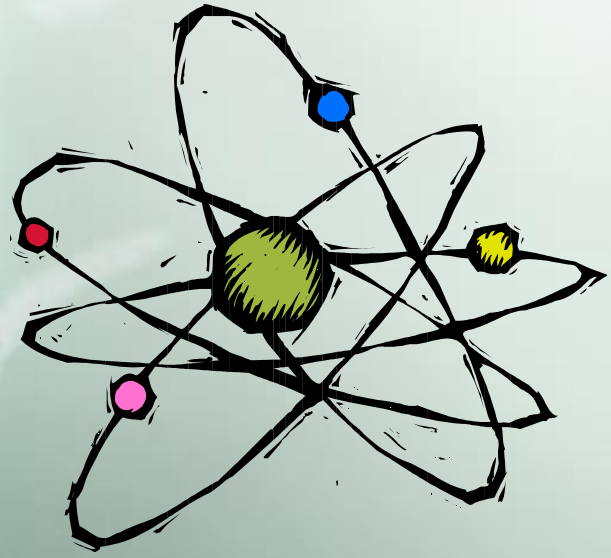
Elements & Atoms



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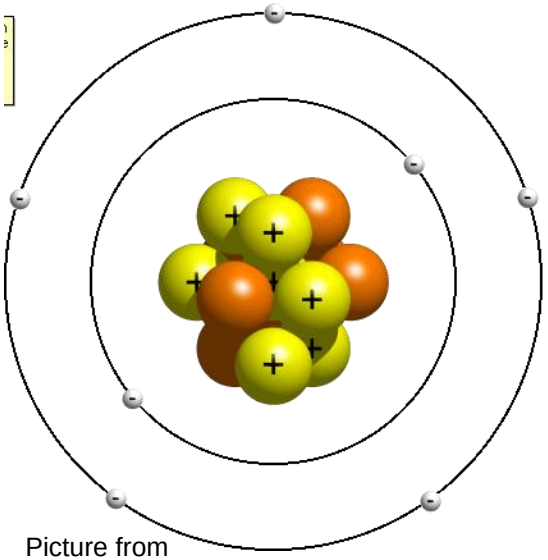
An atom refresher

- **Matter** is anything that takes up space and has mass.
- All matter is made of atoms
- https://pub.dev/packages/advance_pdf_viewer
- Atoms are the building blocks of matter, sort of how bricks are the building blocks of houses.

An atom refresher

- An atom has three parts:
- **Proton** = positive
- **Neutron** = no charge
- **Electron** = negative



Picture from
http://education.jlab.org/qa/atom_model_03.gif

- The proton & neutron are found in the center of the atom, a place called the **nucleus**.
- The *electrons* orbit the nucleus.

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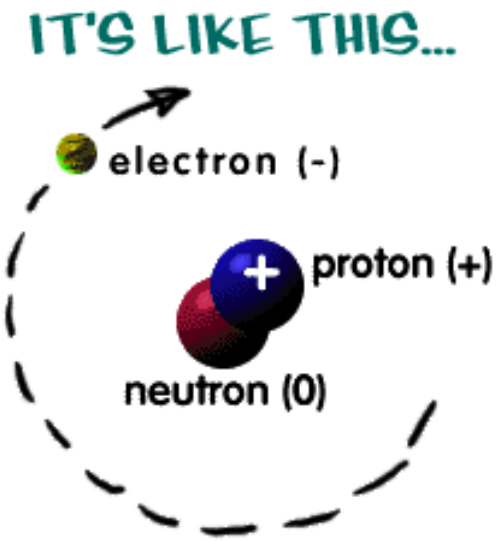
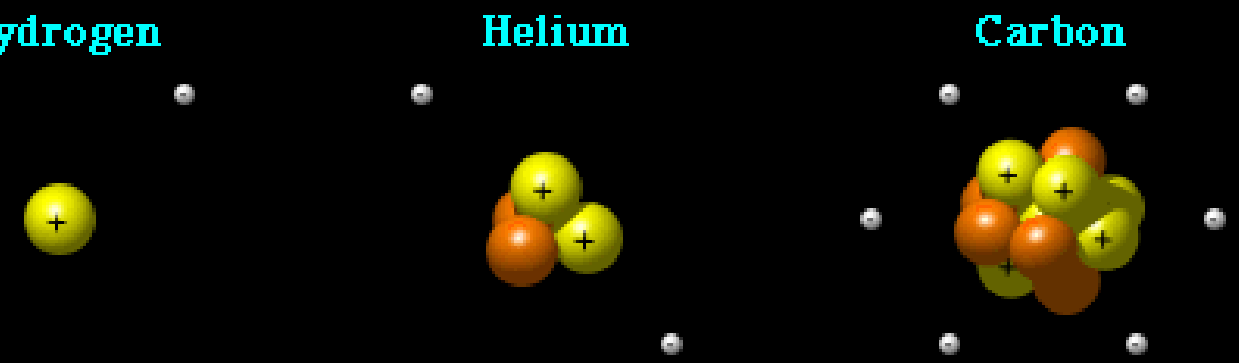
What are elements?

- Elements are the alphabet to the language of molecules.
- To make molecules, you must have elements.
- Elements are made of atoms. While the atoms may have different weights and organization, they are all built in the same way.



Information & picture from Chem4kids at
http://www.chem4kids.com/files/atom_structure.html

Atoms always have as many electrons as protons.
Atoms usually have about as many neutrons as protons.



Hydrogen	Helium	Carbon
1 proton	2 protons	6 protons
1 electron	2 electrons	6 electrons
0 neutrons	2 neutrons	6 neutrons

Adding a proton makes a new kind of atom!
Adding a neutron makes an isotope of that atom, a heavier version of that atom!

Graphic from http://education.jlab.org/atomtour/fact2.html

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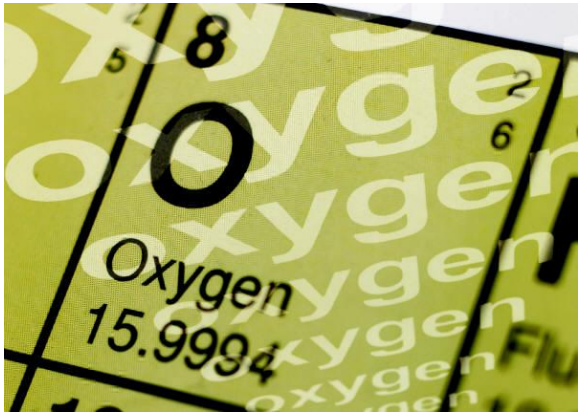
More about Elements..

- **Elements** are the building blocks of all matter.
- The periodic table is a list of all of the elements that can build matter. It's a little like the alphabet of chemistry.
- The periodic table tells us several things…



Periodic Table

Atomic Number:

Number of protons and it is also the number of electrons in an atom of an element.

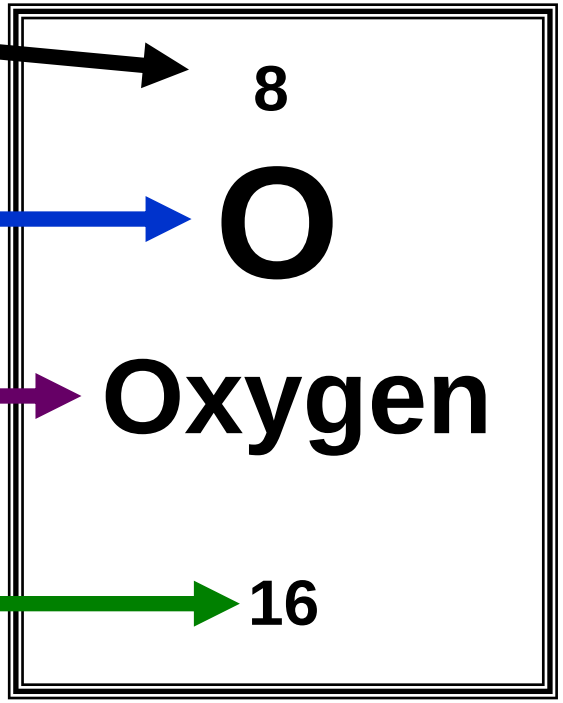
Element's Symbol:

An abbreviation for the element.

Elements Name

Atomic Mass/Weight:

Number of protons + neutrons.

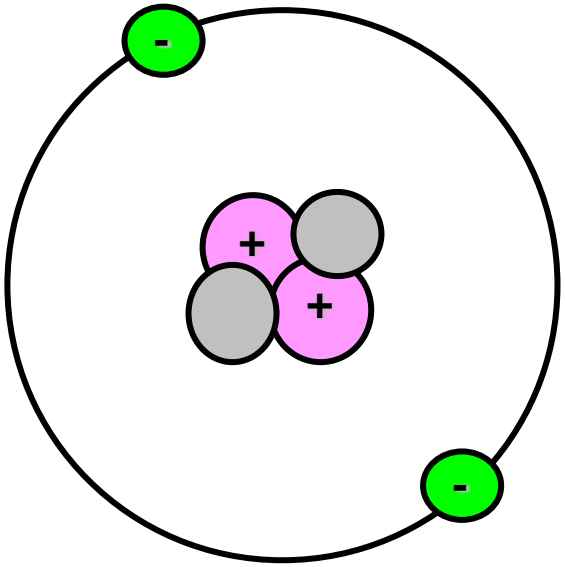


Atom Models

- There are two models of the atoms we will be using in class.
- Bohr Model
- Lewis Dot Structure

Bohr Model

- The Bohr Model shows all of the particles in the atom.
- In the center is circles. Each circle represents a single neutron or proton. Protons should have a plus or P written on them. Neutrons should be blank or have an N.
- In a circle around the nucleus are the electrons. Electrons should have a minus sign or an e.



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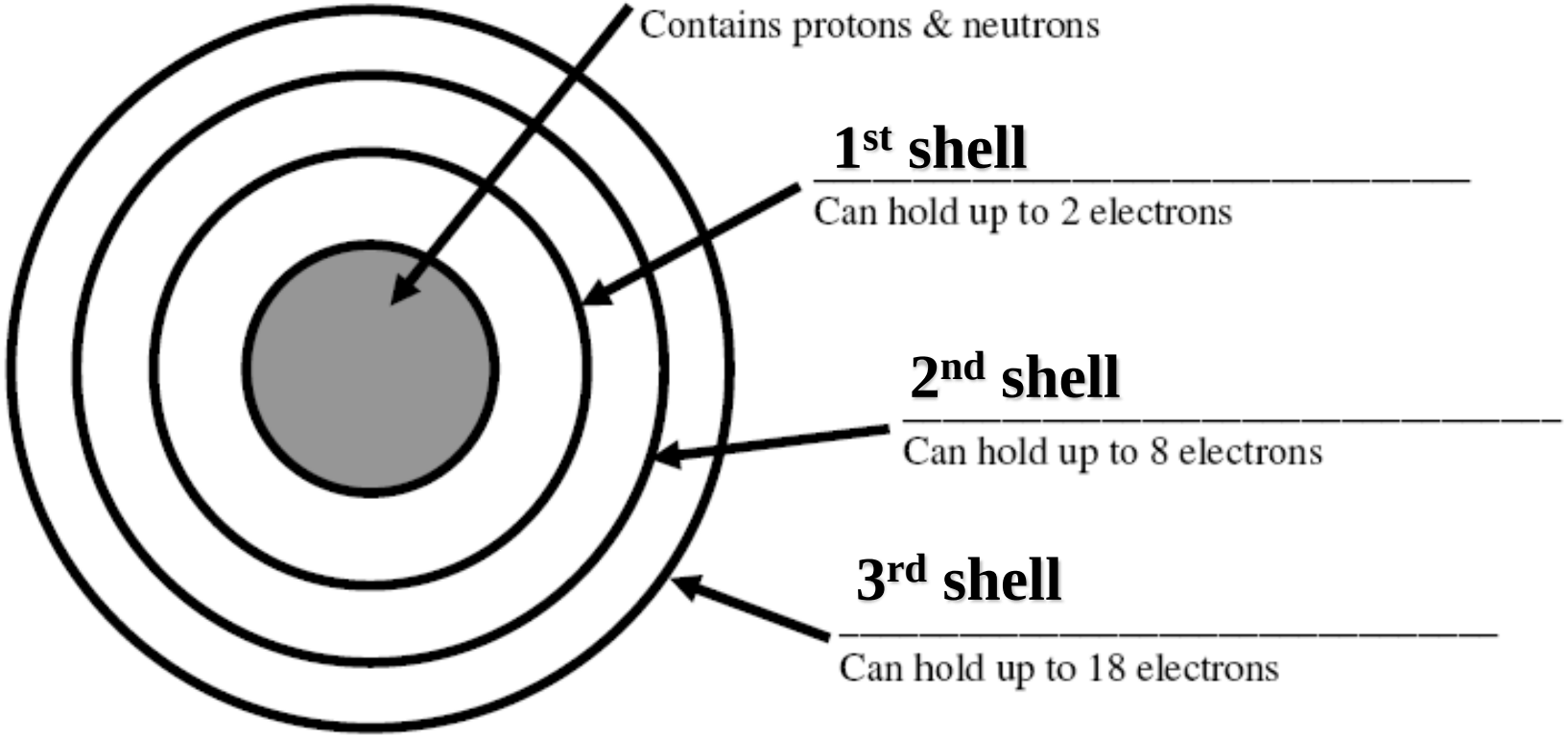
Electrons have special rules….

- You can’t just shove all of the electrons into the first orbit of an electron.
- Electrons live in something called **shells or energy levels**.
- Only so many can be in any certain shell.



Adapted from http://www.sciencespot.net/Media/atomsfam.pdf

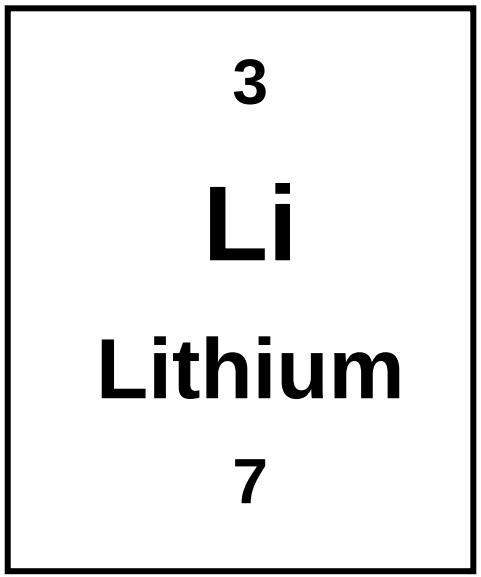
Electrons have special rules….

- You can’t just shove all of the electrons into the first orbit of an electron.
- Electrons live in something called shells or energy levels.

- Only so many can be in any certain shell.
- The electrons in the outer most shell of any element are called **valance electrons**.

So let's try it….

- How to draw a Lithium atom
- First, look at the Periodic Table
- Second, determine the number of protons (Look @ the atomic number)
- Then determine the number of neutrons (Atomic mass – atomic number)
- Then determine the number of electrons (Look @ the atomic number)



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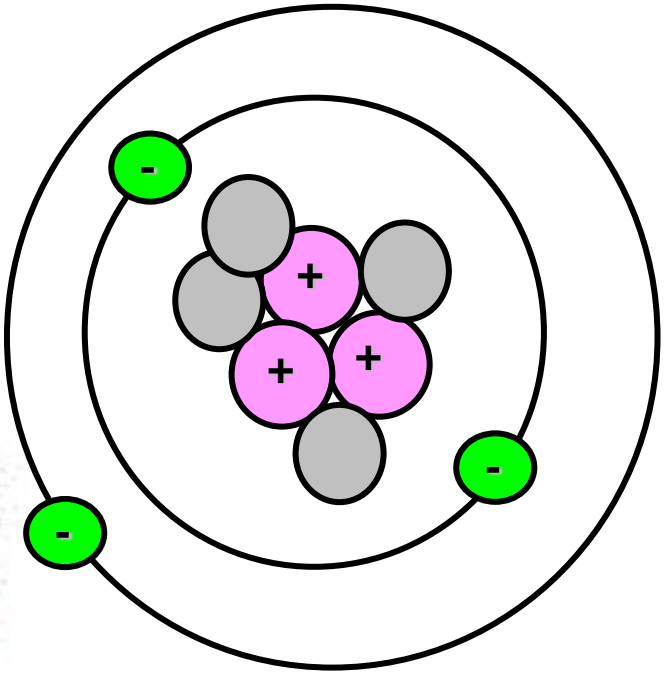
So let's try it....



Protons = 3

3

Li

Lithium

7

Electrons = 3

2 in the 1st shell, 1 in the 2nd shell

Neutrons = 4

(7-3=4)

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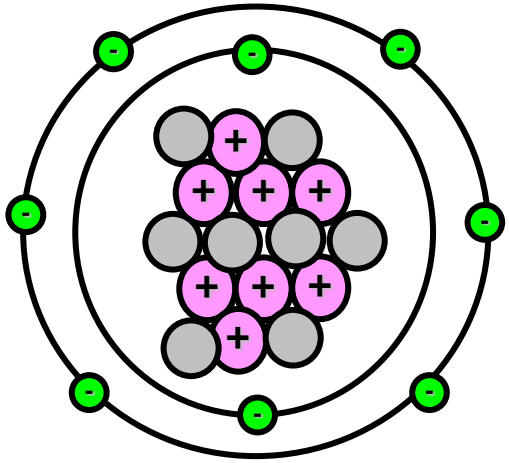
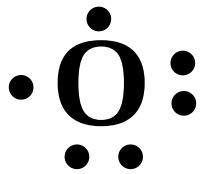
Lewis Dot Structure

- The Lewis Dot Structure is a bit different from the Bohr model.
- It only shows the element symbol and it's outer most electron shell.





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How to…

1. Write the symbol.
2. Start on the right hand side, working your way clockwise around the symbol.
3. Try Lithium

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Your activity…

- Using the beans (Lentils are electrons, Lima Beans are protons, and kidney beans are neutrons), create a Bohr model , and then a Lewis dot structure model of each of the first 20 elements. After you have created each model, draw each model on your chart.
- Hint to make a chart, use a burrito fold, then fold the top down by 1 ½ inches. Unfold, you now have 3 columns. Label the columns: element, Bohr model, Lewis Dot.