



# TITLE

## SUB TOPIC

AUTHOR

<b>Time Frame:</b> 2 – 55 minute class periods Middle school 6 <sup>th</sup> – 8 <sup>th</sup> grade	<b>Standards:</b> 6.S.1.3.1 Analyze changes that occur in and among systems. (618.03.b) 6.S.2.1.1 Compare and contrast the differences among elements, compounds and mixtures. (620.01.a) 8-9.PS.2.4.1 Describe the properties, function, and location of protons, neutrons, and electrons. (650.01a)
<b>Objectives:</b> Following the lessons on atomic theory and matter each middle school student will relate all matter to having atoms and will be able to explain the basic structure of atoms with their electrons, protons, and neutrons, the differing numbers of each in different elements, and their arrangement in an atomic structure, this will be demonstrated by a minimum score of 75% on all assigned work.	
<b>Background Information: class period one</b> All matter is made up of atoms. The basic structure of atoms has been widely accepted since the early 1900's when Neils Bohr(1915) and others proposed the idea. His planet orbiting system is for the most part accurate however later discoveries have add some to the theory and we now call it quantum mechanics. The basics of neutrons in the nucleus having no charge, proton in the nucleus having a positive charge, and electrons orbiting around the outside of the nucleus having a negative charge and the charges being balanced between electrons and protons. Each element on the periodic table has a differing number of protons and electrons making each a different element. Also the number of neutrons can vary in the differing elements which allow varying chemical properties. This lesson will help you teach the students the basics of atom structure and elements of the periodic table. A proton – a small positively charged particle in the nucleus with one (amu) for its mass. An electron – a very small negatively charged particle that orbits around the nucleus having little mass (no amu). A neutron – a small particle with no charge in the nucleus having a mass equal to a proton one (amu). An element – is one type of atom with a specific number of protons in it's nucleus (ex. Hydrogen has 1 proton, Helium has 2, carbon has 6, and etc.) Number of protons determines which element it is. An AMU - (Atomic Mass Unit) Is the number of protons and neutrons (amu's - #protons = #neutrons).	
<b>Background Information:</b> This may be a review unit with a handout or it may be new material with handout and test. Other back ground can be read at <a href="http://www.howstuffworks.com">www.howstuffworks.com</a> .	
<b>Materials:</b> Teacher will need: - an atom model or one for each of the student teams.	

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Bringing Energy to the Classroom



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- a periodic table large enough for all to see or an individual table for each student.

### Procedure:

Day One:

Starter Activity: Show the model of the atom. Do not say anything about it just ask “What is this?” Let the students give answers. Explain about the protons, neutrons, nucleus, and electrons. Their size, charge, placement, etc. 6-7 min.

Show periodic table: Discuss about different elements and how they relate to the model of the atom. Show how to figure out the number of protons, electrons, and neutrons. Explain about AMU or mass at the bottom of each element in relationship to their proton numbers. Show some that are gases, liquids at room temperature. Explain about physical differences (those that are rare, abundant, large in size, very small in size, those that bond readily and those that are inert, organic vs. inorganic etc.) between elements on the table. 20 min.

Handout sheet: Go through some practice problems with each section on the handout 15 min. or go through handout in class. 25 min. You can use the rest of the problems on the handout for homework or guided practice in class if it is not done entirely in class. Handout attached.

Video go to [Howstuffworks.com](http://Howstuffworks.com) Search the videos on Atomic Structure there are many videos, the first one to watch is Simply Science: Early Nuclear Theory. There are videos on atomic structure of the nucleus, protons, neutrons, and the periodic table. There should be something that you would find useful. Atomic Structure: The Modern Model of the Atom. 15-20 min. or more.

Day Two:

Starter Activity: Display names of elements some correct some not right. Have students try and uncover real names and those that are bogus. You can make this as hard and long as your students like. Some may want ten total with five or six correct, some may like a list of thirty total. You may do it as individuals and have them hand it in or as a group and award points for the group that gets each one pegged correctly. 10 min.

Display periodic table and go over the handout home work from last time. Make sure each student is understanding how to find number of protons, electrons, and neutrons. 20 min.

Element Search Activity: Using the internet have the students search for the chemical and



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physical properties of the individual elements. Have the students select (draw out of a hat or choose) an element then in class or as home work take some time and search for the element information to share with the class about their element. The Element handout is attached, but alter it any way necessary to meet your needs. Their presentations should be fairly short and each student can record for them selves the other elements porperties or just listen. You might require that they include a picture of something that contains their element. 15 min. or longer

Small quiz at the end of class to check for understanding on amus and element properties.

There are lots of other videos at How stuff works? to use if you need more time.

### Assessment:

Sample Quiz attached.

### Additional Content:

If you have a model set for each student or group you could have them make a few small elements to visuallly see the difference between Carbon and Hydrogen.

You may have them go more in depth with the atomic theory to figure out the number of an element with 203 amu and 100 neutrons or some similar problem.

If the students are far enough along that they can handle a bonding talk about how the elements form compounds. Then go on into bonding and compounds.

### References:

Web site: [www.howstuffworks.com](http://www.howstuffworks.com) text and video available.