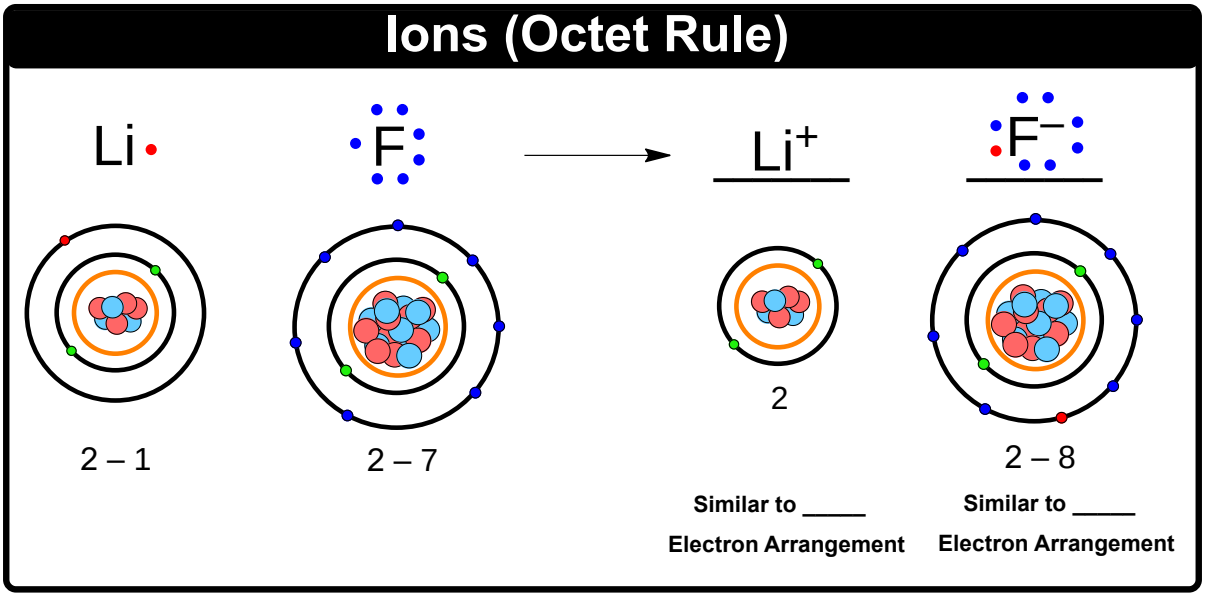
CONCEPT: IONS AND THE OCTET RULE (SIMPLIFIED)

● Tendency of Main Group Elements in achieving _____ valence electrons or _____ outer shell by undergoing chemical reactions.

□ Main Group Metals **lose** electrons to be like the Noble Gas that is _____ them in the Periodic Table.

□ Non-Metals **gain** electrons to be like the Noble Gas that is _____ them in the Periodic Table.

- Creates totally _____ energy levels that lead to _____ stability and _____ further chemical reactivity.



EXAMPLE: How many electrons must the sodium atom (Z =11) lose in order to obtain a filled outer shell?

a) 1 b) 3 c) 2 d) 5

Electron Arrangements (Cations)

● With a metal cation, we first remove electrons from the _____ energy level.

EXAMPLE: Write the electron arrangement for the following ion: Ca^{2+} (Z = 20)

STEP 1: Provide the electron arrangement for the neutral form of the element.

STEP 2: Begin removing electron(s) from the _____ energy level to obtain the desired charge.

□ Recall, each electron removed causes the ion charge to increase by _____.

CONCEPT: IONS AND THE OCTET RULE (SIMPLIFIED)

Electron Arrangements (Anions)

- With a non-metal anion, add an electron(s) to the orbitals with available space.

EXAMPLE: Write the electron arrangement for the following ion: N^{3-} (Z = 7)

STEP 1: Provide the electron arrangement for the neutral form of the element.

STEP 2: Add electron(s) to the energy level that can accommodate more electrons.

PRACTICE: Determine the electron arrangement for the Cl^- ion.

PRACTICE: Determine the electron arrangement for the Al^{3+} ion.