IV. Included on the following pages are examples of the progress reports we have students submit after each laboratory period. The first report asks for specific information about the solutions. The ensuing reports are more general in format so that students can fill in whatever they know. These two pages can be reproduced for your students. Checking the progress reports allows instructors to keep students on the right track, since one wrong conclusion will lead to other wrong conclusions.

V. 1. Colored ions would be transition metals with partially filled d subshells.
Cr^{+3} (a d^3 ion) Co^{+3} (a d^6 ion) Ni^{+2} (a d^8 ion)

2. $AsCl_3$ As is light blue $Ca(NO_3)_2$ Ca is yellowish red $TlCl_3$ Tl is a pure green

3. a) $S^{-2} + 2H^+ \longrightarrow H_2S(g)$

b) $2PO_4^{-3} + 3Ca^{+2} \longrightarrow Ca_3(PO_4)_2(s)$

4. you could use Cl^-, Br^-, I^-, or SO_4^{-2}. All will precipitate Pb^{+2} and not Cd^{+2}. Of these four, I^- and SO_4^{-2} will yield the most insoluble precipitates.

5. You can conclude that the solution is not acidic. There is no way to be certain if the solution is basic or neutral. (You would need to test it with red litmus paper.)

VI. The final report should present the evidence that led to the identification of each of the 14 solutions. It is up to the students to convince the instructor that they understand why the evidence leads to each of their conclusions. When writing net ionic equations for all combinations of the first seven solutions, the results will depend on which solutions are given the first seven numbers. All of the products that can be produced are given below.

precipitates:	$BaSO_4$	$BaCO_3$	$Fe(OH)_3$	$Fe_2(CO_3)_3$	$AgCl$	$AgOH$
	$AgSCN$	Ag_2SO_4*	Ag_2CO_3	$Al(OH)_3$	$Al_2(CO_3)_3$	$Cu(OH)_2$
	$CuCO_3$	$Sr(OH)_2$	$SrSO_4$	$SrCO_3$	$Zn(OH)_2$	$ZnCO_3$
	$Co(OH)_2$	$CoCO_3$	$Mg(OH)_2$	$MgCO_3$		

*Silver(I) sulfate is slightly soluble and may or may not precipitate.

gas: CO_2

weak electrolyte: H_2O

complex ions:	$Al(OH)_4^-$	$Co(NH_3)_6^{+2}$	$Cu(NH_3)_4^{+2}$	$Cu(OH)_4^{-2}$
	$FeSCN^{+2}$	$Ag(NH_3)_2^+$	$Zn(NH_3)_4^{+2}$	$Zn(OH)_4^{-2}$