FLINN SCIENTIFIC

Name_____

The Chemistry of Complex Ions

Data Tables

Part 1

Test Tube	Reagent	Coordination Number	Formula of Complex Ion or Ionic Solid	Color of Complex Ion or Ionic Solid	Absorbed Energy Color (wavelength)
1	Copper(II) sulfate solution				
2	Cobalt(II) sulfate solution				
3	$Cu(H_2O)_4^{2+}(aq) + NO_2^-(aq)$				
4	$Cu(H_2O)_4^{2+}(aq) + C_2H_8N_2(aq)$				
5	$Co(H_2O)_6^{2+}(aq) + C_2O_4^{2-}(aq)$				
6	$Co(H_2O)_6^{2+}(aq) + C_2H_8N_2(aq)$				

Part 2. Color of Reaction Products

	NH_3	Cl^-	OH^-	$C_2O_4^{2-}$	NO_2^-
NH_3					
Cl^-					
OH^-					
$C_2O_4^{2-}$					
NO_2^-					

Post-Lab Calculations

1. Determine the formula of the complex ion or ionic compounds formed during Part 1 in test tubes #2, #3, #5, and #6 in Part 1. Record these values in Part 1 of the Data Table.
2. Using the color wheel on page 2, determine the color and wavelength range of the visible light absorbed by the complex ion or precipitate in each test tube #1 through #6. Record these values in Part 1 of the Data Table.
3. Determine the formula of each complex ion or ionic solid formed in Part 2. The coordination number of the copper is four. Write a balanced chemical equation for the formation of each complex ion or ionic compound and the expression for its stability constant (K_f).
4. From the results, rank the stability constants for the five complex ions or ionic compounds in Part 2 from highest to lowest. For example, if adding hydroxide ion to the copper–ammonia complex ion solution causes a precipitate and/or color change, then the stability constant for the copper–hydroxide complex ion is greater than that for the copper–ammonia complex ion.