

CONCEPT: THE ELECTRON CONFIGURATION

Periodic Law

- Recall, Mendeleev organized the elements into the Periodic Table through *Periodic Law*.
 - Periodic Law:** When arranged by ____ atomic weights, elements in same group share chemical properties.
 - These properties influence _____ arrangements, trends in reactivity, and atomic structures.

Electron Orbital Diagrams

- The visual representation of electrons within **orbitals**.
 - Degenerate orbitals:** **Electrons** in the same set of orbitals having _____ energy – filled using *Hund's Rule*.
 - Hund's Rule:** Degenerate orbitals are first _____ -filled before they are totally filled.

Electron Orbital Diagrams						
Subshell	Sets of Orbitals					Max Electrons
s	↑↓					_____
p						_____
d						_____
f						_____

EXAMPLE: Properly fill in the orbitals of an atom that possesses 8 electrons within its *d* set of orbitals.



PRACTICE: Which electron configuration represents a violation of Hund's Rule?

- a)

↑↓

 1s

↑↓

 2s

↑

 2p₁

↑

 2p₂

↑

 2p₃
- b)

↑↓

 1s

↑↓

 2s

↑↓

 2p₁

↑

 2p₂

↑

 2p₃
- c)

↑↓

 1s

↑↓

 2s

↑↓

 2p₁

↑↓

 2p₂

↑

 2p₃
- d)

↑↓

 1s

↑↓

 2s

↑↓

 2p₁

↑

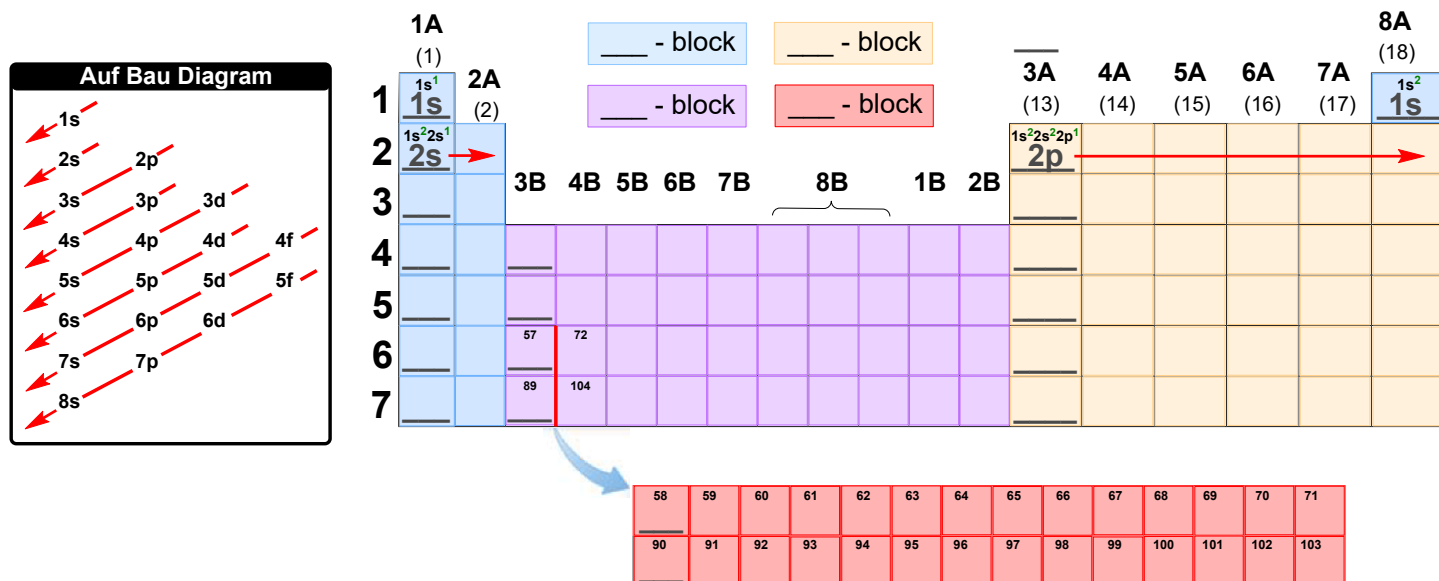
 2p₂ 2p₃

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Ground State Electron Configurations

- Distributions of electrons (1s, 2s, 2p ...) within orbitals using the *Auf Bau Principle*.

□ **Auf Bau Principle:** Starting from 1s, electrons fill _____ energy orbitals before moving to _____ energy orbitals.



EXAMPLE: Write the ground state electron configuration for the following element: Fluorine ($Z = 9$)

PRACTICE: Which electron configuration represents a violation of the *Auf Bau Principle*?

a) 1s 2s 2p

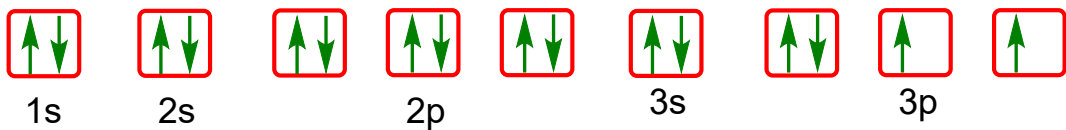
b) 1s 2s 2p

c) 1s 2s 2p

d) 1s 2s 2p

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PRACTICE: Identify the element with the given electron orbital diagram.



a) Silicon

b) Fluorine

c) Sulfur

d) Chlorine

e) Phosphorus

PRACTICE: Write the electron configuration and electron orbital diagram for the following element:

Mn ($Z = 25$)

PRACTICE: Write the ground state electron configuration for the following element:

Lead ($Z = 82$)