Electrons and the Periodic Table Name: _____

1. Give the symbol, block, period, group, and type for the following.

Element	**Symbol**	**Block**	**Period**	**Group**
Sulfur				
Nickel				
[Kr]5s1				
[Ar]4s2 3d5				
Radon				

Valence Electrons

2. For each of the elements below, identify the highest main energy level, valence electron configuration, and how many valence electrons it has when neutral.

Element	**Highest Main Energy Level**	**Valence Electron Configuration**	**Number of Valence Electrons**
Lithium (Li)			
Ruthenium (Ru)			
Calcium (Ca)			
Tellurium (Te)			
Bismuth (Bi)			
Promethium (Pm)			

3. Which electrons are considered valence electrons and why are they importance to a chemist?

4. How many valence electrons make up the standard full octet?

Structure of an Ion

Circle bolded word that best completes the statement.

5. Elements that are classified as **metals/nonmetals** form cations.
6. Elements that are classified as **metals/nonmetals** tend to form anions.
7. A cation **gains/loses** at least one electron causing the ion to have a **positive/negative** charge.
8. An anion **gains/loses** at least one electron causing the ion to have a **positive/negative** charge.

Predicting Ions

Write the symbols with charges for the atoms given below and then identify it as an anion or a cation and metal/nonmetal. In the last column, write the name of the noble gas with an electron configuration achieved by that ion formation. The first one is done for you as an example.

Element	**# of e when neutral**	**Metal or nonmetal**	**# e gained or lost**	**Ion symbol with charge**	**Anion or Cation**	**Matching Noble gas**
Calcium	2	metal	Loses 2 e-	Ca+2	Cation	Argon
Lithium						
Nitrogen						
Fluorine						
Cesium						
Phosphorus						

Electrons and the Periodic Table Answer Key

Element	Symbol	Block	Period	Group
Sulfur	S	P	3	16
Nickel	Ni	d	4	10
[Kr]5s1	Rb	S	5	1
[Ar]4s2 3d5	Mn	d	4	7
Radon	Rn	p	6	18

Element	Highest Main Energy Level	Valence Electron Configuration	Number of Valence Electrons
Lithium (Li)	2	2s1	1
Ruthenium (Ru)	5	5s2	2
Calcium (Ca)	4	4s2	2
Tellurium (Te)	5	5s2 5p4	6
Bismuth (Bi)	6	6s2 6p3	5
Promethium (Pm)	6	6s2	2

3. The outer shell; determines if electron is stable or not
4. 8
5. Metals
6. Nonmetals
7. Loses; positive
8. Gains; negative

Element	# of e when neutral	Metal or nonmetal	# e gained or lost	Ion symbol with charge	Anion or Cation	Matching Noble gas
Calcium	2	metal	Loses 2 e-	Ca+2	Cation	Argon
Lithium	1	metal	Loses 1 e-	Li+1	Cation	Helium
Nitrogen	5	nonmetal	Gains 3 e+	N-3	Anion	Neon

Fluorine	7	nonmetal	Gains 1 e+	F-1	Anion	Neon
Cesium	1	metal	Loses 1 e -	Cs+1	Cation	Xenon
Phosphorus	5	nonmetal	Gains 3 e+	P-3	Anion	Argon