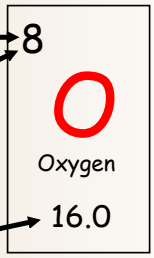
Recall:

- The number of protons = atomic number
- The number of protons = number of electrons
- Mass number = number of protons and neutrons
- Number of neutrons = mass number – atomic number



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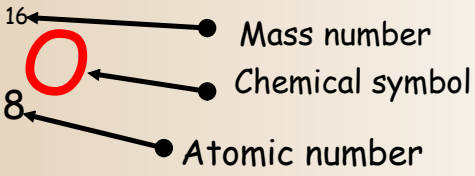
- Standard atomic notation



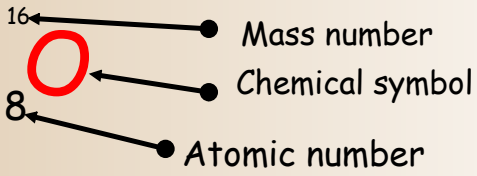
Write the standard atomic notation for the following elements:

Mass
Atomic # Element

a) magnesium b) nitrogen c) sulfur d) gold

$^{24}_{12}Mg$ $^{14}_{7}N$ $^{32}_{16}S$ $^{197}_{79}Au$

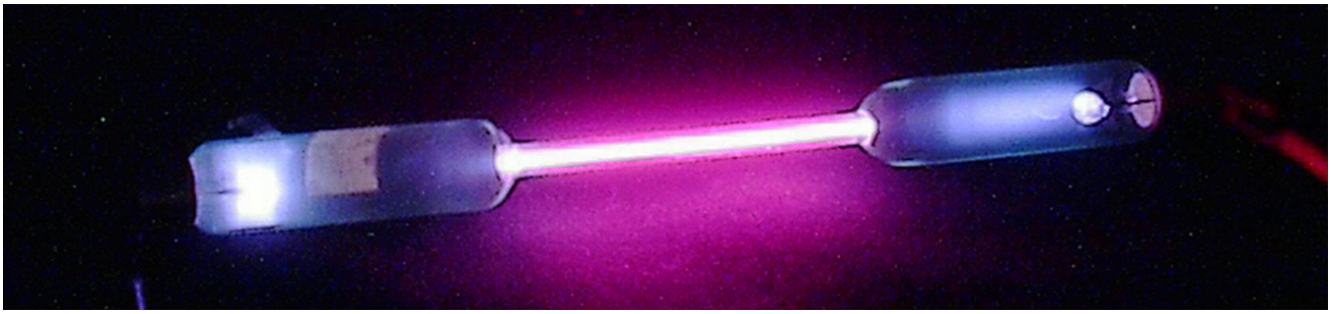
- Protons and Neutrons are found within the Nucleus of an atom, and make up the atomic mass.
- There fore the electrons are outside the nucleus but WHERE?????????



Niels Bohr (1885 – 1962)

- Was a Danish physicist who studied the parts of the atom especially the electron which were found outside of the nucleus

Niels Bohr (1885 – 1962)



- He studied light given off by gases that glowed when an electric current was passed through them

Neils Bohr

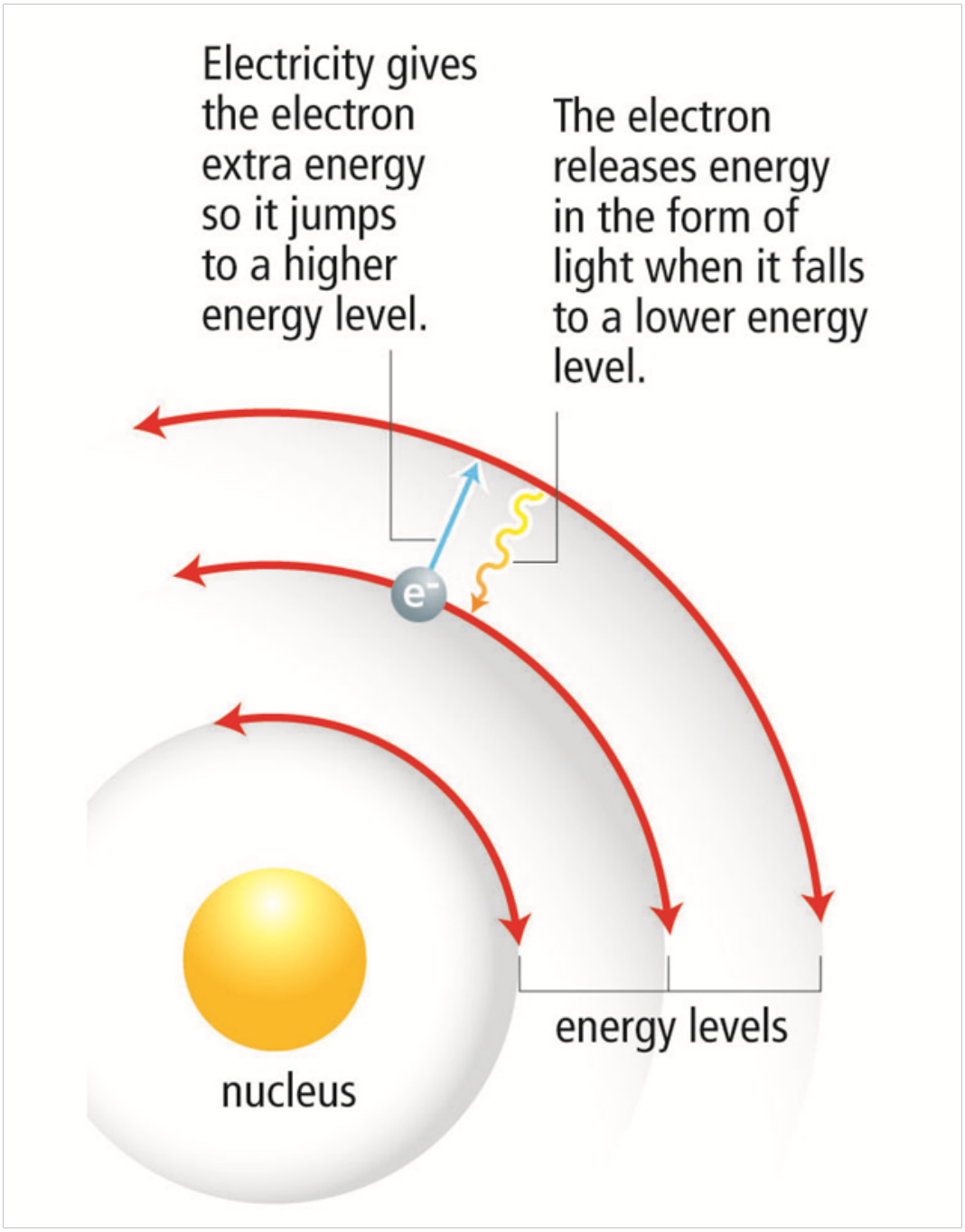
- ~~He~~ discovered that electron surround the nucleus in specific energy 'levels' or 'shells'

Bohr's Model:

Electrons have different amounts of energy

- Basically, electrons orbit the nucleus on specific paths called **orbits**

- If energy is supplied, they can jump to higher energy level paths.(Ions) . When the energy supply stops, the electrons 'fall' back to their original path.


Electricity gives the electron extra energy so it jumps to a higher energy level.
The electron releases energy in the form of light when it falls to a lower energy level.
e⁻
energy levels
nucleus

Bohr suggested that:

1. Electrons move around the nucleus in nearly circular paths called **orbits.**
2. Each plant in has a definite amount of energy.
3. The further away the electrons away from the nucleus, the greater the energy.
4. Electrons cannot exist between these orbits, but can move up or down from one orbit to another.
5. The order of the filling of the electrons in the first five orbits is 2,8,8,18, 18
6. Electrons are more stable when they are lower energy and closer to the nucleus.

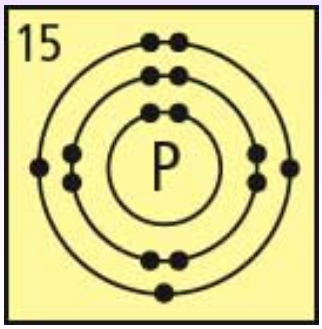
- We draw Bohr diagrams to visually represent the electronic structure of the element.
- In these diagrams the atomic symbol is written in the center to represent the nucleus
- A series of circles are drawn around the nucleus to represent the nucleus, and electrons are placed on these orbits.

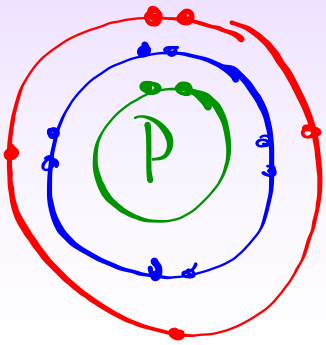
Bohr Diagrams
page 92

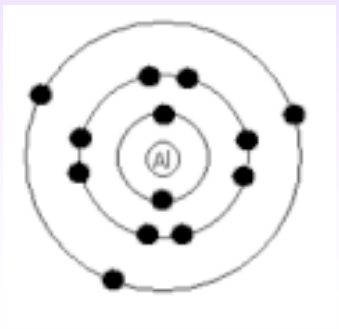
We will start with Bohr diagrams page 92

The symbol is written in the center to represent the nucleus, more circles are drawn around the outside to represent the orbits and dots are drawn to show electrons.

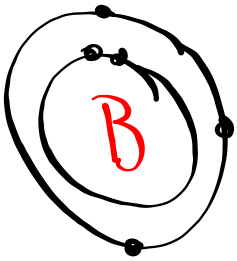
2, 8, 8, 18, 18 . . .







Boron Atomic # is 5



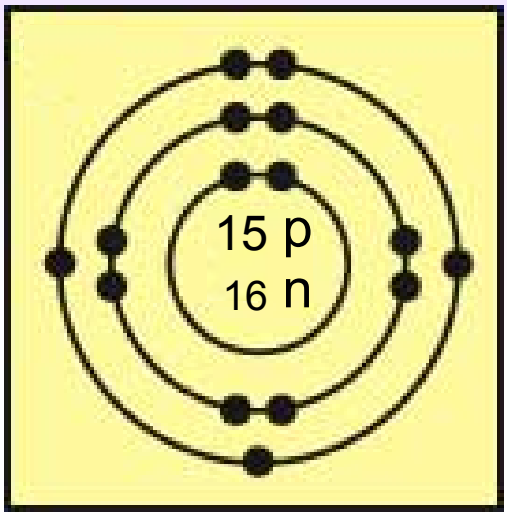
Electron arrangement for the Bohr Model

Each orbit (circle) can only hold so many electrons

Orbit	Number of Electrons
1	2
2	8
3	8
4	18
5	18

Bohr- Rutherford Model

Is a combination of Bohr's planetary model with Rutherford's nuclear model. These diagrams summarize the number and positions of all the three subatomic particles.



Phosphorus Atom

Atomic mass = 31

= P + N

N = Mass − Atomic # Protons

Creating Bohr-Rutherford Diagrams

Follow these steps to make a Bohr diagram.

Step 1: Draw a circle (represents the nucleus) and put the number of neutrons and protons in the centre.

Step 2: Find out how many electrons the element has (periodic table)

Step 3: Draw orbits containing the proper number of electrons.

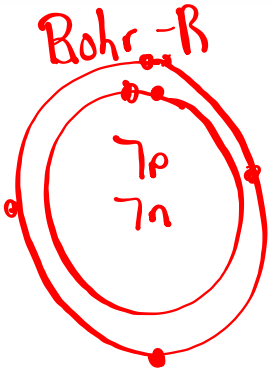
We will do nitrogen as an example.

Atomic # 7

Mass # = 14

p = 7

n = 14 - 7
= 7



" What happens when electrons lose their energy?"

"They Get Bohr'ed"

Bohr-Rutherford Diagram of Nitrogen

Another example
Try helium

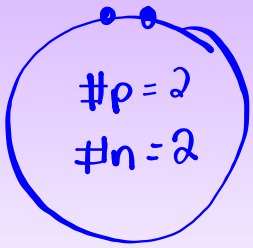
Atomic # = 2

Atomic Mass = 4

p = 2

e = 2

n = 4 - 2 = 2



Helium