

Lesson One: Introduction to the Periodic Table and a 3-D Atomic Model

Key Concept: The importance of this lesson is to become more familiar with the Periodic Table. Eventually this lesson will help lead into the understanding of how a fuel cell works and what the benefits are.

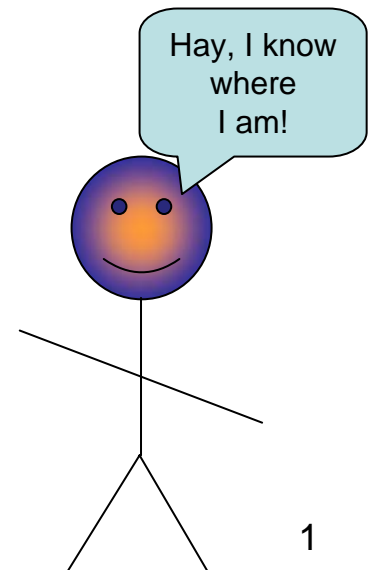
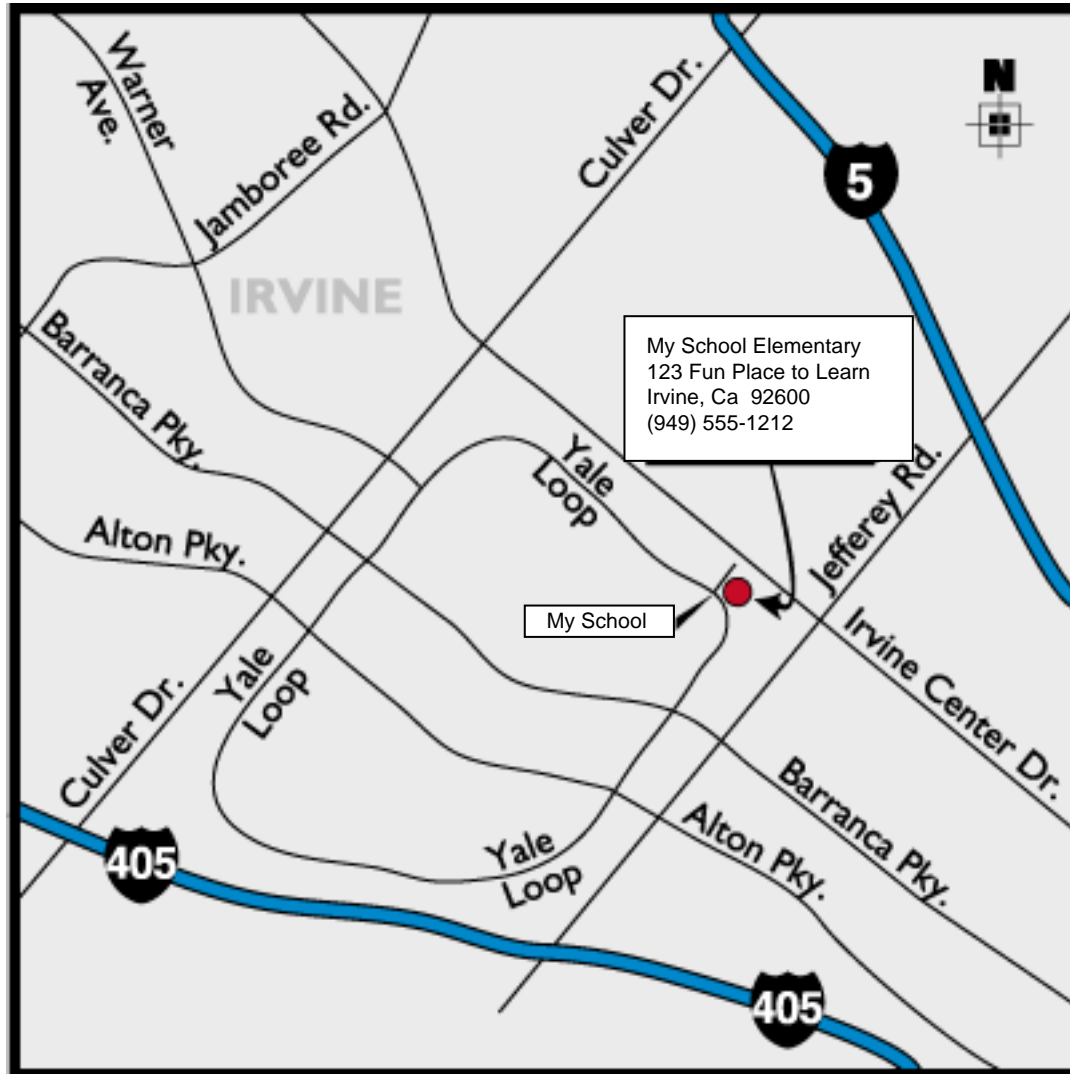
Activity at end of lesson:

Build a 3-D Atomic Model Using Balloons, Beads and a Wiffle Ball

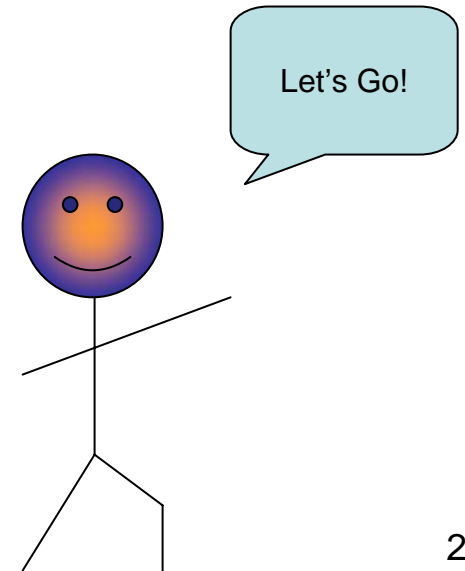
Important words:

Periodic Table Protons Neutrons
Electrons Elements Nucleus

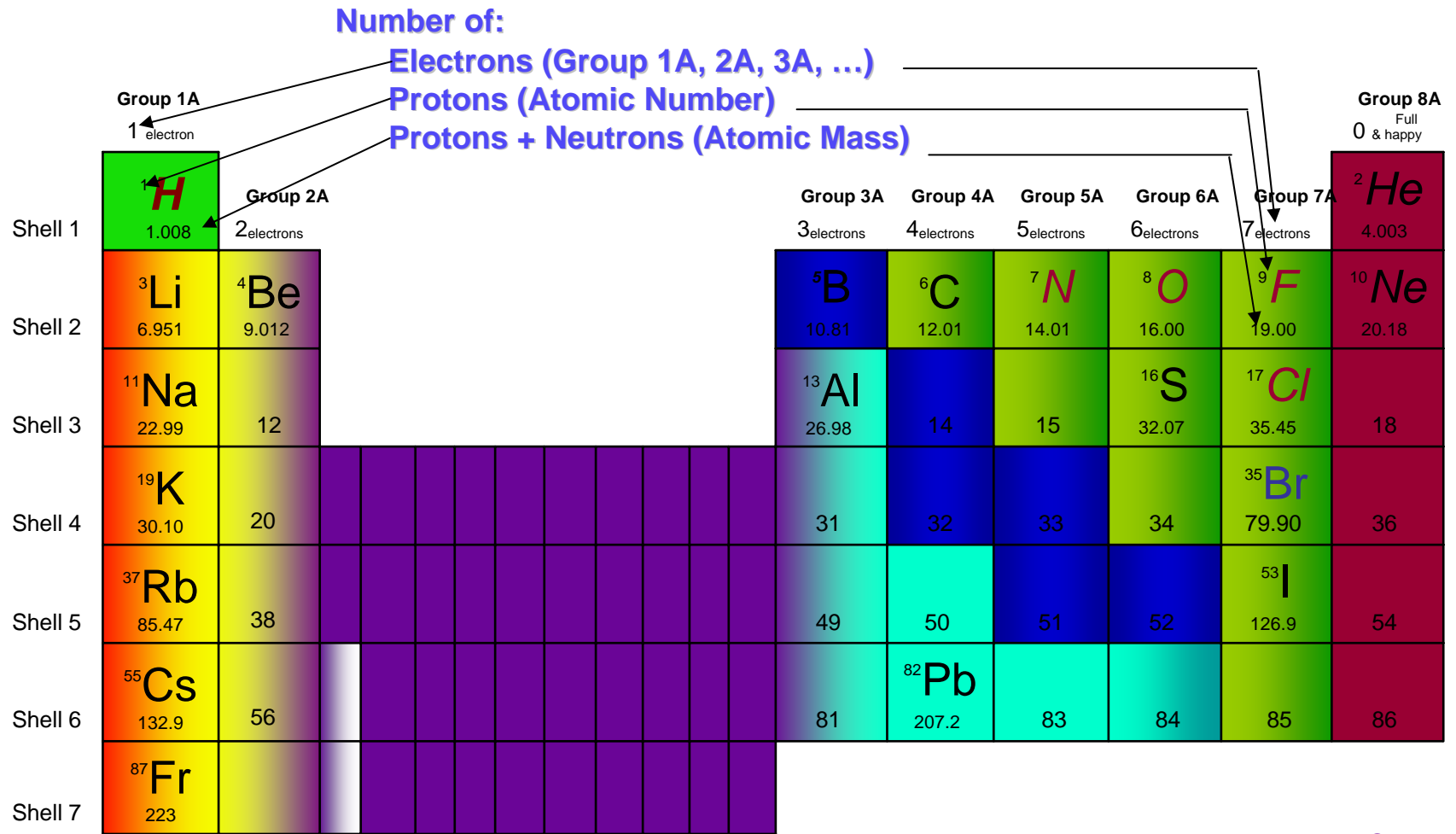
How do you get from here to there?



Finding our way around the Periodic Table is like reading a map. It can lead us on an adventure. It helps us find some fun, excitement, and if we're not careful - **Danger!**



Here is a sample of a Periodic Table of Elements ...



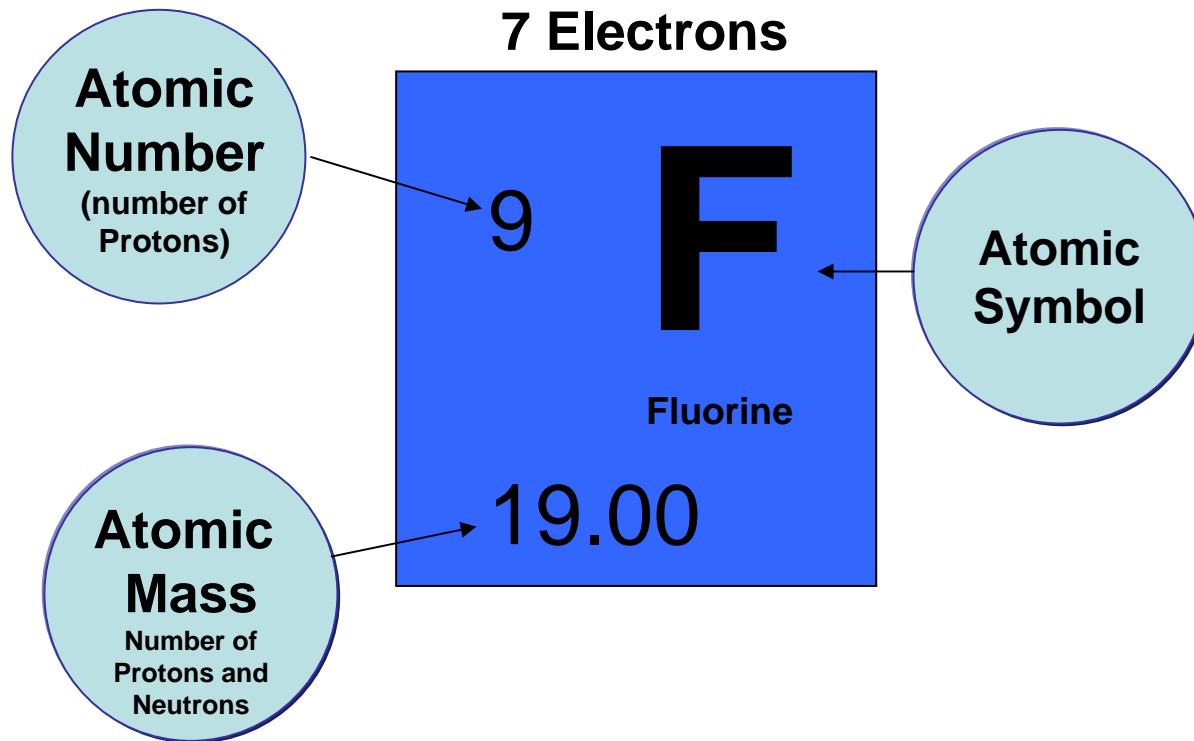
Solid Liquid Gas

Metals – Alkali, Alkali Earth, Transitional, Other
 Metalloids
 Non-Metals
 Noble Gases

Idea for this table from <http://www-tech.mit.edu/Chemicool/>

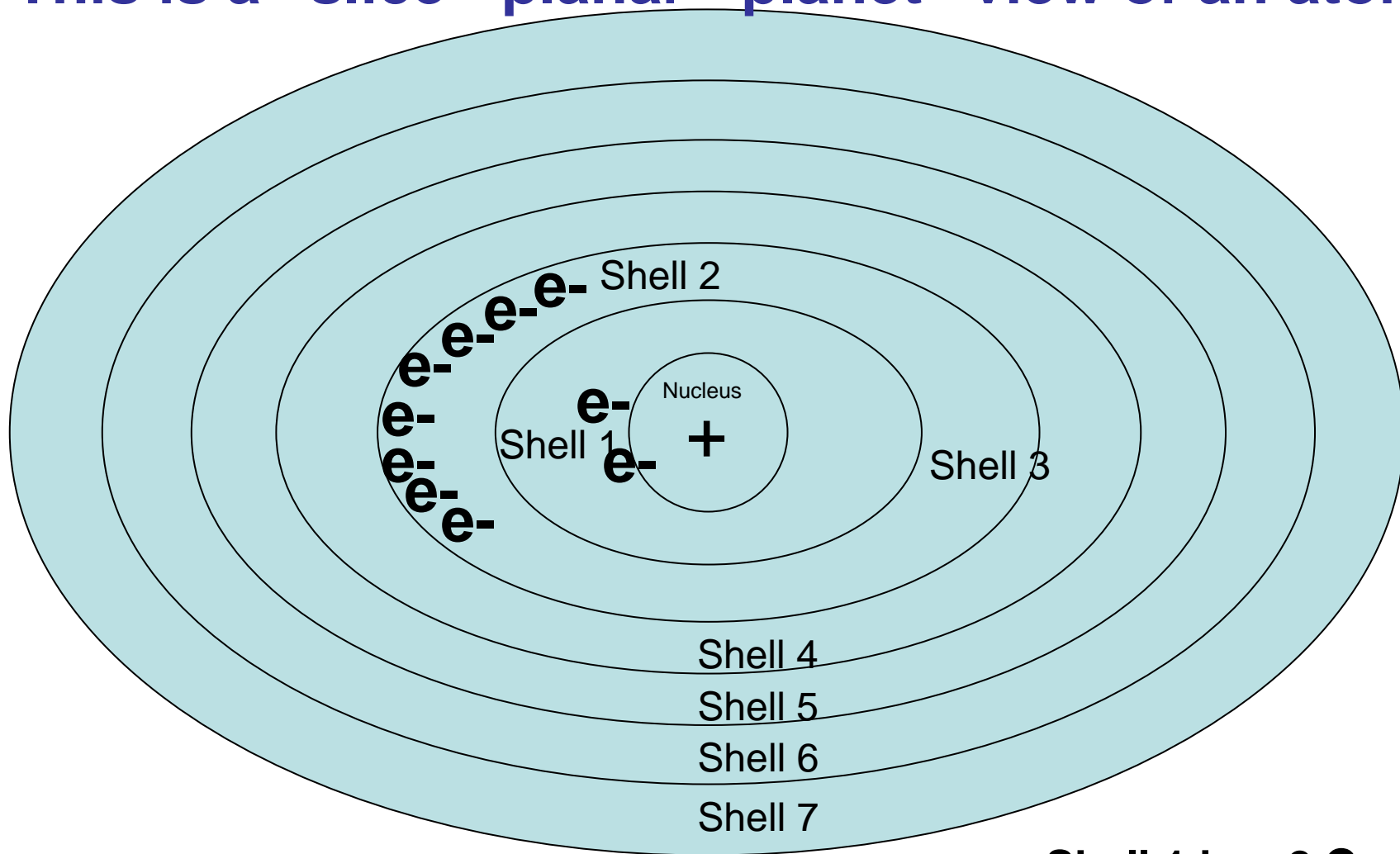
The periodic table of elements was developed in 1870 by a Russian chemist named Dmitri Mendeleev. Over time the elements were ordered according to the number of protons (atomic number). The elements that often have the same number of electrons in the outer energy level or shell are put into the same column. The rows show similar properties, energy level, or shell. New elements are added to the table, most are artificially made. Let me show you what I mean.

Here is a start of how to read the periodic table. – Lets talk about the element Fluorine and it's protons, neutrons, electrons, ...



19 (Atomic Mass) – 9 Protons = 10 Neutrons
Group 7 has 7 Electrons in outermost shell

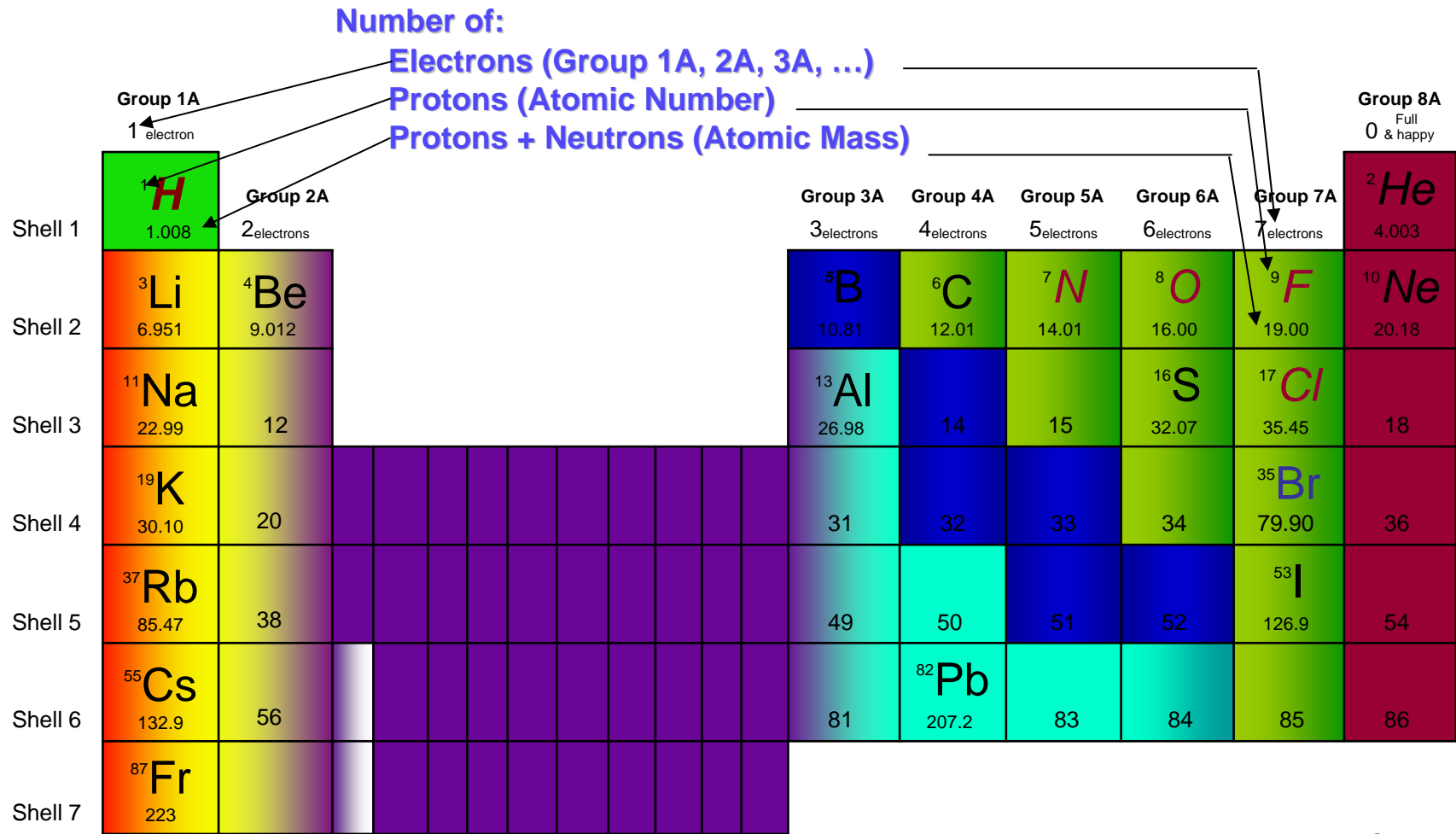
Now it's time to talk about an element's shells.
This is a "slice - planar - planet" view of an atom.



Shell 1 has 2 e-
Shell 2 has 8 e-
6

Teacher note: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 \dots$

Here is a sample of a Periodic Table of Elements ...



Solid Liquid Gas

Metals – Alkali, Alkali Earth, Transitional, Other
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Another Brief Explanation of Shells and their sub shells...

Shell Level One (2 electrons)

Sub Level $1s^2$

Shell Level Two (8 electrons)

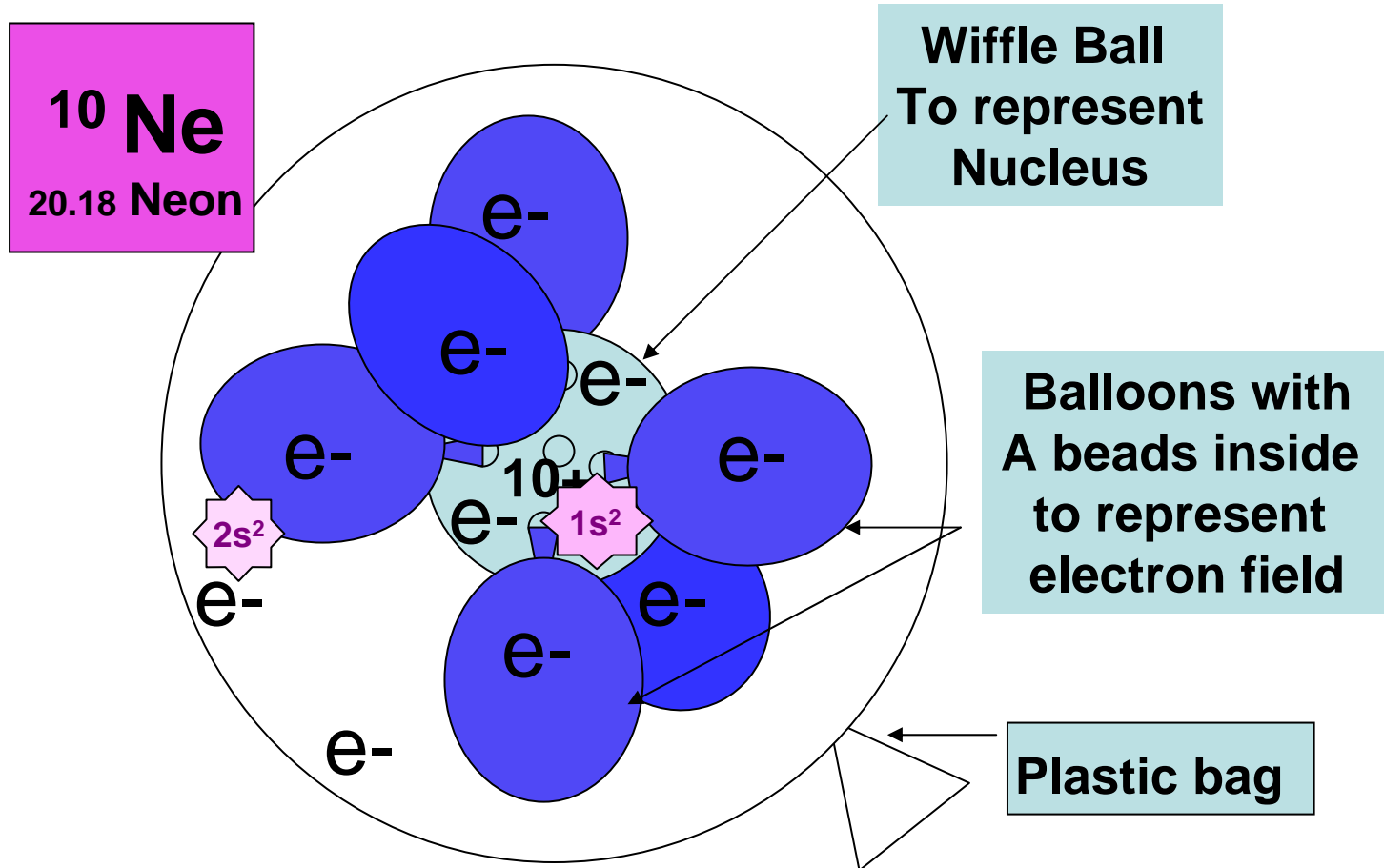
Sub Level A $2s^2$

Sub Level B $2p^6$

8

Shell Level Three and other Shell Levels are different. To keep it simple we only talk about two levels. There are seven levels – seven rows.

The Element Balloon Example



Later in one of our lessons I want to show you that you can use two elements, like hydrogen and oxygen, in a process to make energy without pollution! This will make for a safer, cleaner and more attractive planet. There are still a lot of problems with this idea and YOU are needed to help solve them ...

Some Questions:

What is the atomic number?

What is the periodic table?

What is the atomic mass number?

Who was Dmitri Mendeleev?

Lets see what you remember...

Do you know the difference between mass and weight?

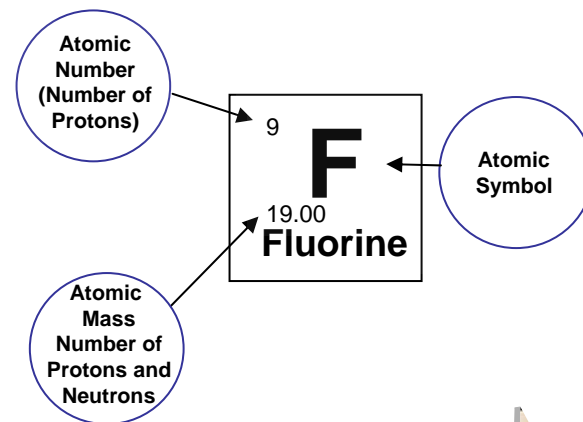
What is the difference between ice, a glass of water, and steam? Do you think the pressure inside a container of ice is different than a balloon?

What is a melting and boiling point?

Give an example of evaporation and condensation.

Will you give an example of a mixture?

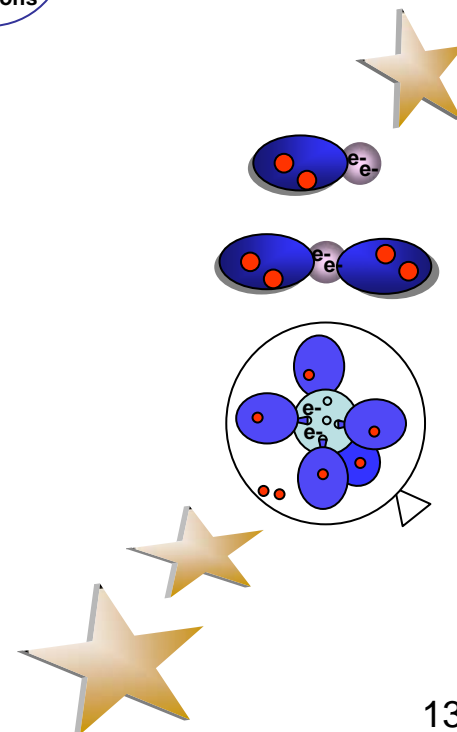
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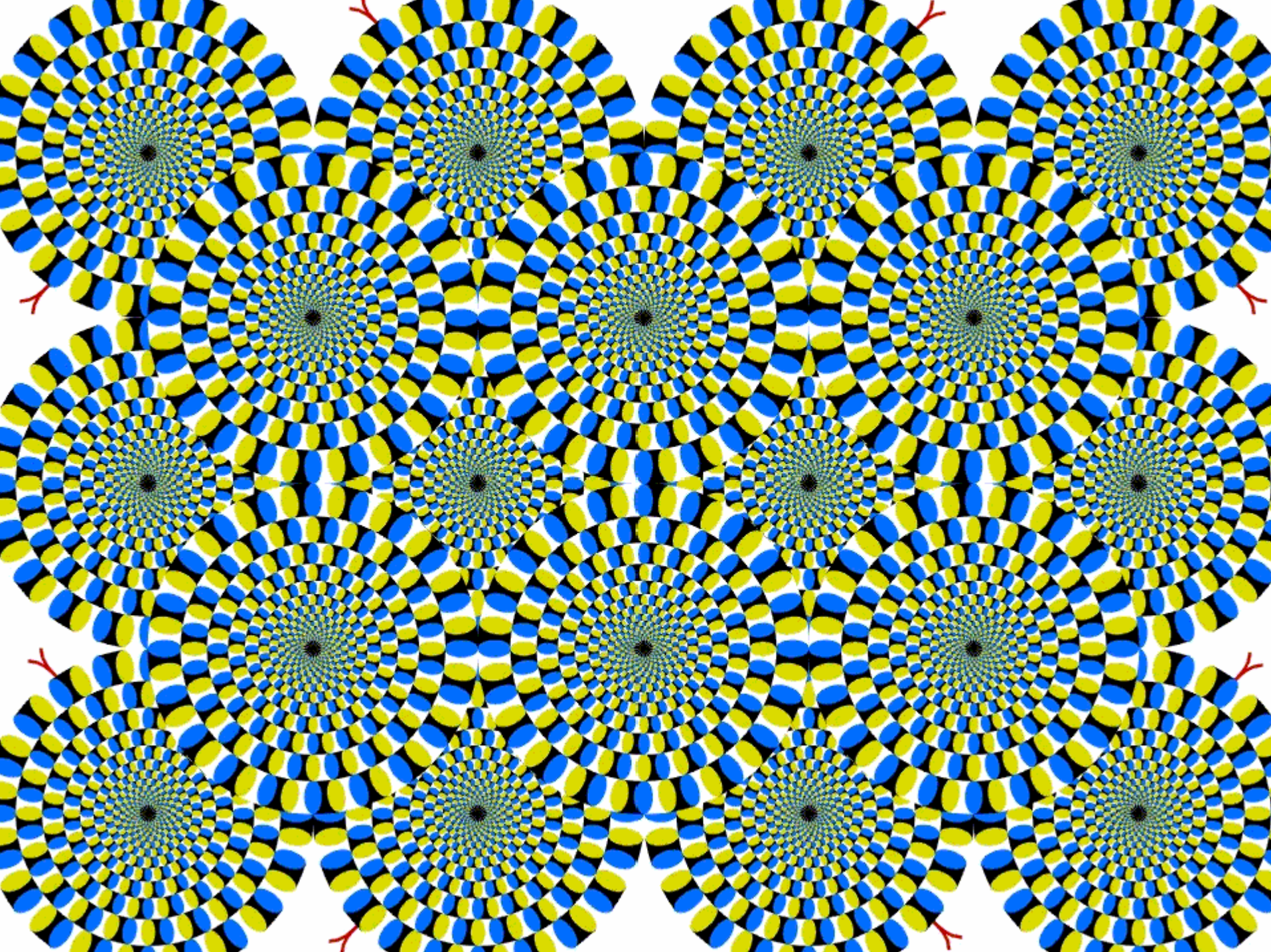


Future Fuel Cell Scientist of America

For completing Lesson One: Introduction to the
Periodic Table and 3-D Atomic Model

Mentor: _____





End of Lesson One