

Electrons in Atoms

Read from **Lesson 3: Electrons** in the **Chemistry Tutorial Section, Chapter 5** of **The Physics Classroom**:

Part a: [Electron Configurations](#)

Part b: [Electrons and the Periodic Table](#)

Part c: [Exceptions to the Rules](#)

An atom's electron configuration is the arrangement of electrons in its electron cloud. The electron configuration can be abbreviated or written as orbital notation. Both will be used on this Think Sheet. Remember:



n is the principal quantum number or energy level.

n is also the number of sublevels within that energy level.

n^2 is the number of orbitals within that energy level.

$2n^2$ is the maximum number of electrons that can be held in that energy level.

Part 1: Electrons in atoms

1. What is the difference between an electron in the $1s$ sublevel and an electron in the $3s$ sublevel?

2. What is the difference between an electron in the $3s$ sublevel and an electron in the $3d$ sublevel?

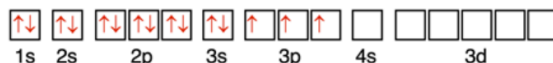
3. What is the difference between the two electrons in the $3s$ sublevel?

4. Flo Wrene, Ellie Ment, and Aaron Agin are discussing the orbital notation for the electron configuration of phosphorus. Each student presents their diagram. Who is correct and why? Who is incorrect and why?

Flo's answer:



Ellie's answer



Aaron's answer



Early Models of the Atom

Part 2: Electron Configuration

- 1a. Write the complete and abbreviated electron configuration for potassium. Identify the number of core electrons and valence shell electrons.

- 1b. Does a potassium atom gain or lose electrons when it forms an ion?

- 1c. Write the electron configuration for potassium ion. Identify the number of core electrons and valence shell electrons.

- 2a. Write the complete and abbreviated electron configuration for selenium. Identify the number of core electrons and valence shell electrons.

- 2b. Does a selenium atom gain or lose electrons when it forms an ion?

- 2c. Write the electron configuration for selenium ion. Identify the number of core electrons and valence shell electrons.

3. Which element's ground state electron configuration includes the following terms as the last filled. For example, $2s^1$ would be lithium.
 - a. $4p^5$
 - b. $3d^2$
 - c. $2p^3$
 - d. $6p^6$
 - e. $5p^1$
 - f. $7s^1$

4. Explain why the following ground state electron configurations are incorrect. Write the corrected electron configuration and identify which element has the corrected electron configuration.
 - a. $1s^2 2s^2 2p^6 2d^2$

 - b. $1s^2 2s^2 2p^6 3s^2 3p^7$

 - c. $[Xe] 6s^1 4f^{14} 5d^{10} 6p^4$