Chem I Name _____

Date _____Per ___

How To Do The Mystery Solutions Labs

The Problem: Bob the chemistry student comes to class one day and finds that at his lab table there are five dropper bottles, labeled L,M,N,O, and P. They contain solutions of silver nitrate, calcium chloride, potassium chloride, sodium nitrate, and sodium hydroxide. (But not necessarily in that order.) In order to figure out which bottle contains which chemical he mixes them all, and gets the following results. NR stands for no reaction, ppt stands for precipitate, and ss stands for slightly soluble, which means there was a light precipitate.

	L	M	N	O	P
L	NR	brown ppt	NR	ss	NR
M	brown ppt	NR	NR	white ppt	white ppt
N	NR	NR	NR	NR	NR
O	ss	white ppt	NR	NR	NR
P	NR	white ppt	NR	NR	NR

What is the content of each of the bottles?

To solve this, set up your own chart with the solutions and fill it in according to the solubility rules. Include the name of the precipitate (since the colors are given). Then compare your chart with the chart that was given to see which letter goes with which solution.

Solubility Rules

1) -nitrate and -acetate = (aq)
2) Group 1 (H+, Li+, Na+, K+, Rb+, Cs+, Fr+) and NH_4+ = (aq)
3) -chloride, -bromide, and -iodide = (aq) EXCEPT when with Pb, Hg_2, or Ag = (s)
4) -sulfate = (aq) EXCEPT when with Ba, Ca, Pb, or Hg_2 = (s)
5) - hydroxide = (s) EXCEPT when with Group 1 or NH_4+ = (aq)
   When with Group 2 (Be, Mg, Ca, Sr, Ba, Ra) = (ss)
6) -sulfide, -carbonate, and -phosphate = (s) EXCEPT when with Group 1 or NH_4+ = (aq)

	silver nitrate	calcium chloride	potassium chloride	sodium nitrate	sodium hydroxide
silver nitrate					
calcium chloride					
potassium chloride					
sodium nitrate					
sodium hydroxide					

(over)

Now try another:

The Problem: Bob the chemistry student comes to class one day and finds that at his lab table there are five dropper bottles, labeled A,B,C,D and E. They contain solutions of lithium iodide, lead acetate, sodium carbonate, lithium nitrate, and calcium iodide (but not necessarily in that order). In order to figure out which bottle contains which chemical he mixes them all, and gets the following results. NR stands for no reaction and ppt stands for precipitate.

	A	B	C	D	E
A	NR	NR	ppt white	ppt yellow	ppt yellow
B	NR	NR	NR	NR	NR
C	ppt white	NR	NR	ppt white	NR
D	ppt yellow	NR	ppt white	NR	NR
E	ppt yellow	NR	NR	NR	NR

What is the content of each of the bottles? You must show your work in the space below in order to get credit. Be sure to say which letter goes with which solution.