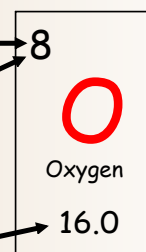


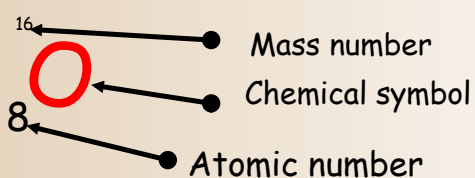
Recall:

- 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



* copy down

- Standard atomic notation



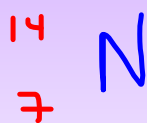
Write the standard atomic notation for the following elements:

Mass
Atomic # Element

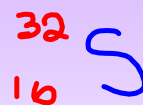
a) magnesium



b) nitrogen



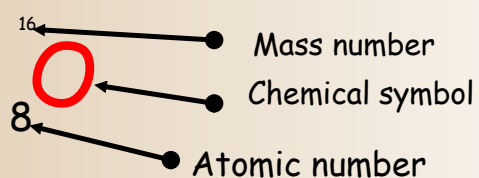
c) sulfur



d) gold



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

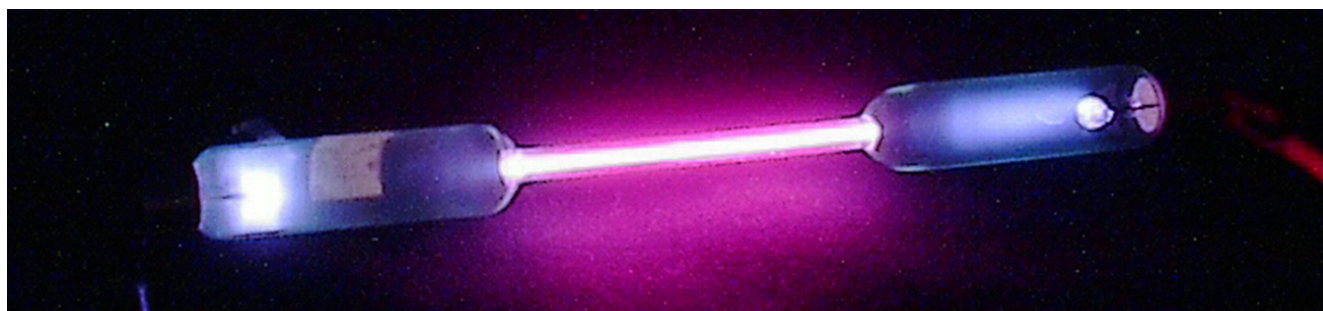


Niels Bohr (1885 – 1962)



- 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

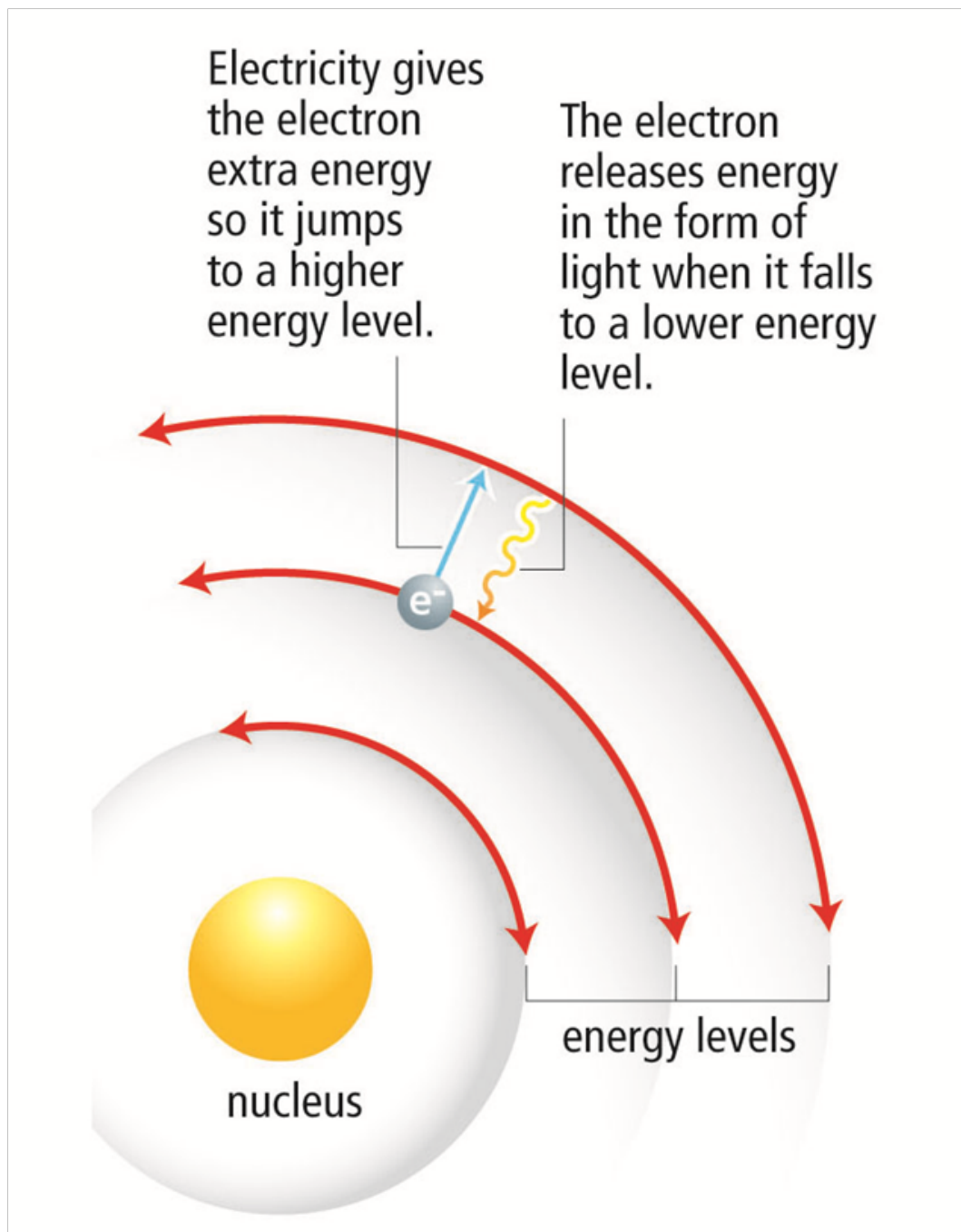
Neils Bohr

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

Bohr's Model:

Electrons have different amounts of energy

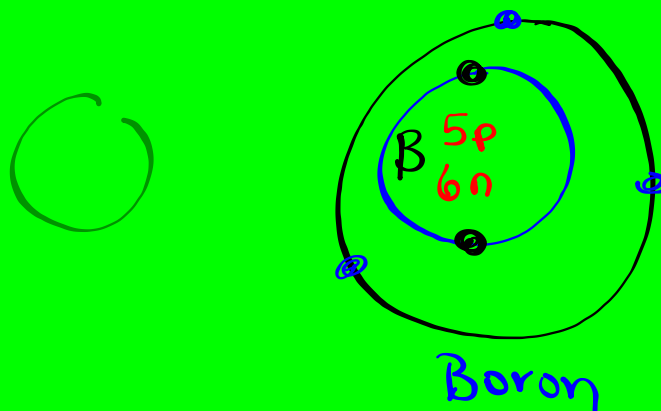
- Basically, electrons orbit the nucleus on specific paths called orbits
- If energy is supplied, they can jump to higher energy level paths. (ions) . When the energy supply stops, the electrons 'fall' back to their original path.



Bohr suggested that:

1. Electrons move around the nucleus in nearly circular paths called orbits.
2. Each orbit 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. *(has to be on a orbit not between)*
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.



#p = 5 11
#e = 5 5 Boron
#n = 6

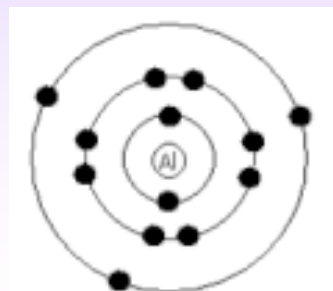
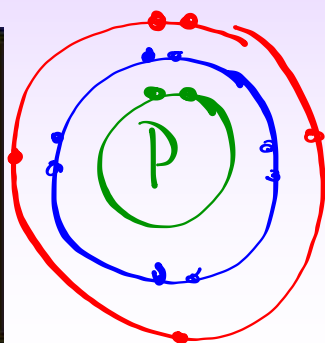
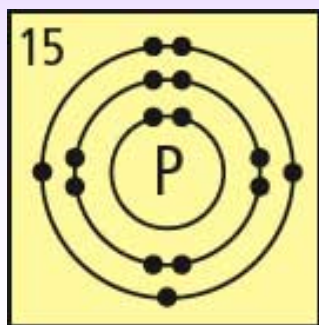
2, 8, 8, 18

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...

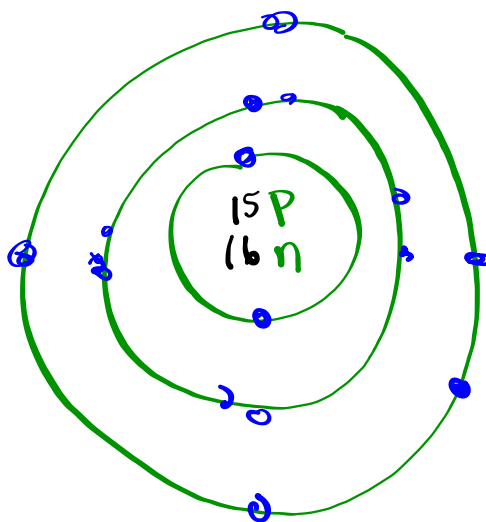


Phosphorus

³¹P
15 P

#e = 15
#p = 15
#n = 31 - 15
= 16

2, 8, 8, 18



Phosphorus

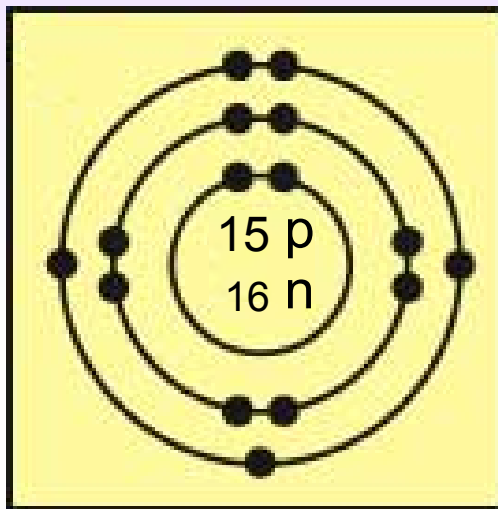
Electron arrangement for the Bohr Model

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

$$= P + N$$

$$N = \text{Mass} - \text{Protons}^{\text{atomic}}$$

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.

mass - p atomic #

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

atomic #

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

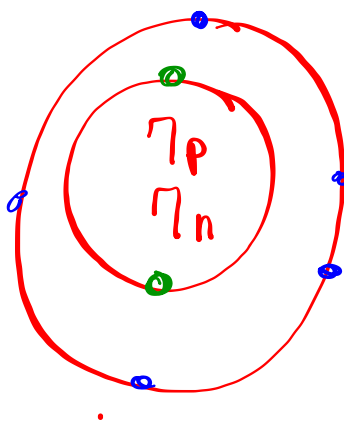
2, 8, 8, 18 /

We will do nitrogen as an example.

$^{14}_7\text{N}$

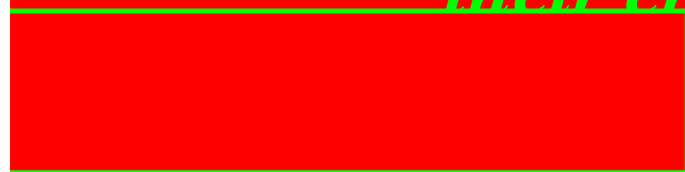
✓ #p = 7
 #e = 7
 ✓ #n = 14 - 7 = 7
 mass - proton

✓ ✓
 2, 8, 8, 18





" What happens when electrons lose their energy?"



"They Get Bohr'ed"

Bohr-Rutherford Diagram of Nitrogen

Another example Try helium

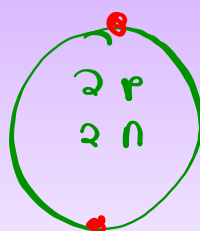


$$\#p = 2$$

$$\#e = 2$$

$$\#n = 4 - 2 = 2$$

2, 8, 8, 18



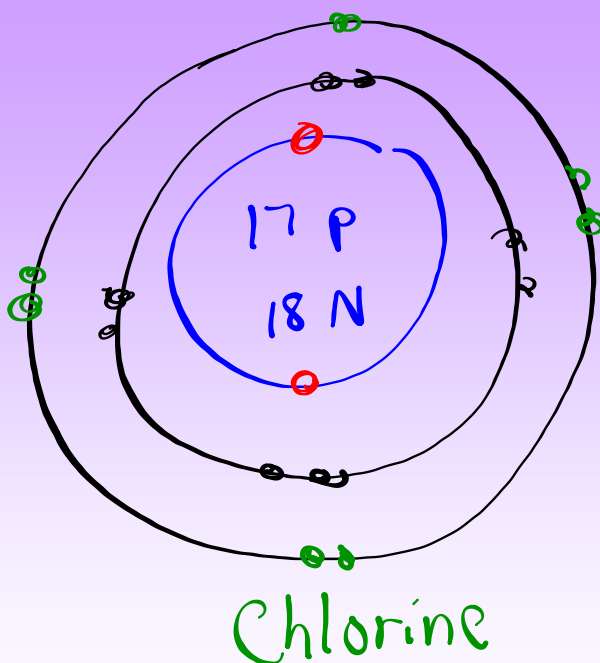
Helium

Bohr Rutherford Diagram of Chlorine

35
17 Cl

#p = 17
#e = 17
#n = 35 - 17
= 18

2, 8, 8, 18
10
18



Another Example

Try carbon

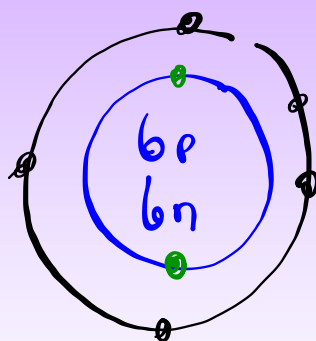


$$\#p = 6$$

$$\#e = 6$$

$$\#n = 12 - 6 = 6$$

2, 8, 8, 18



Carbon

<https://www.youtube.com/watch?v=PnTFQwVSVxk>

Atomic Number greater than 20
Won't ask to do

