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Atoms – Level 2

Reviewed 2025

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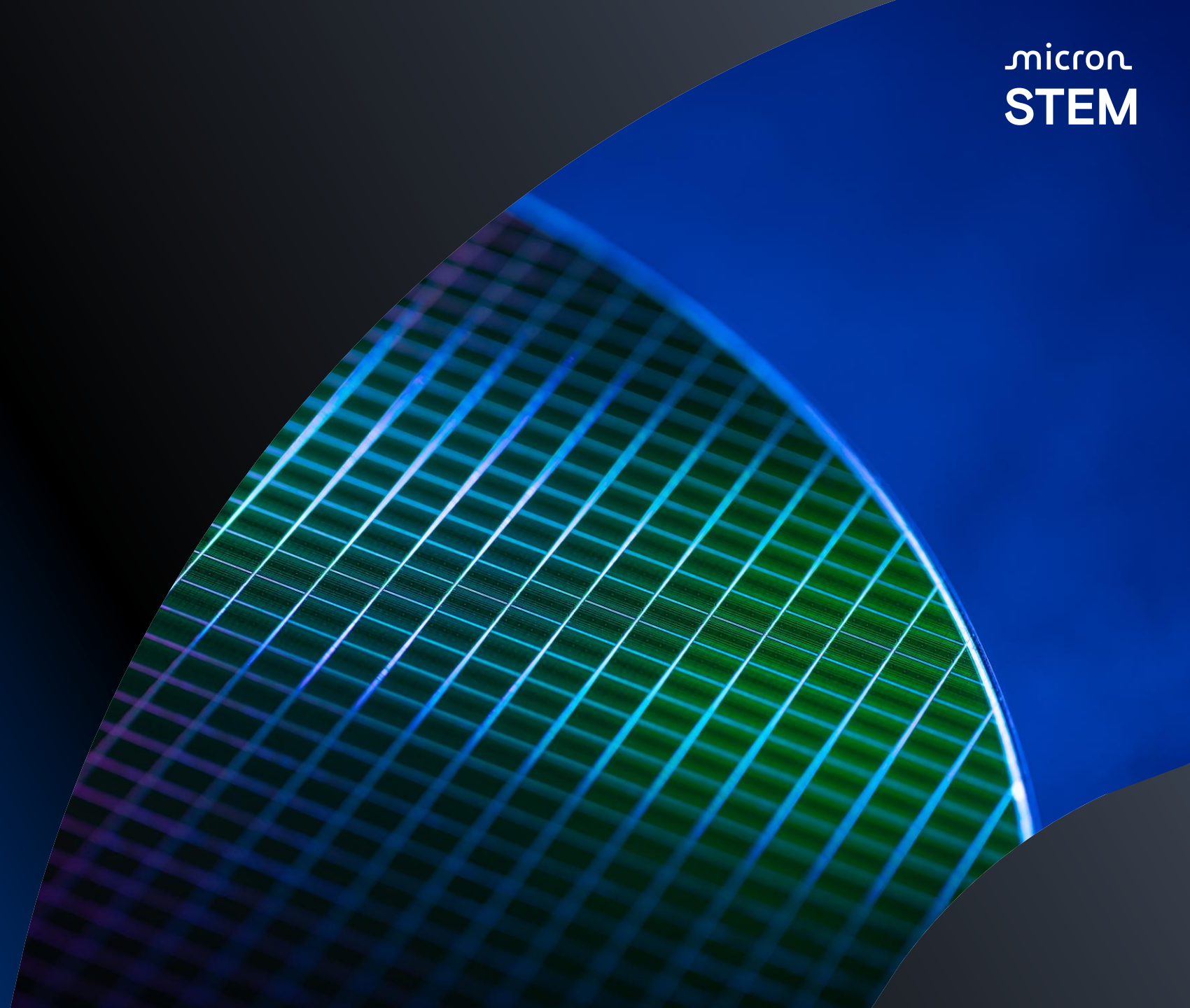
Atoms

K-12 Semiconductor Topics
Level 2



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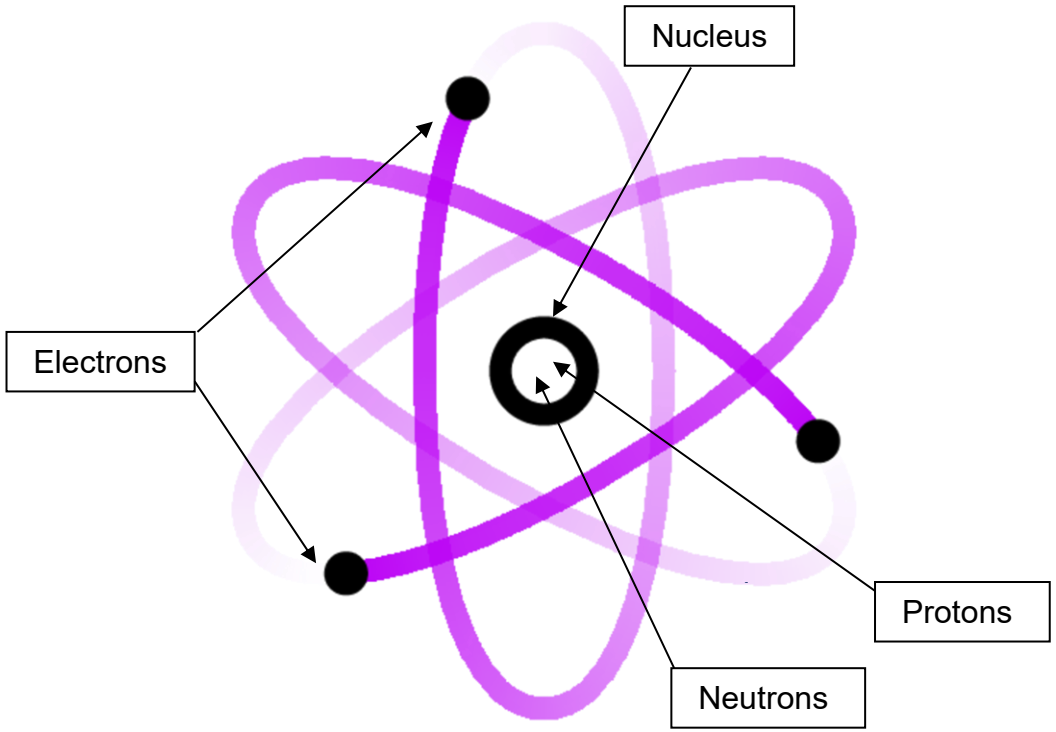
Atomic Structure

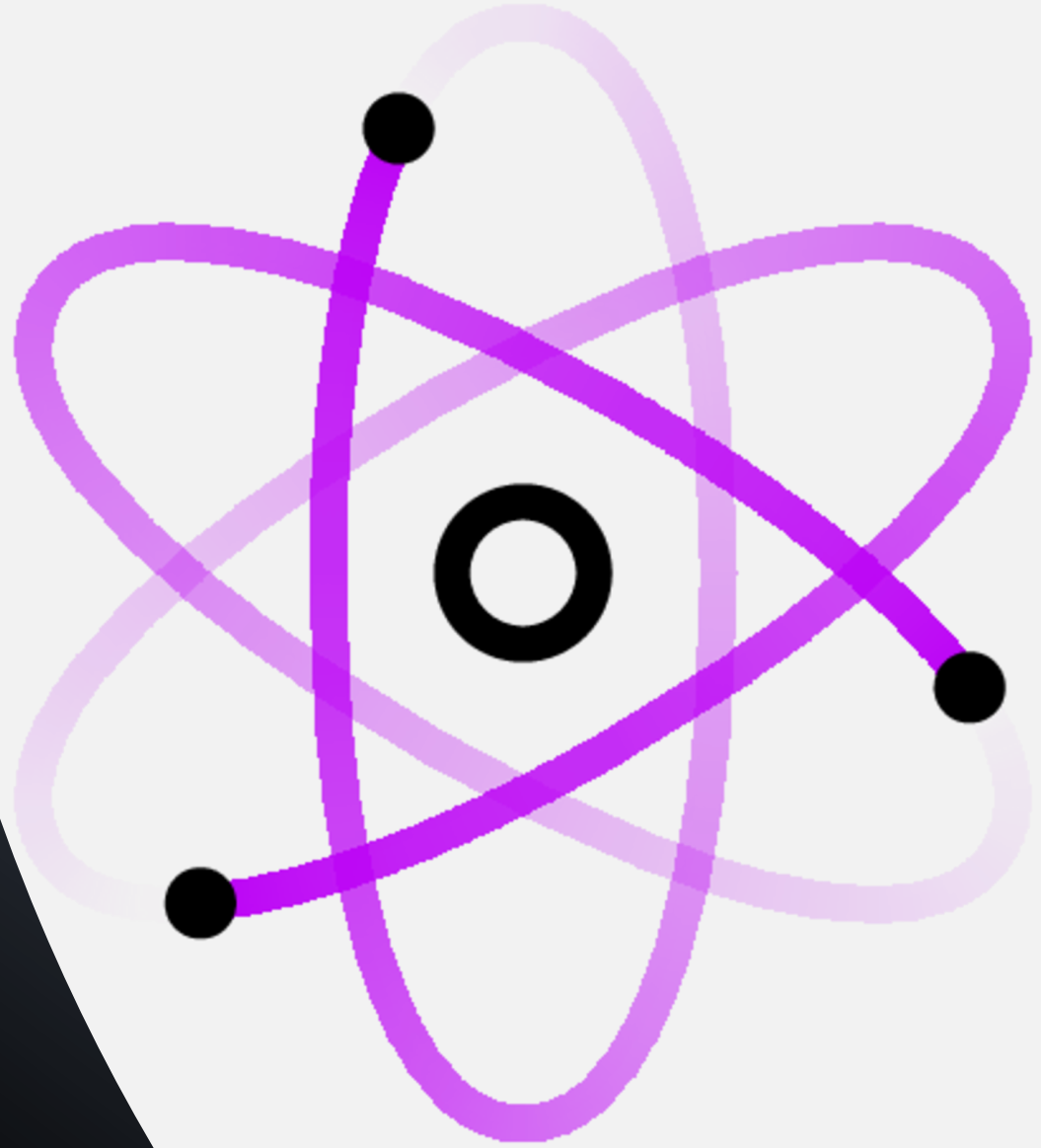
Parts of an atom (sub-atomic particles)

Different combinations of the sub-atomic particles combine to make all the unique elements (atoms)



- Nucleus
- Proton
- Neutron
- Electron

Orbital Shells and Valence Electrons



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Hi there! Mike Rawn here! Let's keep building our understanding of atoms together.

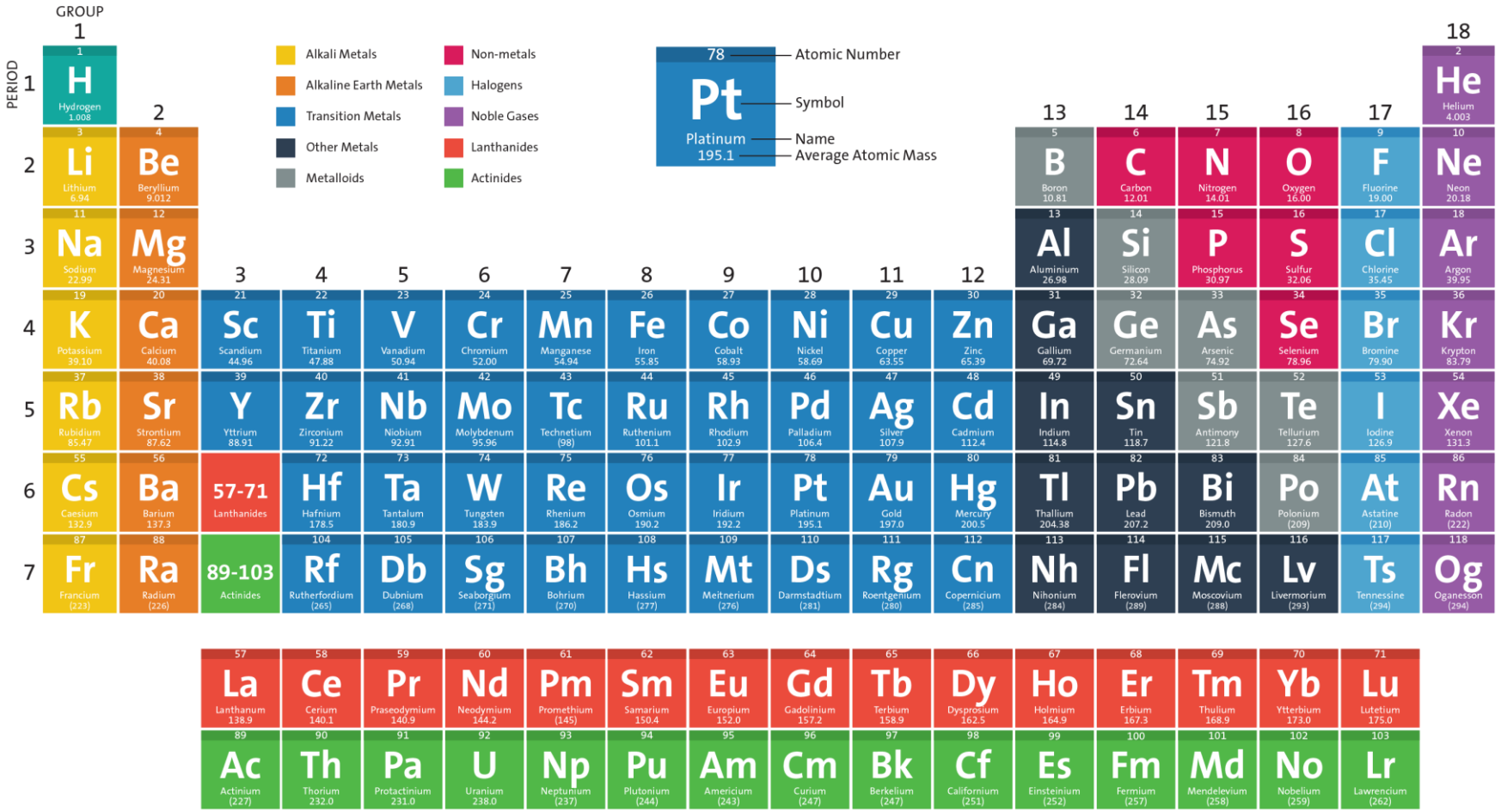
Periodic table of the elements (atoms)

Initially designed in 1869 by scientist Dmitri Mendeleyev.

- Elements are shown by their symbols.
- Elements are arranged in mass order (increasing atomic number).
- Horizontal rows are called **periods**.
  - Elements in the same period have similar properties and the same number of orbital shells.
- Vertical columns are called **groups**.
  - Elements in the same groups have the same number of electrons in the outer shell.

ACS Chemistry for Life®

PERIODIC TABLE OF ELEMENTS



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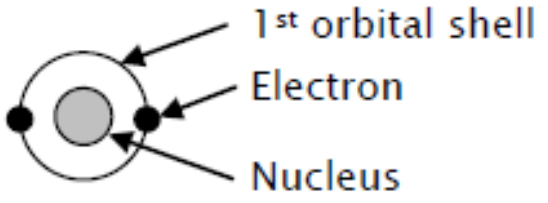
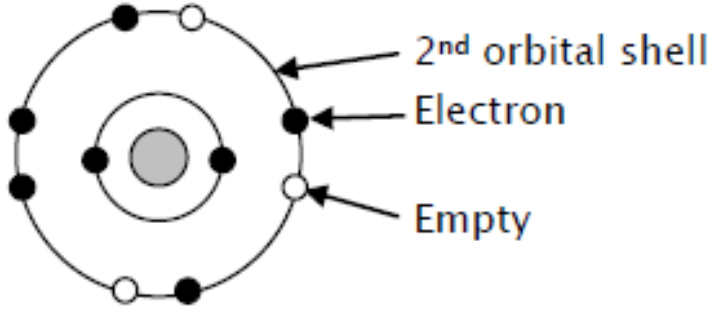
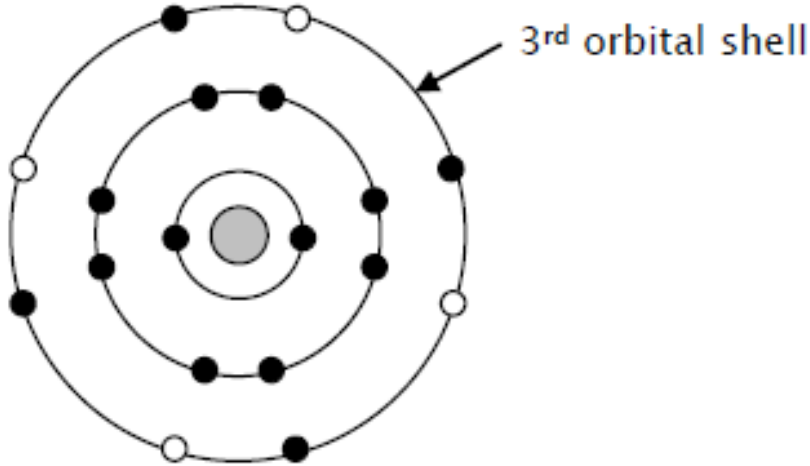
Periods & Orbital Shells

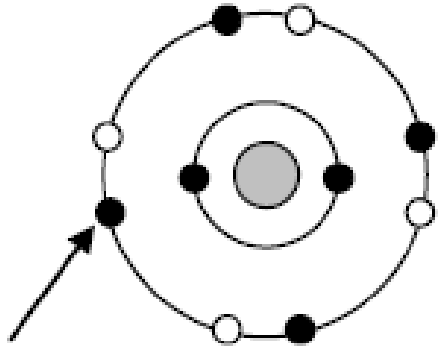
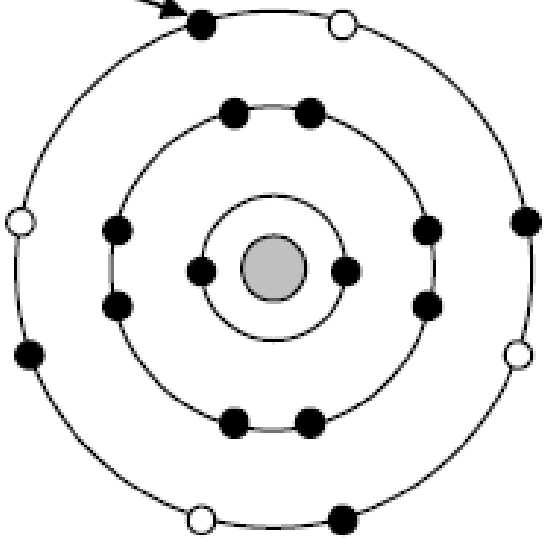
Elements in the same period (row) have similar properties and the same number of orbital shells.

Period 1 elements fill electrons in the 1st orbital shell.	
Period 2 elements fill electrons in the 2nd orbital shell. The 1st shell is full.	
Period 3 elements fill electrons in the 3rd orbital shell. The 1st & 2nd shells are full.	

Groups & Valence Electrons

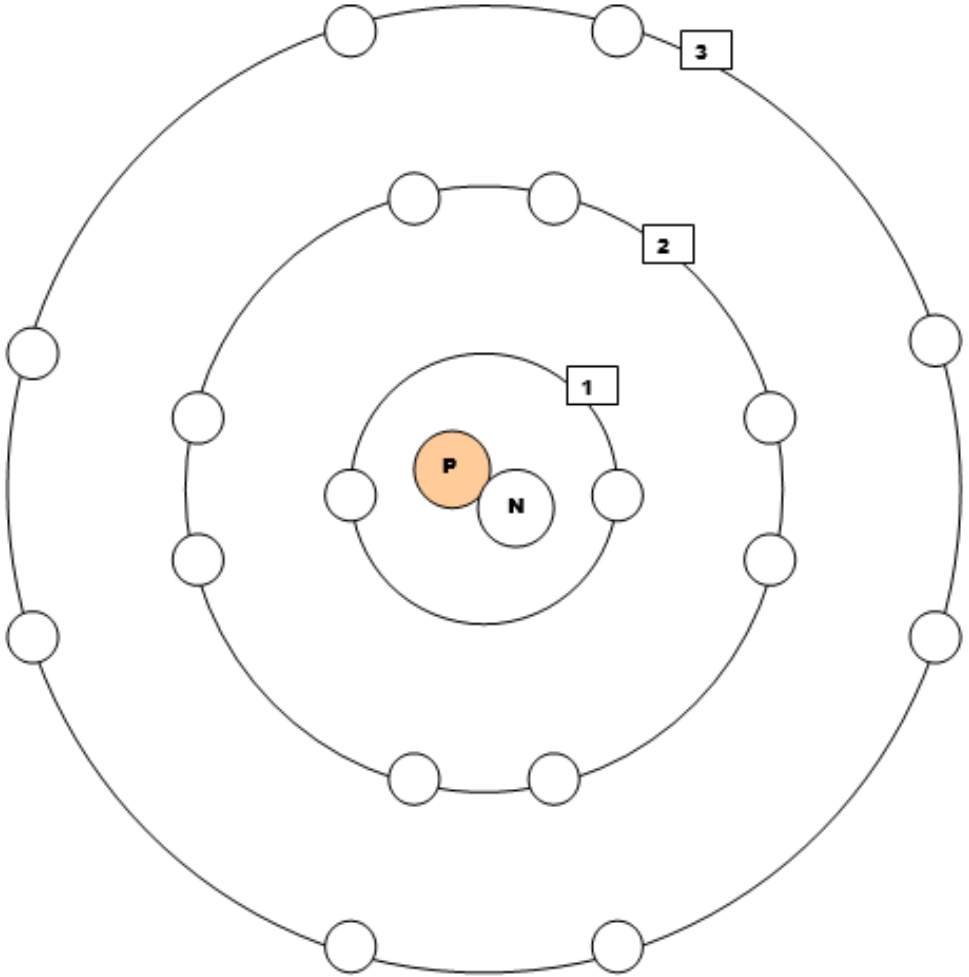
Elements in the same group (column) have the same number of electrons in the outer shell.

Electrons in the outer shell are called Valence Electrons.

Element	Group IV
6 C Carbon	 Valence Electrons = 4
14 Si Silicon	

Activity

Atom Orbitals Activity



Element = _____

Atomic Number = _____

Number of Protons = Atomic Number = _____

Atomic Mass (rounded to nearest whole number) = _____

Number of Neutrons = Atomic Mass – Atomic Number = _____

Number of Electrons = Number of Protons = _____

Period = _____ = Number of Orbitals

Group = _____ = Number of electrons in outermost orbital

(These are called *valence* electrons)

Congratulations on completing the Atoms – Level 2 module!

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