

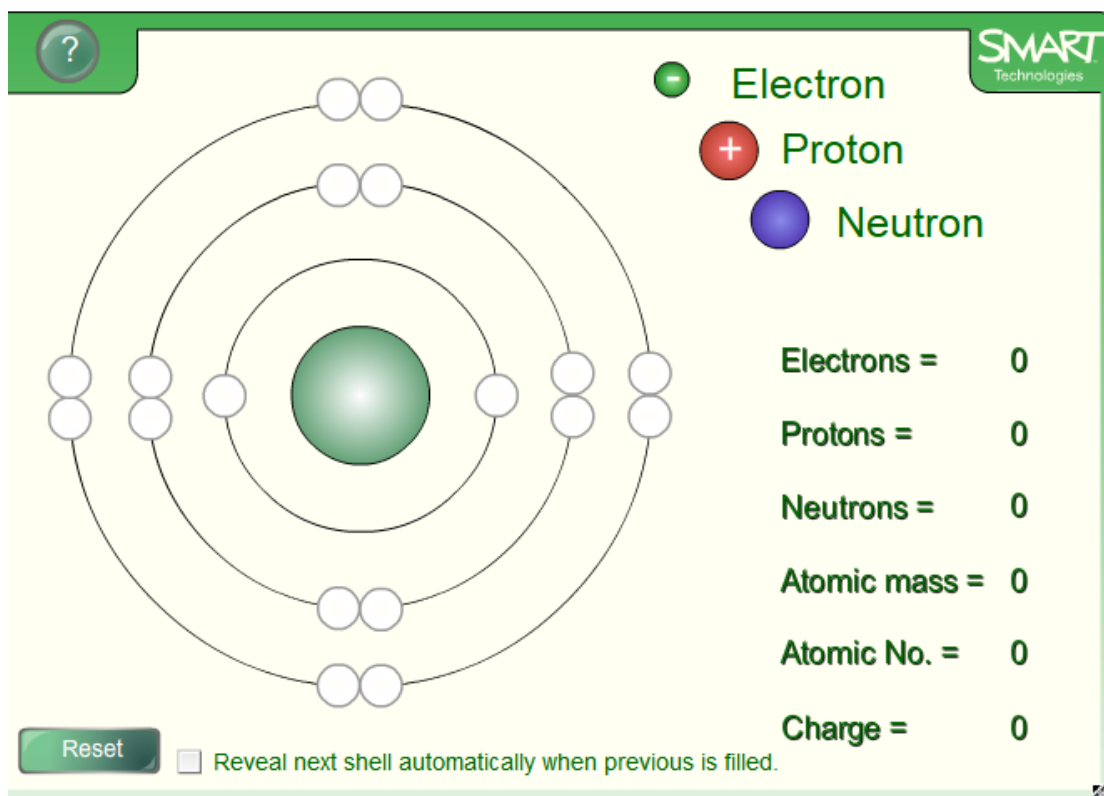
## Warm Up

Without looking in your notes, what 3 facts, names or models can you remember about the atomic model of the atom?

## Elements and Atomic Structure

The Bohr-Rutherford model of the atom states that atoms are composed of three subatomic particles: **protons**, **neutrons**, and **electrons**

# Bohr Diagrams



The image shows a software interface for creating Bohr diagrams. On the left, a central green sphere represents the nucleus, surrounded by three concentric circles representing electron shells. The innermost shell is empty. The middle shell contains two white circles (electrons) at the top and two at the bottom. The outermost shell contains two white circles at the top, two at the bottom, and two on each side. A legend on the right identifies the symbols: a green circle with a minus sign for an electron, a red circle with a plus sign for a proton, and a blue circle for a neutron. Below the legend, a list of properties shows all values set to zero: Electrons = 0, Protons = 0, Neutrons = 0, Atomic mass = 0, Atomic No. = 0, and Charge = 0. At the bottom left, there is a 'Reset' button and a checkbox labeled 'Reveal next shell automatically when previous is filled.' The 'SMART Technologies' logo is in the top right corner.

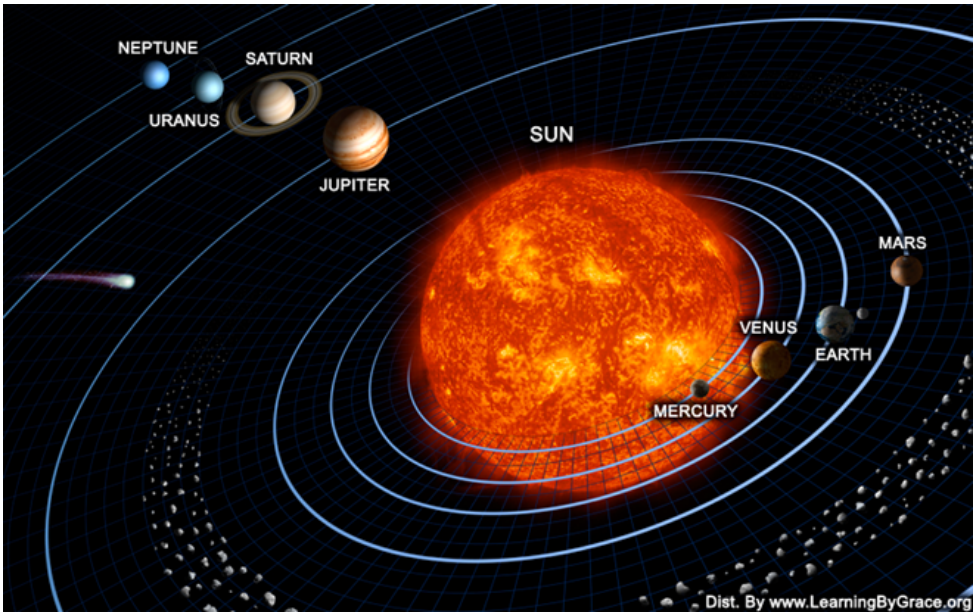
**SMART**  
Technologies

Electron  
Proton  
Neutron

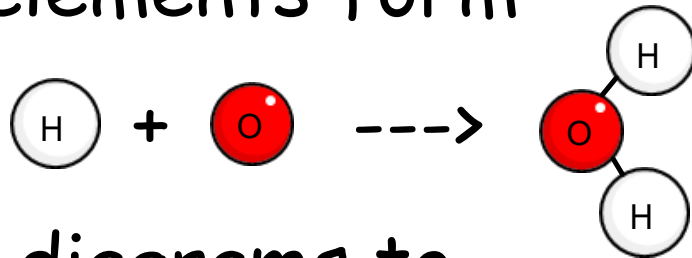
Electrons = 0  
Protons = 0  
Neutrons = 0  
Atomic mass = 0  
Atomic No. = 0  
Charge = 0

Reset  Reveal next shell automatically when previous is filled.

# Bohr Diagrams - A Planetary Model



Bohr diagrams are used to picture how elements form compounds.



We use Bohr diagrams to represent the arrangement of electrons in various orbits.

As the number of electrons increase, so do the amount of orbits for each Bohr diagram. There is actually a set amount of electrons allowed in each orbit before it is "filled"

## Example: Bohr diagram for Lithium

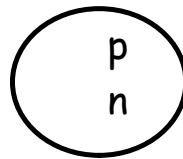
*Step 1*: Find the number of  
**protons**, **neutrons**, and **electrons**

**protons** -

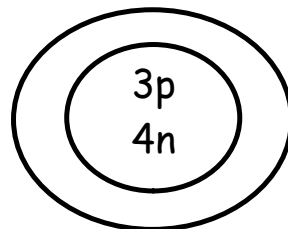
**neutrons** -

**electrons** -

*Step 2* - Draw your nucleus and include in there the number of **protons** and **neutrons** for your elements

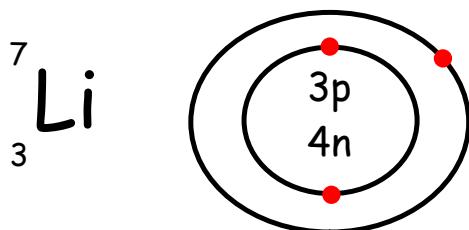


*Step 3* - Place your **electrons** on the orbits as "dots". Remember that the first shell can only hold **2 electrons**, while the second and third can both hold **8 electrons**.





*Step 4 - Include proper atomic notation beside the diagram.*



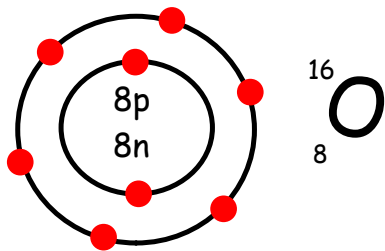


Draw proper Bohr diagrams for the following elements:

- |               |              |
|---------------|--------------|
| (a) beryllium | (f) boron    |
| (b) oxygen    | (g) flourine |
| (c) neon      | (h) sulfur   |
| (d) sodium    | (i) argon    |
| (e) potassium | (j) calcium  |

An **ion** is a charged atom. Ions are formed when atoms **gain** or **lose** electrons.

When orbits have outer shells that are not full (or half-way)

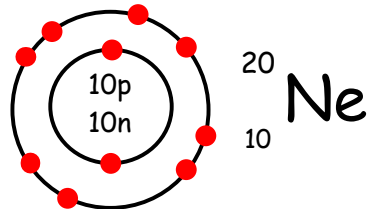
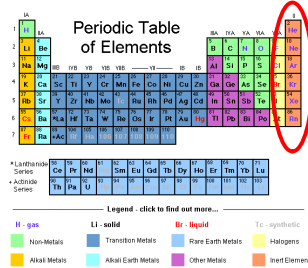


They have a tendency to want to fill or empty that outer level.

If the element **loses** electrons, it would become more positive.

If the element **gains** electrons, it would become more negative.

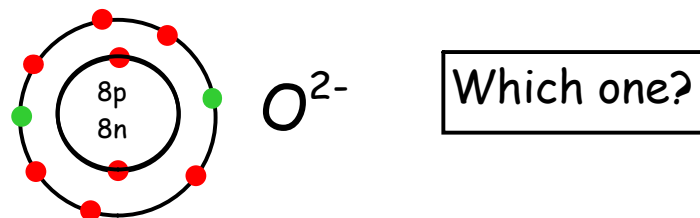
The noble gases don't like to react as much because they are chemically stable.



Ionic charges are assigned to an unstable element to indicate how many electrons were gained or lost.

Ex.  $O^{2-}$ ,  $N^{3-}$ ,  $Be^{2+}$ , Ne

The stable Bohr diagram represents one of the noble gases.



We would say the "Isoelectronic Noble Gas" for Oxygen would be



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Science 10 Textbook