesium compare to the reaction of sodium?

HYPOTHESIS
Write a hypothesis to answer the problem above.

MATERIALS
- Magnesium strip (will be passed out)
- Watch glass
- Small candle
- Clay
- Tweezers
- Small beaker (250mL)
- Large beaker (600mL *or* 1000mL)
- Water
- Apron & safety glasses

WARNING: THIS LAB USES OPEN FLAME AND INCLUDES A VERY EXOTHERMIC REACTION. IN OTHER WORDS, IT'S VERY HOT. ABSOLUTELY NO HORSEPLAY WILL BE TOLERATED. STAY ON TASK AND STAY FOCUSED OR YOU WILL BE REQUIRED TO LEAVE THE LAB. APRONS AND SAFETY GLASSES MUST BE WORN IN LAB AT ALL TIMES.

PROCEDURE

1. Fill the small beaker with 200mL of water. Fill the large beaker about 1/2 full.

2. Observe the Magnesium strip. Record any observations about it in your data table.

3. *Predict* what will happen when the magnesium strip is placed in the small beaker of water.

4. Test your prediction. Record your results

5. Fix the lump of clay to the lab station counter **next to** the sink and place the candle in the lump. When it is secure, light the candle.

6. DOUBLE CHECK TO MAKE SURE THAT YOU, YOUR LAB PARTNER, AND THE PEOPLE AT NEARBY LAB STATIONS ARE WEARING THEIR APRONS AND GOGGLES.

7. Carefully remove the magnesium strip from the small beaker of water.

IN THE NEXT STEP YOU WILL ATTEMPT TO IGNITE THE MAGNESIUM STRIP. IF IT IGNITES, HOLD THE STRIP OVER THE SINK. DO NOT LOOK DIRECTLY AT THE LIGHT.

8. With the tweezers, hold the magnesium at one end. Put the other end in the candle flame and hold it there. Hold the tweezers tight with your hand away from the flame.

9. Observe the reaction. Record your qualitative observations in the data section. Be sure to observe what the product of the reaction looks like.

10. Clean up your lab station and return to your desk.

DATA
Record your observations here.

SUMMARY
Summary and Challenge Questions must be typed on a separate piece of paper.

1. If sodium and magnesium are both metals, why did sodium react so violently with only water and magnesium needed the "extra boost" with a candle?

2. What is the next element on the periodic table after magnesium? What do you *predict* about its reactivity?

CHALLENGE

1. Draw the electron configuration of Potassium and Calcium. Explain why Potassium is in the same family as Sodium and Calcium is in the same family as Magnesium.

2. Refer to your textbook, Chapter 1.2, where it talks about Trends in the Periodic Table. What do you predict about the size of a Magnesium atom compared to a Sodium atom?

3. What do you know about the size of a Potassium atom compared to a Sodium atom? How do you think the difference in size relates to the reactivity of Potassium compared to Sodium?