

CHEMICAL FAMILIES:

Date: _____ Name: _____ Lab Day/Time: _____

Objective

The objective of this experiment is to observe the trends of reactivity in the periodic table as you move across a row from left to right and down a column from top to bottom and to note any exceptions to these trends.

Procedure

See the “Kwantlen University College Chemistry 1094 Lab Manual” pages _____.

Observations

Table 1. Group IA Elements

Element	Reactant	Observations
Na	H ₂ O	
Na	CH ₃ OH	
Li	H ₂ O	
Li	CH ₃ OH	

Which element is more reactive? Does reactivity increase or decrease as you move down the group?

Compare the reactivity of sodium (group IA, period 3) and water versus magnesium (group IIA, period 3) and water. Which is more reactive?

Does reactivity increase or decrease as you move across a row from left to right?

Table 2. Group IIA

Element	Reactant	Observations
Mg	H ₂ O	<i>Hint: Be sure to expose a fresh surface of the Mg by scraping and look carefully to check for any reaction</i>
Mg	HCl	
Ca	H ₂ O	
Ca	HCl	

Which of these two elements is more reactive? Does reactivity increase or decrease as you move down the group?

Compare the reactivity of magnesium (group IIA, period 3) and water versus sodium (group IA, period 3) and water and versus aluminum (group IIIA, period 3) and water. Which is the most and least reactive?

According to your observations does reactivity increase or decrease as you move across a row from left to right?

Table 3. Group IIIA Elements

Element	Reactant	Observations
Al	H ₂ O	
Al	HCl	
Al	NaOH	
B	H ₂ O	
B	HCl	
B	NaOH	

Which of these two elements is more reactive? Does reactivity increase or decrease as you move down the group?

Compare the reactivity of aluminum (group IIIA, period 3) and water versus sodium (group IA, period 3) and water. Which is the most reactive?

According to your observations does reactivity increase or decrease as you move across a row from left to right?

Table 4. Group IVA Elements

Element	Reactant	Observations
C	H ₂ O	
C	HCl	
Sn	H ₂ O	
Sn	HCl	<i>Hint: Be sure to expose a fresh surface of the Sn by scraping and look carefully to check for any reaction</i>
Pb	H ₂ O	
Pb	HCl	<i>Hint: Be sure to expose a fresh surface of the Pb by scraping and look carefully to check for any reaction</i>

What do you observe about the reactivity of group IVA as a whole?

Compare the reactivity of group IVA as a whole versus groups IA-III A. Which is the most and least reactive?

According to your observations does reactivity increase or decrease as you move across a row from left to right?

Table 7. Group VIIA Elements

Halogen	Halide:→	KCl	KBr	KI
Cl ₂	Colour of hexane upper layer with Cl ₂ before reaction			
	Colour of hexane upper layer with Cl ₂ after mixing with halide			
Br ₂	Colour of hexane upper layer with Br ₂ before reaction			
	Colour of hexane upper layer with Br ₂ after mixing with halide			
I ₂	Colour of hexane upper layer with I ₂ before reaction			
	Colour of hexane upper layer with I ₂ after mixing with halide			

Table 8. Equations

Cl ₂ (aq) + KBr(aq) →	
Cl ₂ (aq) + KI(aq) →	
Br ₂ (aq) + KCl(aq) →	
Br ₂ (aq) + KI(aq) →	
I ₂ (aq) + KCl(aq) →	
I ₂ (aq) + KBr(aq) →	

What do you note about the reactivity of group VIIA as compared to groups IA-IVA? (Hint: What would you expect the reactivity between any of the halogens and water to be?)

Which of the halogens studied is the most and least reactive?

Does reactivity increase or decrease as you move down the group?

Conclusion

Questions

Attach any questions assigned by your instructor.