

## Solubility Rules Worksheet

Reference the solubility rules for both parts

### SOLUBILITY RULES

#### Soluble:

- All Nitrates, Acetates, Ammonium, and Group 1 (IA) salts
- All Chlorides, Bromides, and Iodides, except Silver, Lead, and Mercury(I)
- All Fluorides except Group 2 (IIA), Lead(II), and Iron(III)
- All Sulfates except Calcium, Strontium, Barium, Mercury, Lead(II), and Silver

#### Insoluble (0.10 M or greater):

- All Carbonates and Phosphates except Group 1 (IA) and Ammonium
- All Hydroxides except Group 1 (IA), Strontium, Barium, and Ammonium
- All Sulfides except Group 1 (IA), 2 (IIA), and Ammonium
- All Oxides except Group 1 (IA)

1. Classify each of the substances as being soluble or insoluble.

- If Soluble, write **soluble = (aq) state of matter**
- If insoluble, write **insoluble = (s) state of matter**

a.  $\text{KBr}$  =  
b.  $\text{PbCO}_3$  =  
c. zinc hydroxide =  
d. sodium acetate =  
e. silver iodide =  
f. zinc carbonate =

g. silver acetate =  
h. copper (II) sulfide =  
i.  $\text{Mg}_3(\text{PO}_4)_2$  =  
j.  $\text{KOH}$  =  
k.  $\text{NH}_4\text{OH}$  =  
l.  $\text{Hg}_2\text{SO}_4$  =  
m.  $\text{PbI}_2$  =

Identify the two new compounds which would be produced if each of the following soluble compounds were mixed. Identify each product with their correct state of matter.

- If a product is **soluble**, its state of matter should be **(aq)**.
- If a product is **insoluble**, its state of matter should be **(s)**

	$\text{KBr}_{(\text{aq})}$	$\text{Na}_2\text{CO}_3_{(\text{aq})}$	$\text{CaS}_{(\text{aq})}$	$\text{NH}_4\text{OH}_{(\text{aq})}$
$\text{AgNO}_3_{(\text{aq})}$				
$\text{BaCl}_2_{(\text{aq})}$				
$\text{Al}(\text{NO}_3)_3_{(\text{aq})}$				
$\text{Cu}(\text{SO}_4)_{(\text{aq})}$				

## Helpful information on charges of ions and polyatomics

							0
+1		0					
H <sup>+</sup>	+	-1					He <sup>0</sup>
Li <sup>+</sup>	Be <sup>2+</sup>	B <sup>3+</sup>		N <sup>3-</sup>	O <sup>2-</sup>	F <sup>-</sup>	
Na <sup>+</sup>	Mg <sup>2+</sup>	Al <sup>3+</sup>		P <sup>3-</sup>	S <sup>2-</sup>	Cl <sup>-</sup>	Ar <sup>0</sup>
K <sup>+</sup>	Ca <sup>2+</sup>	Ga <sup>3+</sup>		As <sup>3-</sup>	Se <sup>2-</sup>	Br <sup>-</sup>	Kr <sup>0</sup>
Rb <sup>+</sup>	Sr <sup>2+</sup>	In <sup>3+</sup>		Sb <sup>3-</sup>	Te <sup>2-</sup>	I <sup>-</sup>	Xe <sup>0</sup>
Cs <sup>+</sup>	Ba <sup>2+</sup>	Tl <sup>3+</sup>					Rn <sup>0</sup>
Fr <sup>+</sup>	Ra <sup>2+</sup>						

Polyatomic Ions	
NH <sub>4</sub> <sup>+</sup>	Ammonium
BrO <sub>3</sub> <sup>-</sup>	Bromate
CN <sup>-</sup>	Cyanide
C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> <sup>-</sup> (CH <sub>3</sub> COO <sup>-</sup> )	Acetate
ClO <sub>4</sub> <sup>-</sup>	Perchlorate
ClO <sub>3</sub> <sup>-</sup>	Chlorate
ClO <sub>2</sub> <sup>-</sup>	Chlorite
ClO <sup>-</sup>	Hypochlorite
IO <sub>3</sub> <sup>-</sup>	Iodate
MnO <sub>4</sub> <sup>-</sup>	Permanganate
NO <sub>3</sub> <sup>-</sup>	Nitrate
NO <sub>2</sub> <sup>-</sup>	Nitrite
OH <sup>-</sup>	Hydroxide
HCO <sub>3</sub> <sup>-</sup>	Hydrogen carbonate
HSO <sub>4</sub> <sup>-</sup>	Hydrogen sulfate
SCN <sup>-</sup>	Thiocyanate
CO <sub>3</sub> <sup>2-</sup>	Carbonate
Cr <sub>2</sub> O <sub>7</sub> <sup>2-</sup>	Dichromate
CrO <sub>4</sub> <sup>2-</sup>	Chromate
SO <sub>4</sub> <sup>2-</sup>	Sulfate
SO <sub>3</sub> <sup>2-</sup>	Sulfite
PO <sub>4</sub> <sup>3-</sup>	Phosphate