

C11 - 5.3 - Electron/Ion Configuration/Core Notation Notes

A maximum of two electrons can be put in each orbital (superscript/blank)

Row 1 (Horizontal)	Row 2	Row 2 Cont	Row 3	Row 3 Cont
H (1s ¹)	Li (1s ² 2s ¹)	B (1s ² 2s ² 2p ¹)	Na (1s ² 2s ² 2p ⁶ 3s ¹)	Al (1s ² 2s ² 2p ⁶ 3s ² 3p ¹)
He (1s ²)	Be (1s ² 2s ²)	C (1s ² 2s ² 2p ²)	Mg (1s ² 2s ² 2p ⁶ 3s ²)	Cl (1s ² 2s ² 2p ⁶ 3s ² 3p ⁵)
		Ne (1s ² 2s ² 2p ⁶)		Ar (1s ² 2s ² 2p ⁶ 3s ² 3p ⁶)

The superscript is the number of electrons on that level. The Coefficient is the level.

Row 4	Row 4 Continued	
K (1s ² 2s ² 2p ⁶ 3s ² 3p ⁶ 4s ¹)	Sc (1s ² 2s ² 2p ⁶ 3s ² 3p ⁶ 4s ² 3d ¹)	
Ca (1s ² 2s ² 2p ⁶ 3s ² 3p ⁶ 4s ²)	Cr (1s ² 2s ² 2p ⁶ 3s ² 3p ⁶ 4s ¹ 3d ⁵)	
	Ni (1s ² 2s ² 2p ⁶ 3s ² 3p ⁶ 4s ² 3d ⁸)	4s ² 3d ⁴ → 4s ¹ 3d ⁵
	Cu (1s ² 2s ² 2p ⁶ 3s ² 3p ⁶ 4s ¹ 3d ¹⁰)	
	Zn (1s ² 2s ² 2p ⁶ 3s ² 3p ⁶ 4s ² 3d ¹⁰)	4s ² 3d ⁹ → 4s ¹ 3d ¹⁰
	Br (1s ² 2s ² 2p ⁶ 3s ² 3p ⁶ 4s ² 3d ¹⁰ 4p ⁵)	

Both Energy levels would rather be half full

Negative Ions:	Positive Ions: Remove 'p' before 's' before 'd'
O ([He]2s ² 2p ⁴) + 2e ⁻ → O ²⁻ ([He]2s ² 2p ⁶)	Sn ([Kr]5s ² 4d ¹⁰ 5p ²) - 2e ⁻ → Sn ²⁺ ([Kr]5s ² 4d ¹⁰)
Cl ([Ne]3s ² 3p ⁵) + 1e ⁻ → Cl ⁻ ([Ne]3s ² 3p ⁶)	Sn ([Kr]5s ² 4d ¹⁰ 5p ²) - 4e ⁻ → Sn ⁴⁺ ([Kr]4d ¹⁰)

Full Notation: Core Notation:

Row 1		Row 3	
H (1s ¹)	H (1s ¹)	Na (1s ² 2s ² 2p ⁶ 3s ¹)	Na ([Ne]3s ¹)
He (1s ²)	He (1s ²)	Mg (1s ² 2s ² 2p ⁶ 3s ²)	Mg ([Ne]3s ²)
		Cl (1s ² 2s ² 2p ⁶ 3s ² 3p ⁵)	Cl ([Ne]3s ² 3p ⁵)
		Ar (1s ² 2s ² 2p ⁶ 3s ² 3p ⁶)	Ar ([Ne]3s ² 3p ⁶)
Row 2		Row 4 ...	
Li (1s ² 2s ¹)	Li ([He]2s ¹)	K (1s ² 2s ² 2p ⁶ 3s ² 3p ⁶ 4s ¹)	K ([Ar]4s ¹)
Be (1s ² 2s ²)	Be ([He]2s ²)	Kr (1s ² 2s ² 2p ⁶ 3s ² 3p ⁶ 4s ² 3d ¹⁰ 4p ⁶)	Kr ([Ar]4s ² 3d ¹⁰ 4p ⁶)
O (1s ² 2s ² 2p ⁴)	O ([He]2s ² 2p ⁴)	Rb (1s ² 2s ² 2p ⁶ 3s ² 3p ⁶ 4s ² 3d ¹⁰ 4p ⁶ 5s ¹)	Rb ([Kr]5s ¹)
Ne (1s ² 2s ² 2p ⁶)	Ne ([He]2s ² 2p ⁶)		

Properties of metals:
 Shiny with a metallic lustre
 Good conductors of heat and electricity
 Sometimes flexible if thin
 Malleable – compressed easily
 Ductile – easily stretch
 Solid phase at room temperature except Hg

Properties of non-metals:
 Gases, liquids and weak solids at room temperature
 Bad conductors of and electricity

Electron Affinity: change in energy of a atom when electron is added.

Ionization energy: the energy required to take away an electron from an uncharged atom.

Electronegativity: the tendency of an atom to attract/hold electrons.

Size of Atom: Less p⁺ pulling in e⁻

Size of Ion*: (Anions (-ve) Larger, gain electron/Cations (+ve) Smaller, lose electrons)

Period: Elements in a row → Least Metallic

Group or Family: Elements in a column ↓ Most Metallic

Metals vs **Non-Metals**

Alkali Metals, **Alkaline Earth Metals**, **Lanthanides Actinides**, **Halogens**, **Nobel Gases**

Inc (Increase) arrows for Ionization Energy, Electronegativity, and Atomic Size.

Formula: $F = \frac{kqq}{r^2}$

Examples: F – 9 p⁺ pulling 7 valence e⁻ (Tighter shell Than) / O – 8 p⁺ pulling 6 valence e⁻.