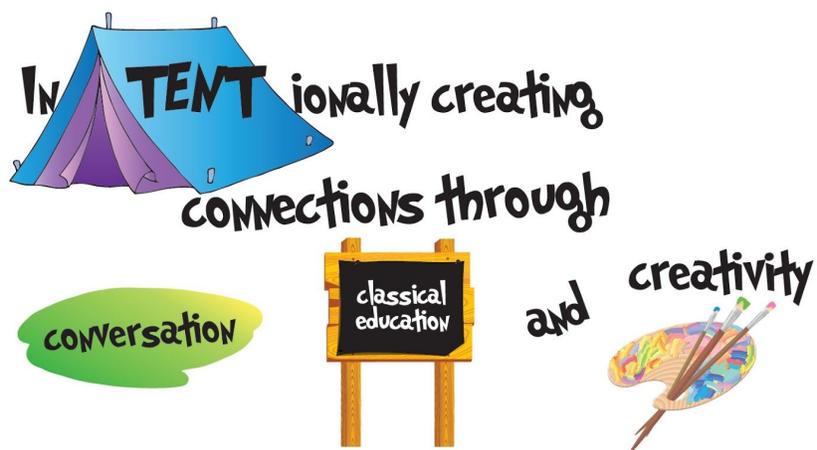


ELEMENTS EXPLAINED

An introduction to the first 12 elements of the periodic table

- Atomic Number
- Atomic Mass
- Number of Electrons (Electron shells)
- Isotopes

For more lesson planning ideas, check out <https://ClassicalbutRelevant.com>



<https://ClassicalbutRelevant.com>

I hope you are enjoying learning about Chemistry! I am not an expert at this. I don't have a Science major. But I have been studying up in order to teach my children about the periodic table. I am excited to share with you what I am learning!

This resource is meant to be only an overview and not a comprehensive study of the periodic table. Some of the concepts have been oversimplified for beginners.

Included with this resource:

- Basic Definitions
- Models of Atoms for Elements 1-12
- Basic Information about Elements 1-12
- Blank Atom Models for Student Use
- Lesson Planning Ideas

This resource is meant for homeschool or classroom use. If you would like to share this information with others, please refer them to classicalbutRelevant.com .

Thanks,

Christina Easterling

Definitions

Atomic Number - Number of protons in an atom. This number defines the element. The number of neutrons and electrons can change but the element is still the same element. If the number of protons changes, it is not longer the same element.

Atomic Mass - Number of protons + neutrons in an atom. Electrons do not add mass to an atom.

Isotope - an atom with a different amount of neutrons. Example: Uranium can be found in two forms: Uranium - 235 and Uranium - 238. The number after the element is the atomic mass. It differs because of differing number of neutrons. Both have the same number of protons so they are both Uranium.

Electron shells - electrons orbit a nucleus in shells. They fill these shells in a predictable order. An atom fills the first shell with two electrons (except of course for Hydrogen, which has only one electron). The second shell can hold up to 8. The third shell fills to 8.¹

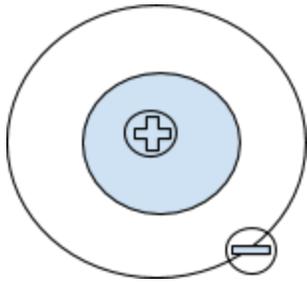
An atom likes to have its shells full. This is why the noble gases are stable - their electron shells are full. The atoms with one extra electron, known as **alkali**, are highly reactive - they want to react to get rid or share that extra electron. Likewise, atoms with only one electron missing from the shell, known as **halogens**, readily react to fill that shell.

¹ Things change a bit when you get to the transition metals and the fourth shell. Since we are only covering the first twelve elements, we do not need to go into further details.

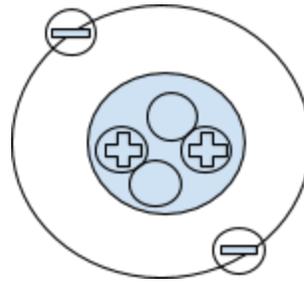
The first row on the periodic table

One shell for electrons. The first shell for electrons holds two.

Hydrogen and Helium are the smallest, lightest atoms. They are gases.



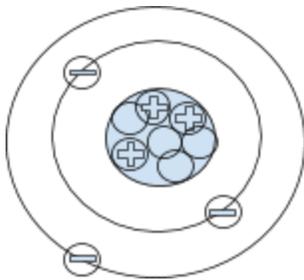
Hydrogen - H
Atomic Number (protons): 1
Atomic Mass (protons + neutrons): 1
Electrons: 1



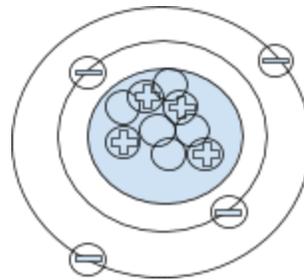
Helium - He
Atomic Number (protons): 2
Atomic Mass (protons + neutrons): 4
Electrons: 2

Second row on the periodic table.

Two shells for electrons. First shell holds two. Second shell holds eight.

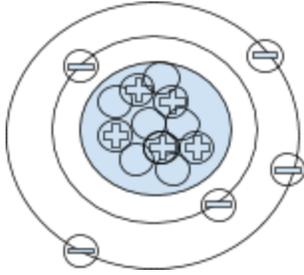


Lithium - Li
Atomic Number (protons): 3
Atomic Mass (protons + neutrons): 7
Electrons: 2 + 1

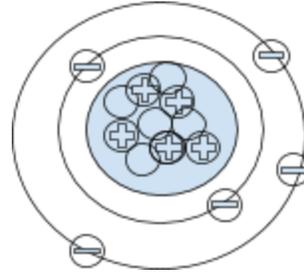


Beryllium - Be
Atomic Number (protons): 4
Atomic Mass (protons + neutrons): 9
Electrons: 2 + 2

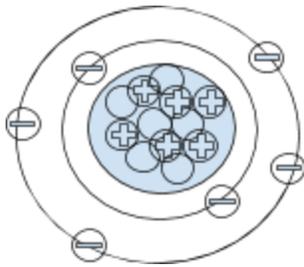
Boron is an example of an **isotope**. It can be found with 6 neutrons or with 5 neutrons. The number electrons and protons remains the same.



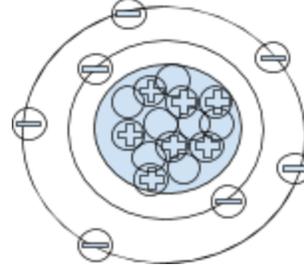
Boron - B, Isotope 11
Atomic Number (protons): 5
Atomic Mass (protons + neutrons): 11
Electrons: 2 + 3



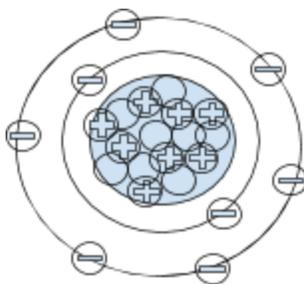
Boron - B, Isotope 10
Atomic Number (protons): 5
Atomic Mass (protons + neutrons): 10
Electrons: 2 + 3



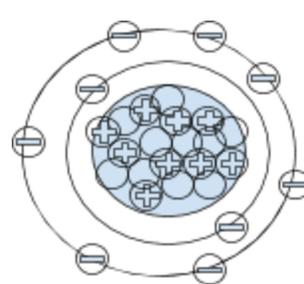
Carbon - C
Atomic Number (protons): 6
Atomic Mass (protons + neutrons): 12
Electrons: 2 + 4



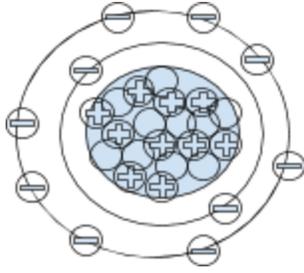
Nitrogen - N
Atomic Number (protons): 7
Atomic Mass (protons + neutrons): 14
Electrons: 2 + 5



Oxygen - 8
Atomic Number (protons): 8
Atomic Mass (protons + neutrons): 16
Electrons: 2 + 6



Fluorine - 9
Atomic Number (protons): 9
Atomic Mass (protons + neutrons): 19
Electrons: 2 + 7



Neon - Ne

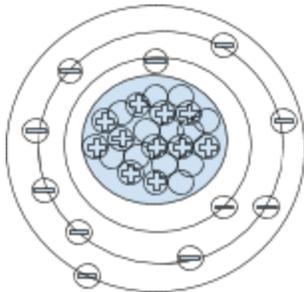
Atomic Number (protons): 10

Atomic Mass (protons + neutrons): 20

Electrons: 2 + 8

Third row of the periodic table

Three shells for electrons. First shell holds two. Second shell holds eight. Third shell holds eight.

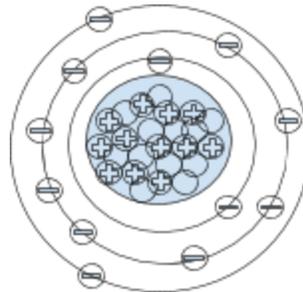


Sodium - Na

Atomic Number (protons): 11

Atomic Mass (protons + neutrons): 23

Electrons: 2 + 8 + 1

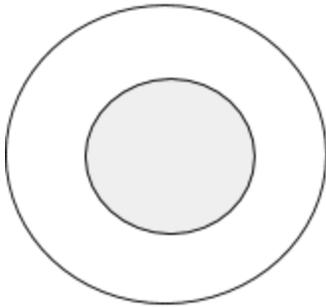


Magnesium - Mg

Atomic Number (protons): 12

Atomic Mass (protons + neutrons): 24

Electrons: 2 + 8 + 2

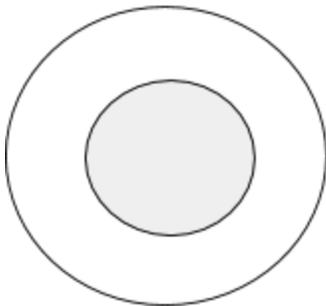


Element Name: _____

Element Symbol: _____ Atomic Number: _____

Atomic Mass: _____

of electrons: _____ protons: _____ neutrons : _____

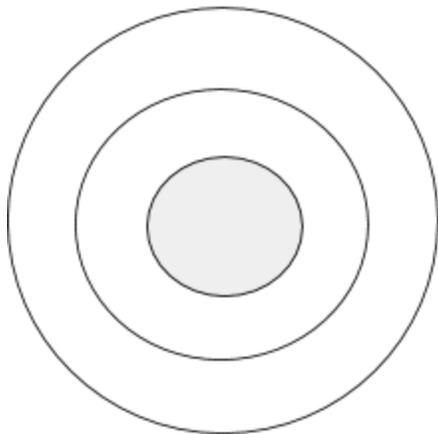


Element Name: _____

Element Symbol: _____ Atomic Number: _____

Atomic Mass: _____

of electrons: _____ protons: _____ neutrons : _____

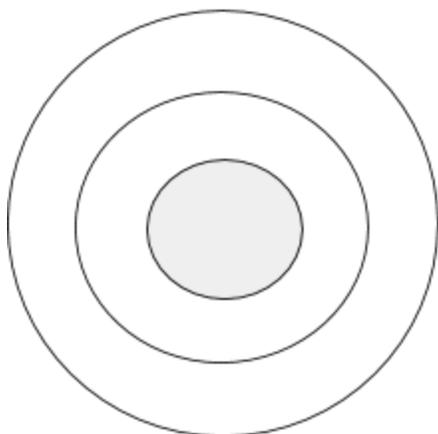


Element Name: _____

Element Symbol: _____ Atomic Number: _____

Atomic Mass: _____

of electrons: _____ protons: _____ neutrons : _____

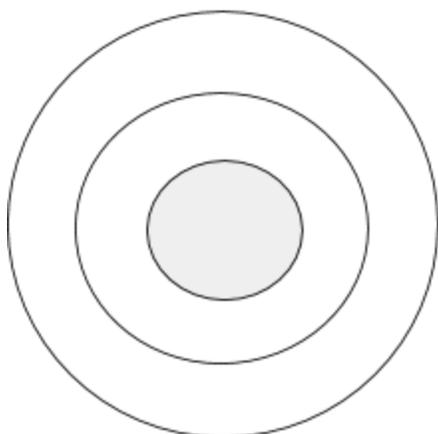


Element Name: _____

Element Symbol: _____ Atomic Number: _____

Atomic Mass: _____

of electrons: _____ protons: _____ neutrons : _____

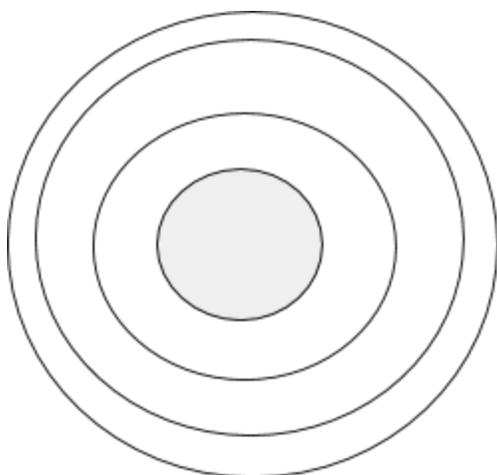


Element Name: _____

Element Symbol: _____ Atomic Number: _____

Atomic Mass: _____

of electrons: _____ protons: _____ neutrons : _____

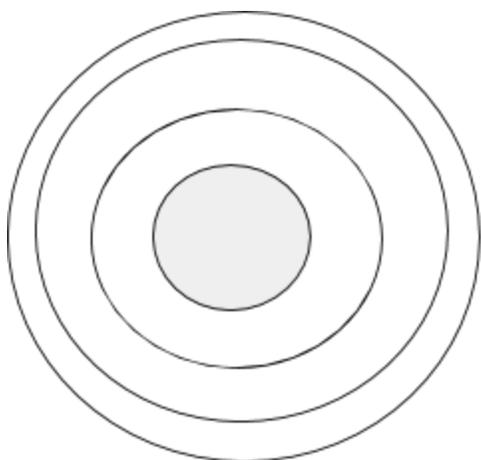


Element Name: _____

Element Symbol: _____ Atomic Number: _____

Atomic Mass: _____

of electrons: _____ protons: _____ neutrons : _____

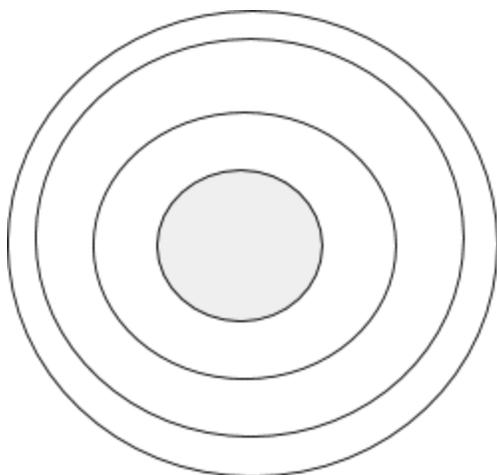


Element Name: _____

Element Symbol: _____ Atomic Number: _____

Atomic Mass: _____

of electrons: _____ protons: _____ neutrons : _____



Element Name: _____

Element Symbol: _____ Atomic Number: _____

Atomic Mass: _____

of electrons: _____ protons: _____ neutrons : _____

Lesson Plan For Teaching Elements and Periodic Table

Give your student the blank diagrams. (Make multiple copies of the atom models that have only two electron shell rings.) Have the periodic table (or at least the first 12 elements) available for reference or check out the flashcard link below. Have the students fill in the information.

For the purpose of this exercise, we will assume the atom is neutral, which means that the number of protons and the number of electrons are the same. The atomic number is the number of protons. The atomic mass is the number of protons + neutrons, so to find the number of neutrons subtract. $\text{Neutrons} = \text{atomic mass} - \# \text{ of protons}$.

The electrons orbit around the nucleus. The protons and neutrons are found inside the nucleus. Begin by drawing electrons on the inner shells. Then, move outward. The first shell can hold 2, and the second and third shells can hold 8 each.

Use my filled in models as reference. Students should attempt to fill in their models without just copying.

For instructions on creating more crafty atom models of elements, check out my blogpost at

<https://classicalbutrelevant.com/2017/06/08/atoms-and-elements-activities/>

To print out flashcards with atomic number and atomic mass:

<http://stemsheets.com/science/periodic-table-flash-cards>