Name_____

Ion Formation and Polyatomic Ions

1. Complete the table below. For example, fluorine has seven valence electrons in its electronic structure. If fluorine acquires one extra electron it would have a filled valence shell and become an ion with a -1 charge. Theoretically, fluorine could also lose seven electrons to produce a filled valence shell, but this is unlikely. Thus, the resulting ion is an anion with a charge of -1.

Element	# Valence electrons	# Electrons lost to form ion	# Electrons gained to form ion	Charge on monatomic ion
F	**7**	**7**	**1**	**-1**
Cl	7	7	1	-1
Ba	2	2	6	+2
S	6	6	2	-2
Li	1	1	7	+1
Ne	8	8	8	0
Ca	2	2	6	+2

2. Predict the formula and give the name of the ionic compound formed by the reaction of each pair of elements.

Elements	Formula of Ionic Compound	Name of Compound
Ca and Cl	**$CaCl_2$**	**calcium chloride**
Na and S	Na_2S	sodium sulfide

Elements	Formula of Ionic Compound	Name of Compound
Al and O	Al_2O_3	aluminum oxide
Ga and F	GaF_3	gallium fluoride
Rb and I	RbI	rubidium iodide
Ba and Se	BaSe	barium selenide

3. Each compound below contains a polyatomic ion. Name each compound. Based on the solubility guidelines handed out in lecture, determine whether each compound is soluble or insoluble in water.

Formula	Name of Compound	Soluble or insoluble?
$AgNO_3$	**silver (I) nitrate**	**soluble**
$KC_2H_3O_2$	potassium acetate	soluble
$Ca(OCl)_2$	IGNORE THIS ONE	
NH_4OH	ammonium hydroxide	soluble
Na_2SO_4	sodium sulfate	soluble
$Fe_2(CO_3)_3$	iron (III) carbonate	insoluble