Name: _____ Period: _____

Unit 4B- Electron Configuration- Guided Notes

Atomic Structure

- Electrons are arranged in _____ or _____ around the nucleus of an atom
  - First shell can hold a maximum of _____ electrons
  - Second shell can hold a maximum of _____ electrons
  - Third shell can hold a maximum of _____ electrons

Energy Levels

- Further away from the nucleus means _____ energy
- Energy levels have sublevels called _____ and each subshell has _____
- _____ are in the outer most energy level
- Every orbital can hold up to _____ electrons

Subshell	# of Orbitals	Maximum # of electrons	Starts at energy level	Picture

- There are two ways to represent atomic structure of an element:
  1.
  2.

Electron Configuration

- Is a form of notation showing how _____ are distributed among _____ and _____.
- The format for writing electron configuration includes a series of …..

- Standard Notation of Fluorine: $1s^2 2s^2 2p^5$

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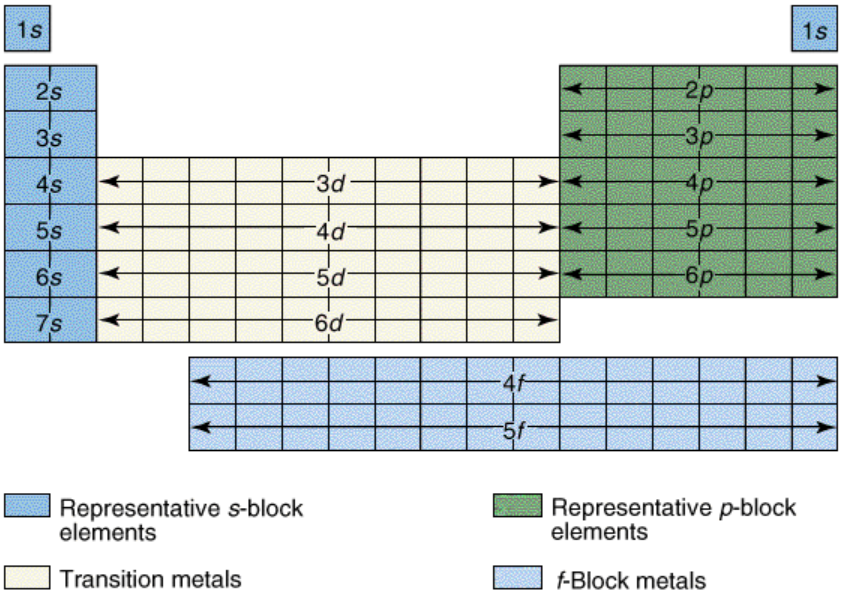
- 

- S starts at _____, p starts at _____, d starts at _____ and f starts at _____

Writing Electron Configuration- Selenium

1. Find the element you are looking for on the periodic table.
2. Always start your configuration at hydrogen
3. Write the energy number and letter, then as a superscript write the number of electrons you pass in that section to get the desired element

Selenium:

- Practice: Write the electron configuration of the following elements
    1. Beryllium
    2. Cadmium
    3. Bromine
    4. Iodine
    5. Iron

Electron Configuration with Ions

- When doing electron configuration with ions, write the configuration and then add (if it is an _____) or subtract (if it is a _____) the charge from the number of electrons (superscript)

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- Example: O^{-2}
  - Oxygen:
  - Oxygen ion:
- Practice: Write the electron configuration of the following ions
  1. Ca^{+2}
  2. P^{-3}
  3. Mg^{+2}
  4. F^{-1}

Noble Gas Notation (AKA shorthand notation)

- Use the last noble gas that is located in the periodic table right before the element.
  - The easiest way to find this is to find your element; Go up one period; go to the end of the period to the noble gases
- Write the symbol of the noble gas in brackets.
- Write the remaining configuration after the brackets.
- Ex: Fluorine _____
- Practice: Write the noble gas configuration for the following elements:
  1. Chlorine : _____
  2. Tellurium: _____
  3. Barium : _____
  4. Argon: _____
  5. K^{+}: _____
  6. F^{-}: _____

End Video 1

Name: _____ Period: _____

Orbital Diagrams

- Orbital diagrams are very similar to _____
- They show the _____ of electrons in an atom
- _____are used to represent orbitals
    - S has _____ orbital
    - P has _____ orbitals
    - D has _____ orbitals
    - F has _____ orbitals
- The energy level and sublevel are written _____ the boxes (example 1s or 2p)
- Electrons are represented by _____
- ONLY _____ arrows per box pointing opposite directions
- 3 Rules for Orbital Diagrams:
    1. Aufbau principle: Electrons occupy orbitals of _____ energy levels first
    2. Hund's Rule: In a set of orbitals, the electrons will fill the orbitals in a way that would give the _____ number of unpaired electrons.
        - Analogy: Students could fill each seat of a school bus, one person at a time, before doubling up
    3. Pauli Exclusion Principle: An orbital can hold only _____ electrons and they must have _____ spin
        - One arrow points up, the other points down
- Example: Draw the orbital diagram for Nitrogen:
    1. Write the configuration for Nitrogen
    2. Draw the boxes you need and label them

    3. Fill in arrows following Aufbau's, Hund's, and Pauli's rules
    4. Why are the arrows in 2p in separate boxes?

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- Practice:
    1. Draw the orbital diagram for Boron

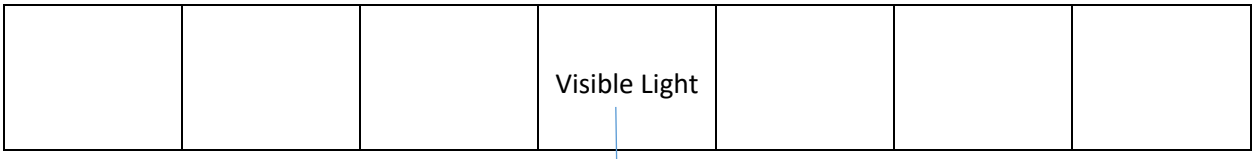
    2. Draw the orbital diagram for Bromine (you may use short hand just don't for get to include the noble gas before the element in brackets [ ])

    3. Draw the orbital diagram for Titanium

Electrons and Energy Levels

- Electrons in their energy levels are considered to be in their _____
- If electrons are given energy, they can jump _____ in energy levels
    - We call this the _____
- When they fall back to their energy level, they release a _____ of light
    - A photon of light is _____
    - The _____ of the light corresponds to the amount of energy the electron released when it goes from its excited state to its ground state

Electromagnetic Spectrum: The range of _____or _____ over which electromagnetic radiation extends



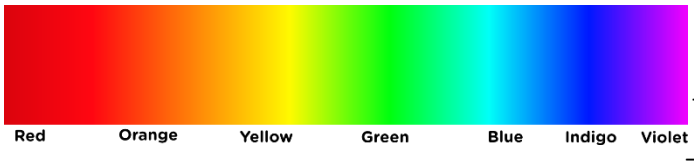
Visible Light

_____

_____ Energy

_____ Frequency

_____ Wavelength



_____ Energy

_____ Frequency

_____ Wavelength