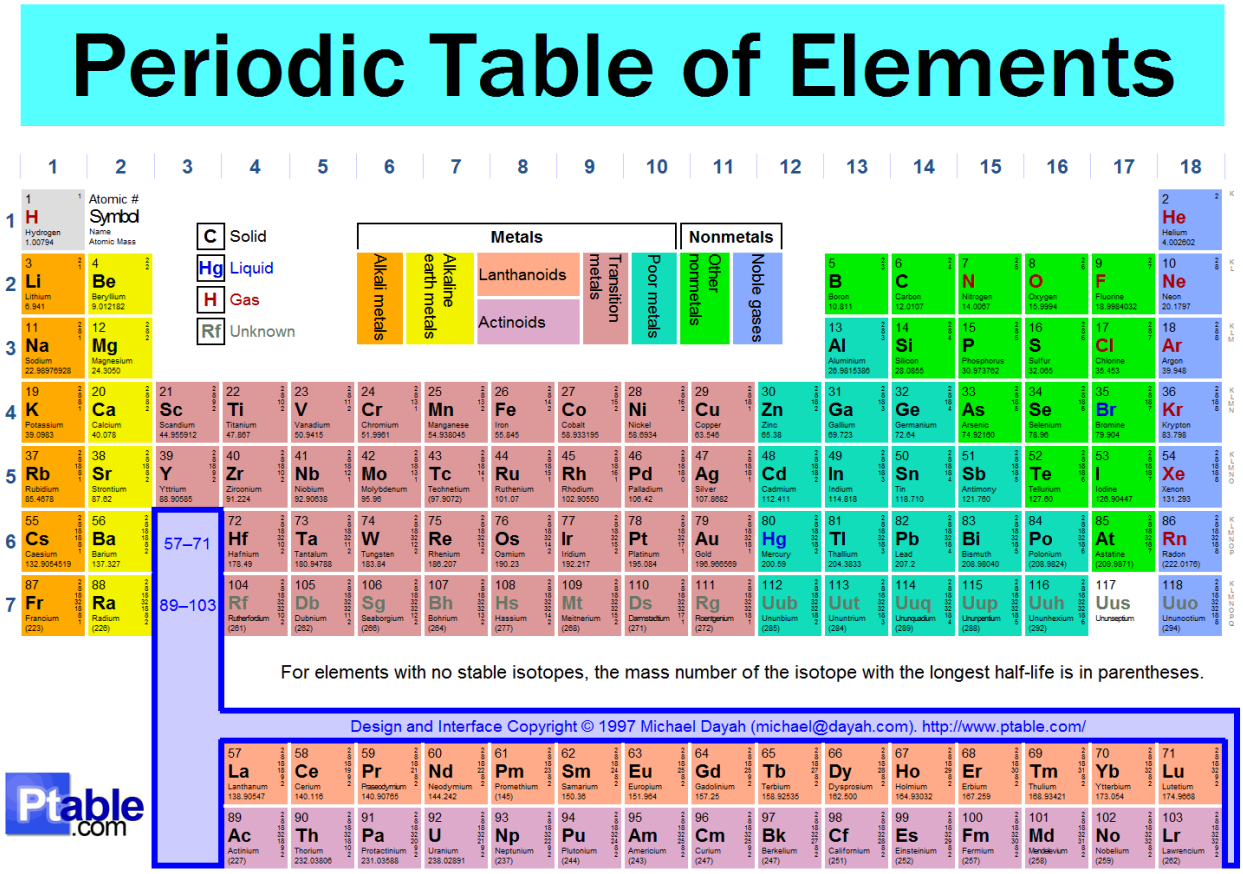
Campus Academic Resource Program

Understanding the Periodic Table of Elements

This handout will:

- Introduce the concept of an element.
- Cover the various components contained within each element.
- Provide a description for how to read the Periodic Table.
- Explain how the Periodic Table can be used to find information about each element.

The chart below is known as the Periodic Table, which can be used to find useful information regarding each element. Before looking at how this table can be used, it will be important to familiarize ourselves with the basic properties of elements.



[1] http://www.ptable.com/Images/periodic%20table.png

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What is an Element?

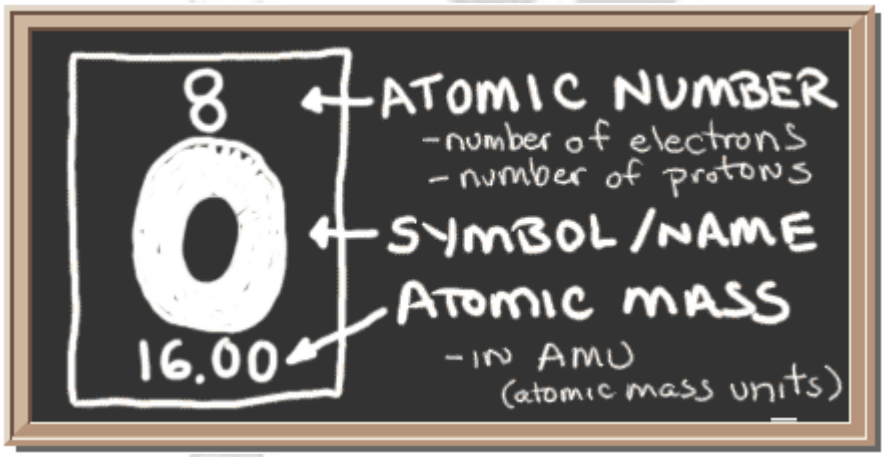
An **element** is a substance that cannot be broken down into any other substance through chemical processes. For example, oxygen is an element, but H_2O (also known as water) is not. This is because H_2O can be broken down into 2 H's (hydrogen) and an O (oxygen), both of which are elements.

Subparticles of Elements:

Elements are made out of three types of particles:

- **Electrons**: *negatively charged*, low mass particles.
- **Protons**: - *positively charged* particles that are more massive than electrons.
- **Neutrons**: **-** particles that have the same mass as protons, but have *no charge.*

Here's an example of the information that can be found on the periodic table. This is a closer look at the element oxygen:



[2]

[2] https://encrypted-tbn1.gstatic.com/images?q=tbn:ANd9GcTK0lQqOFAPBXHEjJjIsoWaA1zBpwL9NXZvouA2bSYeWc__3N-v

Atomic Number and Atomic Mass:

Now is a good time to look at the periodic table at the beginning of this handout. Each box on the table contains information regarding a particular element. Within each box is a whole number, which is referred to as the **atomic number** of the element. The atomic number represents the number of protons and electrons in the element. (In this handout, the atomic number is always in the upper left corner)

Example: Boron (symbol B) has an atomic number of 5.
How many protons and electrons does Boron have?

[3]

Answer: Boron has 5 electrons and 5 protons.

The number at the bottom of each box is the element's **atomic mass**, where one atomic mass unit is equal to the mass of either a proton or neutron (both of which have about the same mass). Because electrons have such a low mass, the atomic mass indicates the total number of protons and neutrons. Therefore:

$$Number\ of\ Neutrons = Atomic\ Mass - Atomic\ Number \quad (1)$$

Note: If the mass number is not a whole number, round it either up or down to the nearest whole number for this calculation.

[3] http://sciencenotes.org/wp-content/uploads/2013/05/05-Boron-Tile.png

Example: Find the number of protons, neutrons, and electrons in oxygen.

Oxygen (symbol O) has an atomic mass of 16. Since the atomic number is 8 (meaning there are 8 protons and 8 electrons), we can use equation (1) to find the number of neutrons.

$$Number\ of\ Neutrons\ =\ Atomic\ Mass\ -\ Atomic\ Number$$

We will use the following information in our equation:

Atomic mass = 16

Atomic number = 8

This gives:

$$Number\ of\ Neutrons\ =\ 16\ -\ 8$$

$$Number\ of\ Neutrons\ =\ 8$$

Now that you know how to use the period table to find the number of protons, electrons, and neutrons in the element, fill out the following chart for the elements given:

Element	**Atomic number**	**Mass number**	**Protons**	**Electrons**	**Neutrons**
Ex: Oxygen	8	16	8	8	8
Chlorine					
Potassium					
Zinc					
Iron					
Magnesium					

Answer Key:

Element	Atomic number (smaller number given by period table)	Mass number (larger number given by periodic table)	Protons (same as atomic number)	Electrons (same as atomic number)	Neutrons (Mass number) – (Atomic Number)
Ex: Oxygen	8	16	8	8	8
Chlorine	17	35	17	17	18
Potassium	19	39	19	19	20
Zinc	30	65	30	30	35
Iron	26	56	26	26	30
Magnesium	12	24	12	12	12