

# Modern Atomic Theory & Bohr Model Notes

## Bohr's Model of the Atom

- Focuses on \_\_\_\_\_ and their \_\_\_\_\_.
- Bohr stated that electrons \_\_\_\_\_ with \_\_\_\_\_ in \_\_\_\_\_ around the nucleus, like planets around a sun.
- Bohr \_\_\_\_\_ assigned \_\_\_\_\_ to electrons, but electrons do \_\_\_\_\_ move in \_\_\_\_\_ orbits around the nucleus.

## What are Energy Levels?

- The possible energies that electrons in an atom can have are called **energy levels**.
- When an atom gains or loses energy, the energy of an electron can change.
  - An electron in an atom can move from one energy level to another when the atom gains or loses energy.
- An electron cannot exist between energy levels.

## Electron Cloud Model

- The electron cloud model \_\_\_\_\_ Bohr's vision of electrons moving in predictable paths.
- An electron cloud is a visual model of the \_\_\_\_\_ for \_\_\_\_\_ in an atom.
  - probability of finding an electron is higher in the \_\_\_\_\_ regions of the cloud.
- An electron cloud is a good approximation of how electrons behave in their orbitals.
  - An \_\_\_\_\_ is a region of space around the nucleus where an electron is likely to be found.
  - The electron cloud represents \_\_\_\_\_ the orbitals in an atom.
- The level in which an electron has the least energy—the lowest energy level—has only one orbital. Higher energy levels have more than one orbital.

## Electron Configuration

- An electron configuration is the \_\_\_\_\_ of electrons in the \_\_\_\_\_ of an atom.
- The most \_\_\_\_\_ electron configuration is the one in which the electrons are in orbitals with the \_\_\_\_\_ possible energies.

**Because we cannot see electrons in the Electron Cloud Model, we will draw Bohr Models to illustrate the number of electrons in the atom of an element.**

## Before drawing a Bohr Model...

- \_\_\_\_\_ rows on the Periodic Table are called \_\_\_\_\_.
  - The row number tells you how \_\_\_\_\_, or \_\_\_\_\_, the element has.
  - Elements in the \_\_\_\_\_ have the \_\_\_\_\_ number of \_\_\_\_\_.
  - The number of rings \_\_\_\_\_ as you move \_\_\_\_\_ the Periodic Table.
    - Example: Sodium (Na) and Magnesium (Mg) are in the third row so they both will have three rings in their Bohr Model.
  - **Draw how many rings each of the elements below will have in their Bohr Model:**
    - Hydrogen:
    - Lithium:
    - Sodium:

- Number of Electrons on a Ring
  - Each ring has a maximum number of electrons that can fit on it.

Ring	Maximum Number of Electrons
1	_____
2	_____
3	_____
4	_____

- Each ring CAN and will hold LESS than the maximum number of electrons.
- \_\_\_\_\_ columns on the Periodic Table are called \_\_\_\_\_.
  - Group numbers tell you how many \_\_\_\_\_ each element in that column has.
    - Valence electrons are electrons that are located on the \_\_\_\_\_ energy level.
  - The number of valence electrons \_\_\_\_\_ as you move \_\_\_\_\_ the Periodic Table.
    - Example: Sodium and Potassium are both in the 1<sup>st</sup> column, so they both will have one valence electron in their last energy level.
  - If the group number is higher than nine, so 10-18, drop the one to determine the number of valence electrons.
  - **How many valence electrons will each of the elements below have?**
    - Hydrogen: \_\_\_\_\_
    - Calcium: \_\_\_\_\_
    - Aluminum: \_\_\_\_\_
    - Carbon: \_\_\_\_\_
    - Phosphorous: \_\_\_\_\_
    - Sulfur: \_\_\_\_\_
    - Bromine: \_\_\_\_\_
    - Neon: \_\_\_\_\_

### Drawing Bohr Models

1. Determine the number of rings, or energy levels. (Look at the period, or row, number.)
2. Determine the number of protons, neutrons, and electrons.
3. Determine the number of valence electrons. (Look at the group, or column, number.)
4. Draw the correct number of rings.
5. Draw the correct number of electrons on each ring, or energy level. (Use Energy Levels, Orbitals, and Electrons table.)