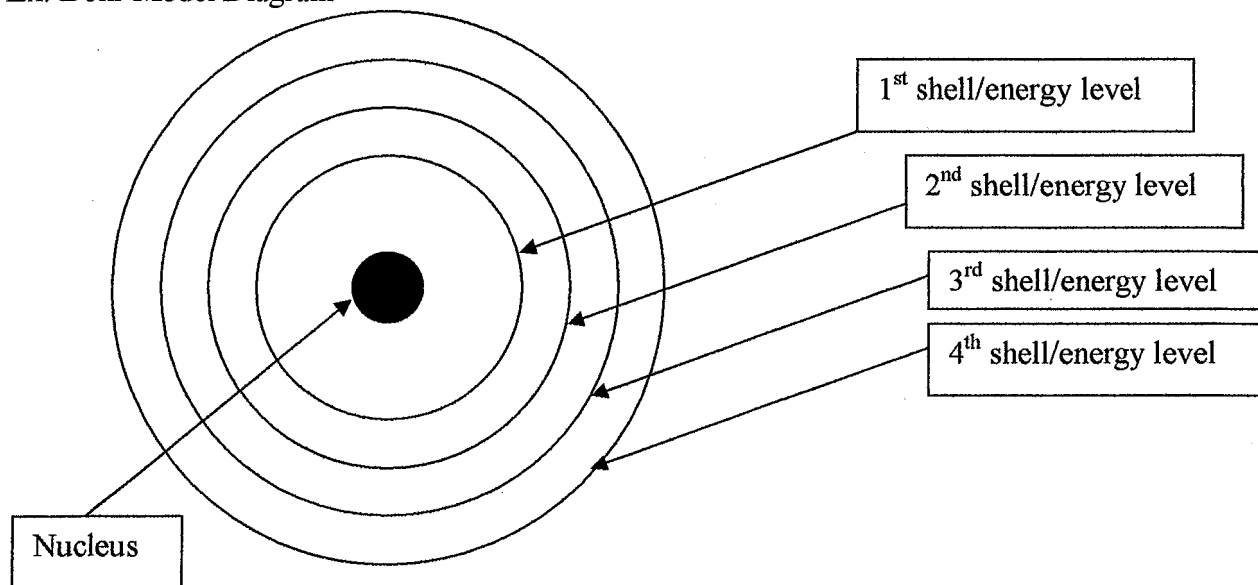


### Building an Atomic Model from a Bohr Diagram

INTRO: Scientists' perception of the structure of the atom has evolved over a period of many years. Neils Bohr proposed his model of the atom in 1913. Although the quantum mechanical model has replaced the Bohr model as the accepted model of the atoms, Bohr diagrams are useful to show the number and arrangement of electrons in various energy levels. For this lab, you will build a Bohr model for an atom of an element that your instructor assigns. (This will be for a multiple lab grade)

The Bohr model proposed electrons revolving around the nucleus in concentric, circular orbits (also called shells or energy levels), which are numbered from 1 to 7. Each orbit has a unique energy; the lowest energy is associated with the orbit closest to the nucleus and the highest energy with the orbit farthest from the nucleus.

#### Ex. Bohr Model Diagram



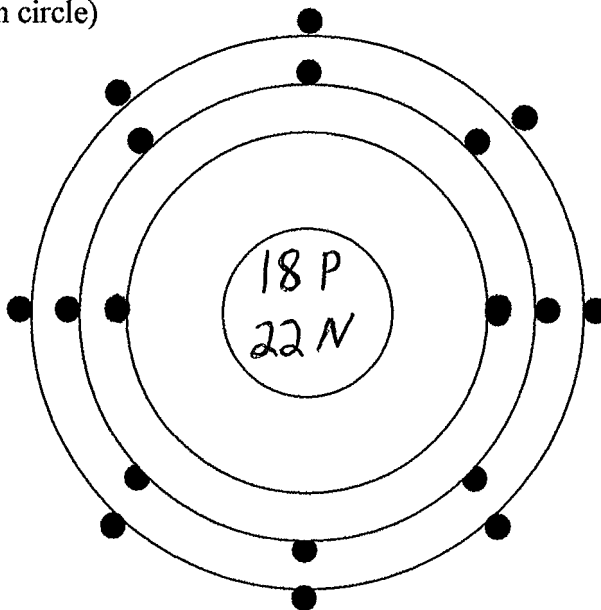
On the Periodic table of your Reference Table, the number of electrons in the principal energy level is listed below the element's atomic number. For instance, **Ar**, 2-8-8, indicates that there are 2 electrons in the 1<sup>st</sup> (or closest) principal energy level, 8 electrons in the 2<sup>nd</sup> energy level and 8 electrons in the 3<sup>rd</sup> (or outermost) principal energy level. The electrons in the outermost energy level of an atom are called the valence electrons. Argon, therefore has 8 valence electron.

- TASK I) Draw Bohr diagram for the element that was giving to/selected by you  
II) Complete the following pieces of information for your element  
III) Build a 3-Dimensional model of this element  
IV) Present your model to the class

I: Drawing a Bohr Diagram: \*Obtain a compass from the teacher for this exercise\*

1. Draw a center circle representing the nucleus and write the number of protons and neutrons in the center of this circle
2. Draw concentric circles for each occupied energy level.
3. Draw the correct number of electrons in each principal energy level (try to spread them out as evenly as possible for each circle)

Example for Argon:



**Draw Your Bohr Diagram in the space below:**

Element Name \_\_\_\_\_

Electron Configuration \_\_\_\_\_

46

## II: Atomic information

1. Element Name \_\_\_\_\_
2. Atomic Symbol \_\_\_\_\_
3. Atomic mass \_\_\_\_\_
4. Mass Number for most abundant isotope  
(Round the atomic mass to the nearest whole number) \_\_\_\_\_
5. Number of Protons \_\_\_\_\_
6. Number of Electrons \_\_\_\_\_
7. Number of Neutrons (for this isotope) \_\_\_\_\_
8. Electron configuration \_\_\_\_\_
9. Number of valence electrons  
(Re-read intro again if necessary) \_\_\_\_\_
10. 2 interesting facts about your element  
\_\_\_\_\_  
\_\_\_\_\_

## III: Build a 3-Dimensional model of this element

Construct a 3-dimensional Bohr model for your assigned element. You may use any non-perishable (non-food etc.) materials that you choose. The dollar store has many things you can use that are inexpensive and easy to obtain, or you may use materials from home. Your model will be graded on creativity and effort as well as the following:

1. Must have the correct number of protons and neutrons in the nucleus
2. Must have the correct number of electrons in the correct energy levels according to the electron configuration on your periodic table
3. Must have a way to distinguish between the different sub-atomic particles (ex. different color beads or materials for the protons, neutrons and electrons)
4. Must have a label including at least the elements name, symbol and atomic number as well as a key to distinguish between protons, neutrons and electrons

## IV: Present your model to the class

You will present your models to the class and will discuss the following information:

1. Element name
2. Symbol
3. Atomic Number
4. Number of protons, neutrons and electrons
5. Number of occupied energy levels
6. Number of valence electrons
7. 2 interesting facts about your element

See the Rubric on the following page to meet model and presentation requirements, if necessary.

Name \_\_\_\_\_

Rubric for Bohr Model Lab: This lab packet and your model must be turned in/ready on the due date in order to not be penalized the 10pts per lab period. Remember this is a multiple lab grade.

I: Drawing of your Bohr diagram for the element that was giving to/selected by you: 15 points \_\_\_\_\_

II: Complete the following pieces of information for your element: 25 points \_\_\_\_\_

III: Model: 50 points

Correct protons (6)	_____
Correct Neutrons (6)	_____
Correct electrons in proper energy level (6)	_____
Distinguished between sub-atomic particles (6)	_____
Label with name, symbol, atomic number and key (6)	_____
Effort (used class time wisely/completed outside work) (10)	_____
Creativity (goes beyond basic materials and is unique etc.) (10)	_____

Total for Model \_\_\_\_\_

IV: Presentation of your model to the class: 10 points

The following were stated: (1 point each)

Element Name	_____
Symbol	_____
Atomic Number	_____
# Protons	_____
#Neutrons	_____
#Electrons	_____
Occupied Energy levels	_____
Valence Electrons	_____
Interesting Fact #1	_____
Interesting Fact #2	_____

Total for Model \_\_\_\_\_

Final Score \_\_\_\_\_

48