

Chapter 10

TRANSPARENCY 23

OXIDATION NUMBERS OF GROUPS

1. Complete the table below for the indicated elements.

Group and element	Outer configuration	Number of outer electrons	Electrons typically lost or gained	Oxidation number
Group 1 Li Rb	$2s^1 + 5s^1$	1	1	+1
Group 2 Mg Ba	$3s^2 + 6s^2$	2	2	+2
Group 13 Al Ga	$3s^2 3p^1 + 4s^2 4p^1$	3	3	+3
Group 14 C Pb	$2s^2 2p^2 + 6s^2 6p^2$	4	4	+4
Group 17 Cl I	$3s^2 3p^5 + 5s^2 5p^5$	7	1	-1
Group 18 Ne Kr	$2s^2 2p^6 + 4s^2 4p^6$	8	0	0

2. In general, what relationship exists between the number of outer electrons and the oxidation numbers of the elements within each of the following:

a. Groups 1, 2, and 13 they are the sameb. Groups 15, 16, and 17 8 - outer electrons gives the oxidation

3. How could you predict oxidation numbers by looking at electron configurations?

will lose them if less than 5
will gain electrons to get to 8 if greater than 5

4. From what sublevel do alkali and alkaline earth elements tend to lose electrons?
- s

5. Relate the idea of filled outer energy levels to oxidation numbers in general.

metals lose electrons, nonmetals gain electrons to get 8 outer electrons

6. From what sublevels do transition metals tend to lose electrons? Why do these metals tend to have more than one oxidation number?

d - because filled d and 1/2 filled d's are more stable than a filled s

7. Predict the oxidation numbers of the following:

a. K +1 d. Sr +2
b. Ca +2 e. P -3