CONCEPT: PERIODIC TABLE: CHARGES

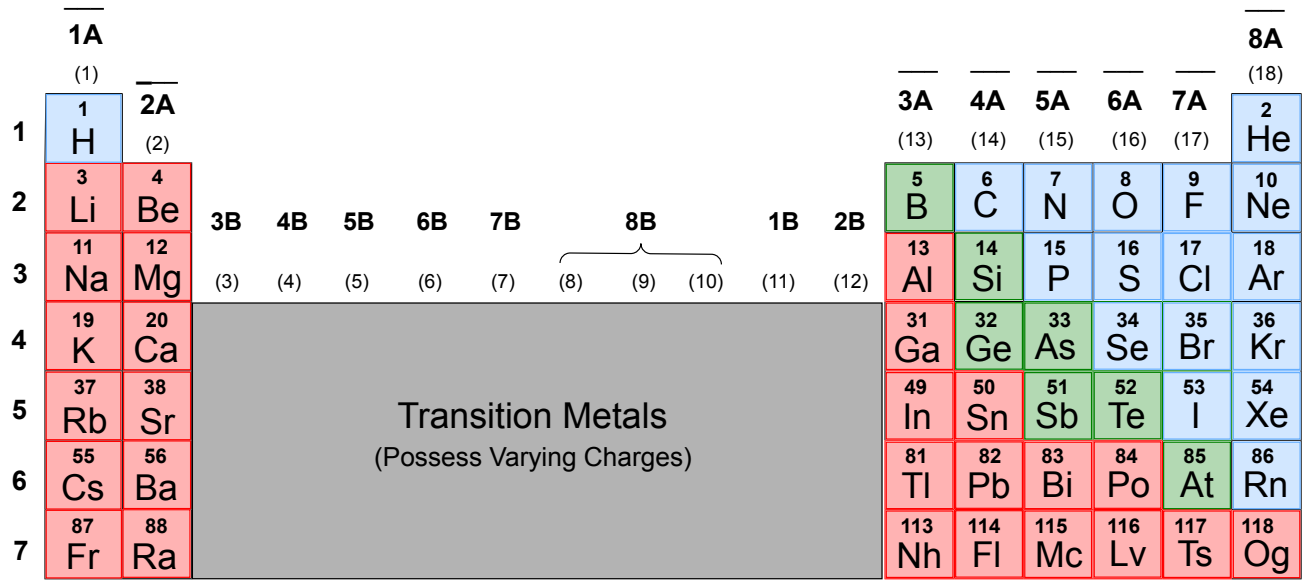
- Elements lose or gain electrons to be like the noble gases, which have the optimal number of outer shell electrons.
  - **Metals**: tend to _____ electrons to become positively charged ions called *cations.*
    - Metals that have _____ charge are referred to as *Type I* Metals.
    - Metals that have _____ charge are referred to as *Type II* Metals.
  - **Non-metals**: tend to _____ electrons to become negatively charged ions called *anions.*

EXAMPLE: From what you know about ion formation and the Periodic Table, which ion would be unlikely to occur?

a) Rb^{+} b) O^{2-} c) Mn^{5+} d) Al^{3-} e) Cl^{-}

Main Group Elements

- Recall, that the atomic number of an element equals the number of protons within its nucleus.
  - For a neutral element, its number of electrons is equal to the number of protons.
  - EXCEPTION 1**:** Main Group Metals of Lead (Pb) and Tin (Sn), which can be _____ or _____.
  - EXCEPTION 2**:** The heavy metals of Bismuth (Bi), Polonium (Po) and Z = 114 to 118 have variable charges.



EXAMPLE: Predict the charge that a gallium ion would possess.

a) +1 b) +2 c) +3 d) -1 e) -2

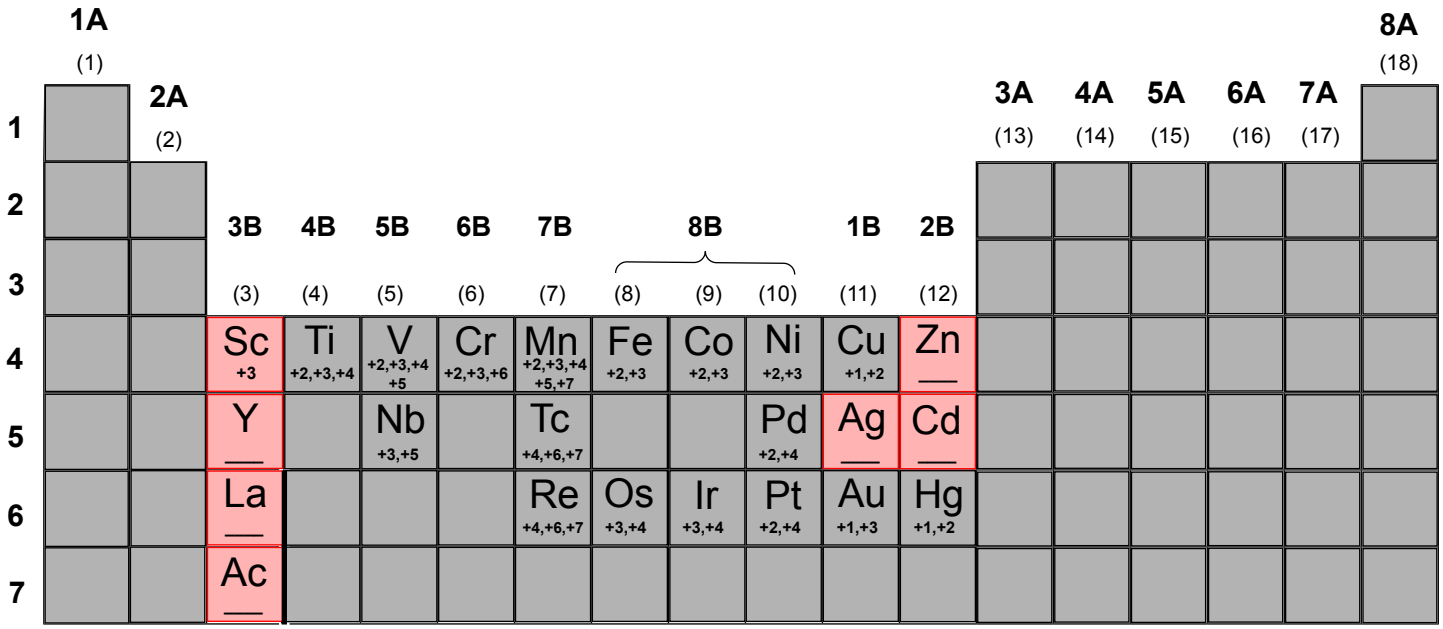
PRACTICE: Which element possesses a -2 charge when it combines with other elements?

a) Ca b) Mn c) P d) Se e) F

CONCEPT: PERIODIC TABLE: CHARGES

Transition Metals (Type II Metals)

- Most transition metals have varying positive charges because of their electron arrangements around the nucleus.
  - □ More advanced explanations for these varying charges will be discussed in the later chapters.



EXAMPLE: Predict the major charge of an ion if it were discovered to be in Period 10, Group 3B.

a) +2 b) +5 c) -2 d) -3 e) +3

PRACTICE: What is the likely charge of the element with an atomic number of 47?

a) +4 b) +3 c) -1 d) +1 e) +2

PRACTICE: How many electrons would the cadmium ion possess?

a) 50 b) 48 c) 46 d) 52 e) 30