

# Electron Configurations

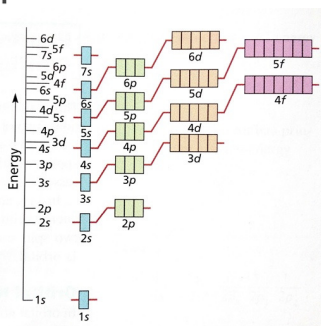
Mr. Sudbury

## Electron Configuration

- ▶ **Electron configuration** is the arrangement of electrons in atoms.
- ▶ Every element has a distinct electron configuration.
- ▶ Electrons have arrangements that are the lowest possible energy... The ground-state configuration.

## Aufbau Principle

- ▶ Electrons will occupy the lowest-energy orbital that can receive it.
- ▶ Energy Levels are the numbers and letters represent the orbitals within the energy levels

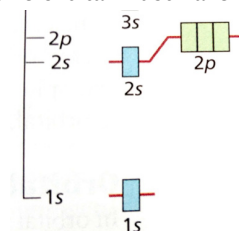


## Rules for Electron Configurations

1. **Aufbau principle:** Electrons will occupy the lowest-energy orbital that can receive it.
2. **Pauli exclusion principle:** No two electrons in the same atom can have the same set of quantum numbers. (2 electrons in the same orbital must have opposite spins.)
3. **Hund's rule:** orbitals of equal energy are each occupied by one electron before any orbital is occupied by a second electron. And all singly occupied orbitals must have the same spin.

## Pauli Exclusion Principle

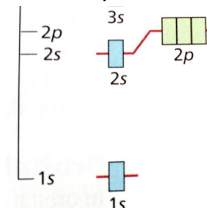
- ▶ No two electrons in the same atom can have the same set of quantum numbers. (2 electrons in the same orbital must have opposite spins.)



## Hund's Rule

- ▶ Orbitals of equal energy are each occupied by one electron before any orbital is occupied by a second electron. And all singly occupied orbitals must have the same spin.

▶ Fluorine =  $9e^-$



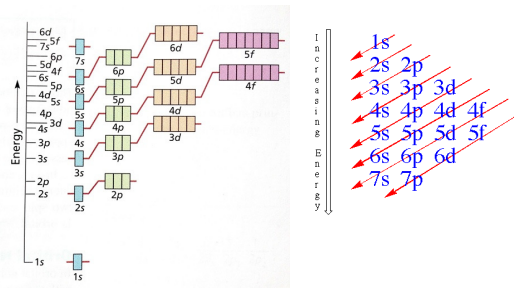
## Writing Electron Configurations

- Write the electron configuration for chlorine. Chlorine has 17 e<sup>-</sup>



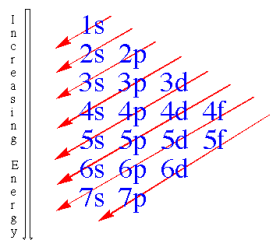
- Red numbers represent energy levels
- Blue letters represent orbitals
- Green exponents represent how many electrons in that orbital.
  - S holds 2 electrons max.
  - P holds 6 electrons max.
  - D holds 10 electrons max.
  - F holds 14 electrons max.

## Writing Electron Configurations



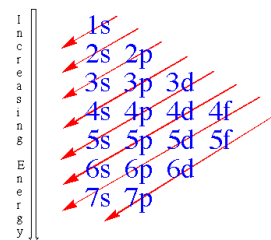
## Writing Electron Configurations

- Hydrogen (1 electron)
- Aluminum (13 electrons)
- Oxygen (8 electrons)
- Zinc (30 electrons)



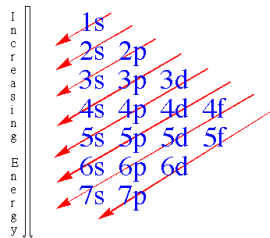
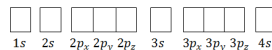
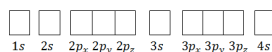
## Writing Electron Configurations

- Barium (56 electrons)
- Iodine (53 electrons)



## Writing Electron Configurations

- Sodium (11 electrons)
- Sulfur (16 electrons)



## The End



- Electron fill orbitals lowest energy first following 3 rules:
  - Aufbau principle
  - Pauli exclusion principle
  - Hund's rule
- Use the chart to write electron configurations.

