

# Periodic Trends and the Properties of Elements

**Data Table A. Activity of Metals**

		Calcium		Magnesium		Aluminum	
Reaction with H <sub>2</sub> O	Observations						
	Litmus test	Before?	After?	Before?	After?	Before?	After?
Reaction with HCl	Observations	Initial temp _____		Initial temp _____		Initial temp _____	
	Match test (optional)	Final temp _____		Final temp _____		Final temp _____	

**Data Table B. Solubility of Alkaline Earth Metal Compounds**

	MgCl <sub>2</sub>	CaCl <sub>2</sub>	SrCl <sub>2</sub>	BaCl <sub>2</sub>	Unknown
Na <sub>2</sub> CO <sub>3</sub>	A1	A2	A3	A4	A5
Na <sub>2</sub> SO <sub>4</sub>	B1	B2	B3	B4	B5
KIO <sub>3</sub>	C1	C2	C3	C4	C5

## Post-Lab Questions *(Use a separate sheet of paper to answer the following questions.)*

1. Which group IIA metal, magnesium or calcium, is more active? Cite your evidence.
2. Which period 3 metal, magnesium or aluminum, is more active? Cite your evidence.
3. Rank the three metals tested in Part A from most active to least active.
4. Write a general statement describing the periodic trend in metal activity within a group (vertical column) of the periodic table.
5. Write a general statement describing the periodic trend in metal activity across a period (horizontal row) of the periodic table.
6. Locate the following metals on the periodic table: *magnesium*, *potassium*, and *sodium*. Based on your answers to Questions #4 and 5, rank these metals in order of their expected activity, from most active to least active.
7. Litmus paper changes color in acidic (red) and basic (blue) solutions. The word alkaline is a synonym for basic. Why are the two words “alkaline” and “earth” used to name the Group IIA metals?
8. In Part B, which alkaline earth metal formed the most precipitates? The fewest?
9. Write a general statement that describes the periodic trend in the solubility of alkaline earth metal compounds.
10. Use the solubility pattern observed for the known and unknown alkaline earth compounds in Part B to deduce the identity of the unknown alkaline earth metal. Explain your reasoning.
11. *(Optional)* Using Equation 1 in the Background Section as an example, write a chemical equation for each precipitate-forming reaction that was observed for *strontium* in Part B. Include the abbreviations (aq) and (s) to show what compound is responsible for the precipitate in each case.