So, the nucleus gets heavier and bigger...what about **atomic radius**?

ATOMIC RADIUS: distance from the center of the nucleus to the furthest electron(s) surrounding the atom.

Rank each atom in order from **smallest** to **largest** atomic radius.

Make a Claim: Which of these 4 atoms you drew has the biggest radius? Why did you make this choice?

Graphing the data….does it match our claim?

Actual data:

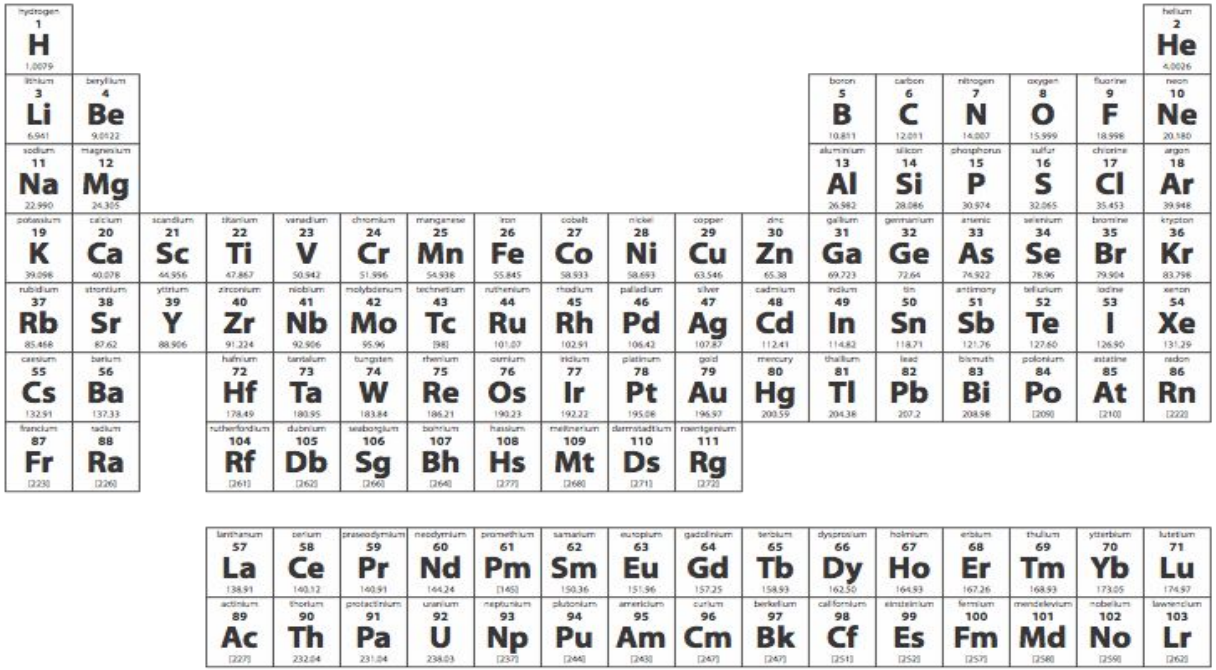
Atomic #	Element Symbol	Atomic radius
3	Li	1.67
4	Be	1.12
5	B	0.87
6	C	0.67
7	N	0.56
8	O	0.48
9	F	0.42
10	Ne	0.38

Answer underneath your graph:

1. Before you saw the data which atom did you think had the biggest atomic radius?

2. Was the trend we graphed something you expected? Why do you think we see this trend?

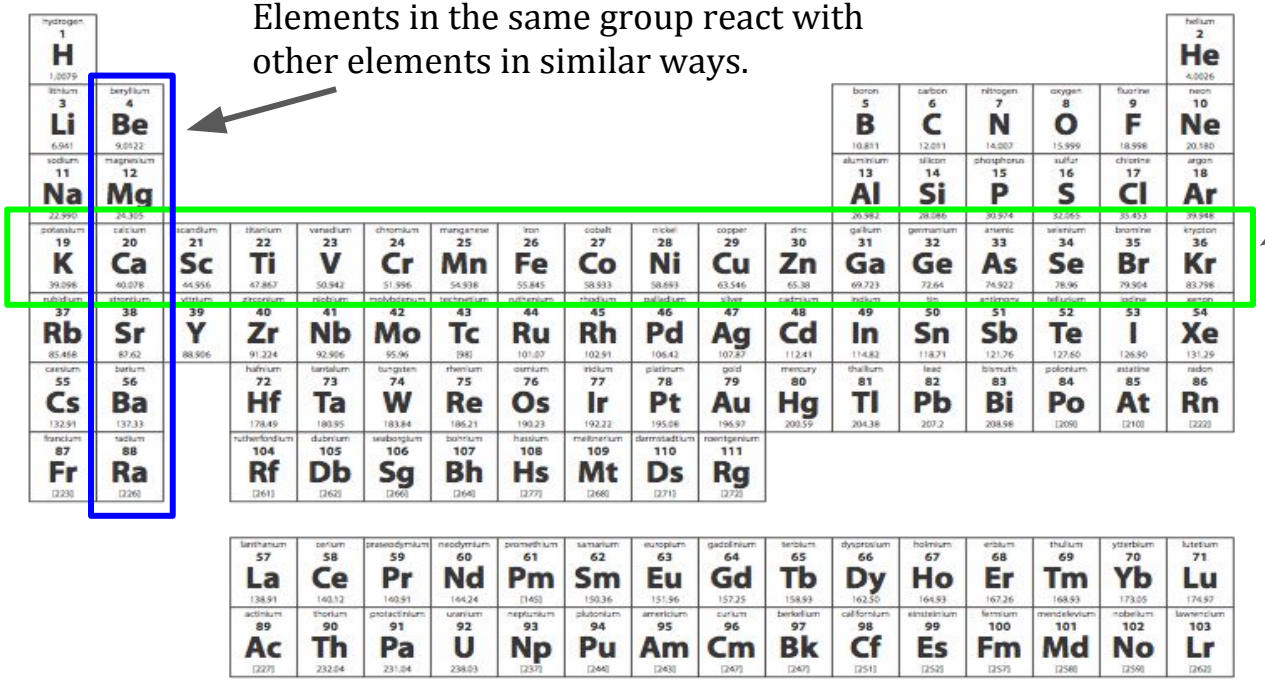
Paste in Periodic Table to PAGE _16_



We will use this to keep track of the trends we identify…

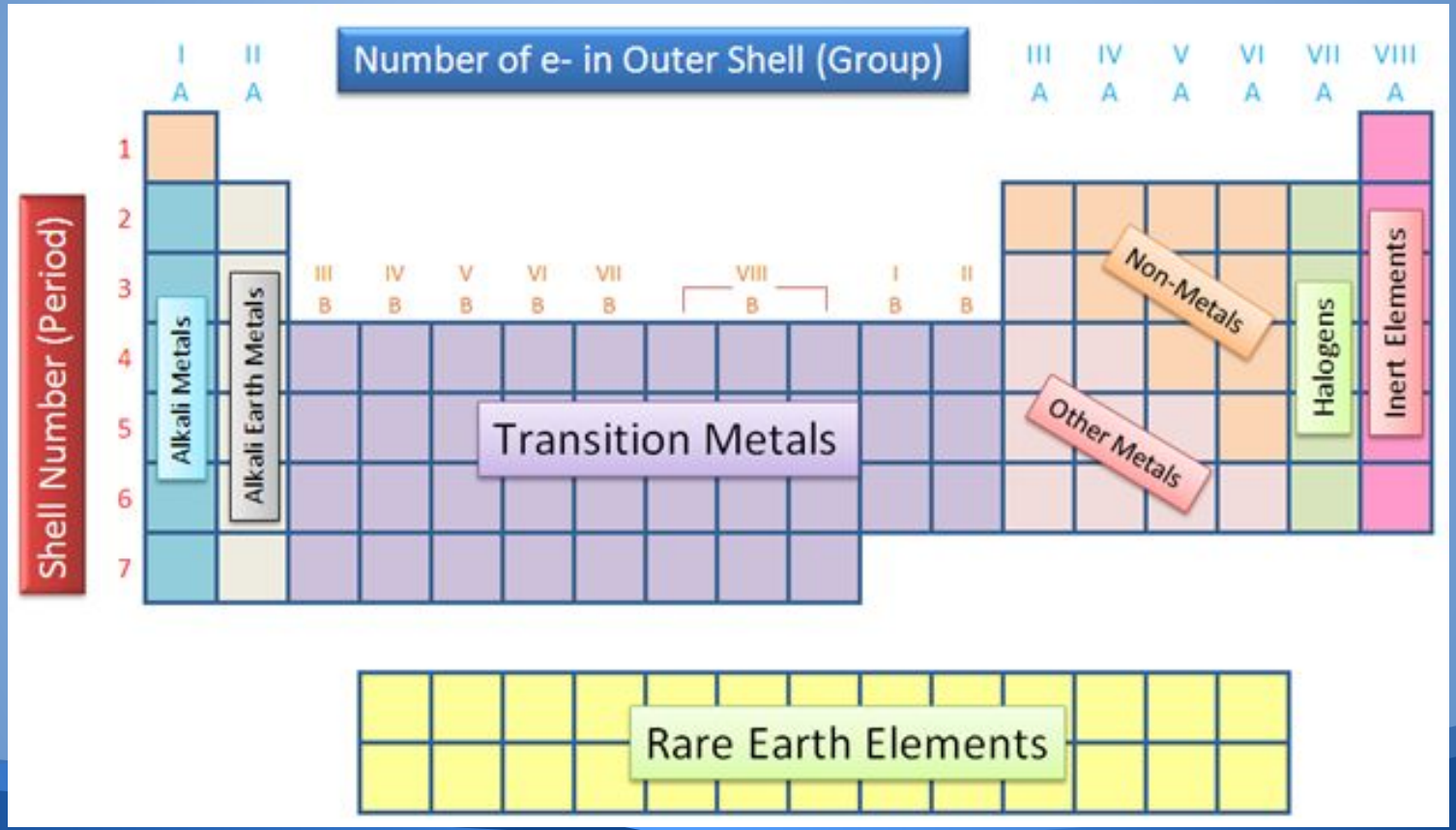
Periods and Groups

Groups are columns of the table. Elements in the same group react with other elements in similar ways.

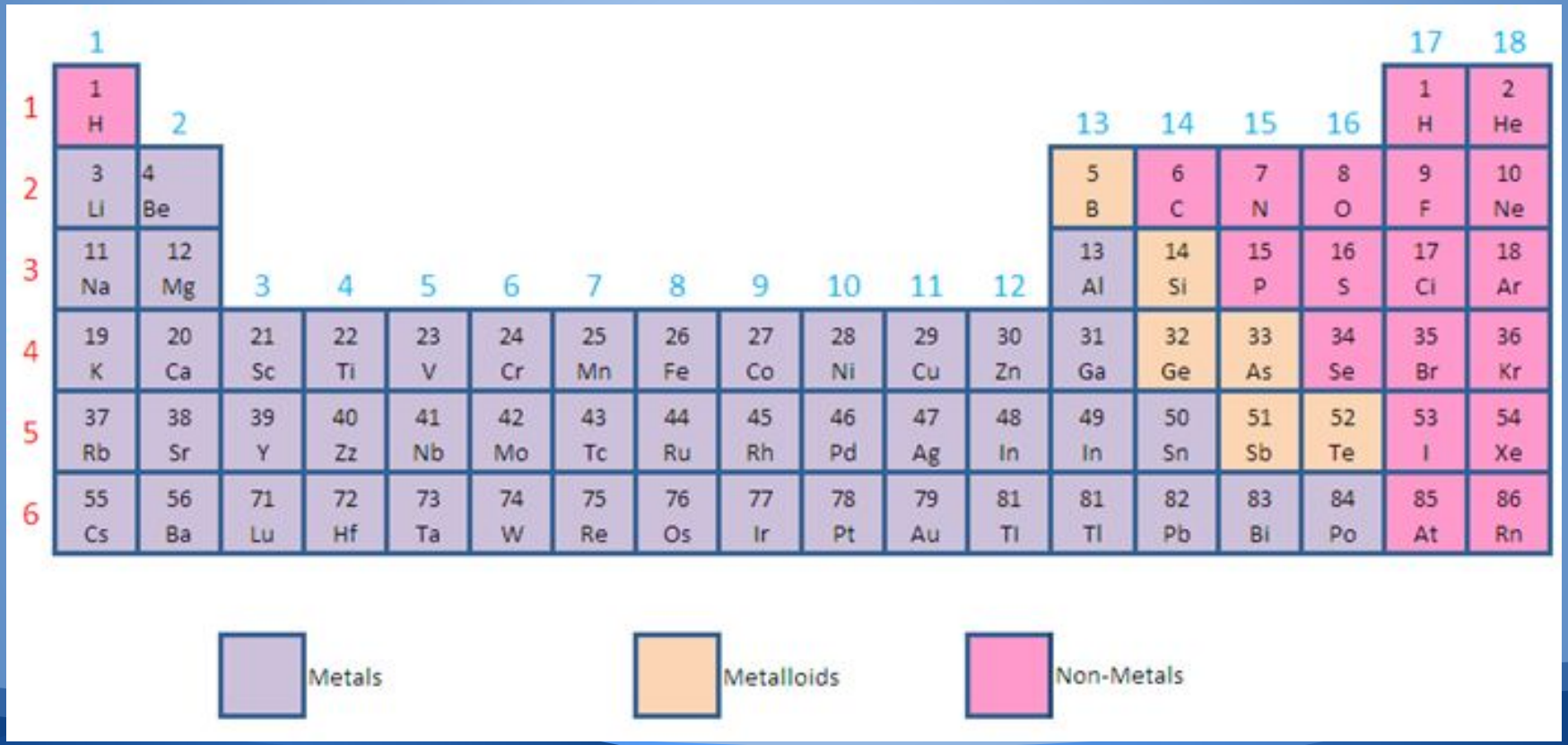


Periods are rows of the table. As you go left to right, the number of valence electrons an element has increases

Based on where in the periodic table you are, you will see different common properties



Based on where in the periodic table you are, you will see different common properties



We will learn more about the chemical and physical properties of these groups of elements and the molecules they make later in the unit…

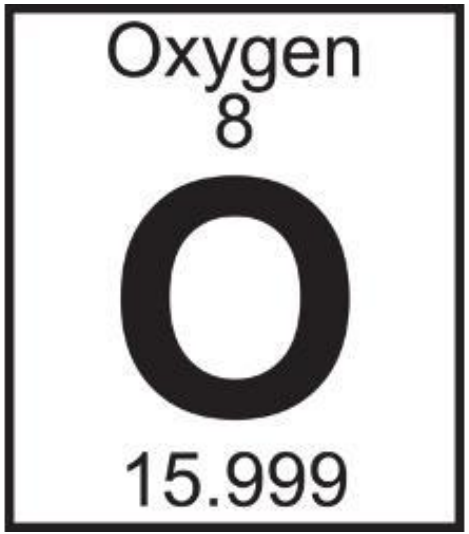
for now...back why they are organized in the periodic table this way

Trends we will identify:

1. **Atomic radius**
2. **Number of valence electrons an element has**
3. **Ionization energy**

Refresh: How can we find electron count from looking at the Periodic Table?

Atomic number gives us the number of protons...



….and since this atom is <u>neutral</u>, then # of
protons = # of electrons!

Atomic radius

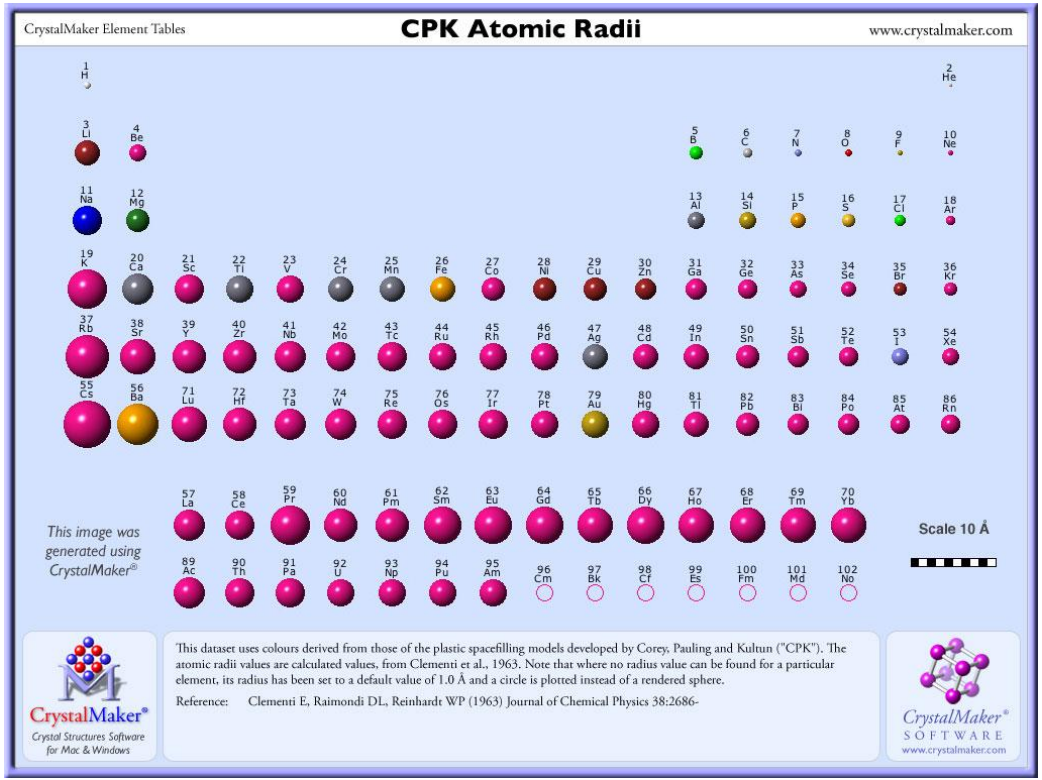
ATOMIC RADIUS: distance from the center of the nucleus to the furthest electron(s) surrounding the atom.

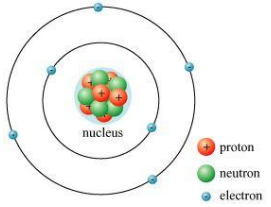
Trend (that we just graphed):

Atomic radius increases DOWN in group and
from RIGHT to LEFT across a period.

Atomic radius **increases** from RIGHT to LEFT across a period

Atomic radius **increases** DOWN a column





Has to do with the amount of electrons are on the furthest orbital

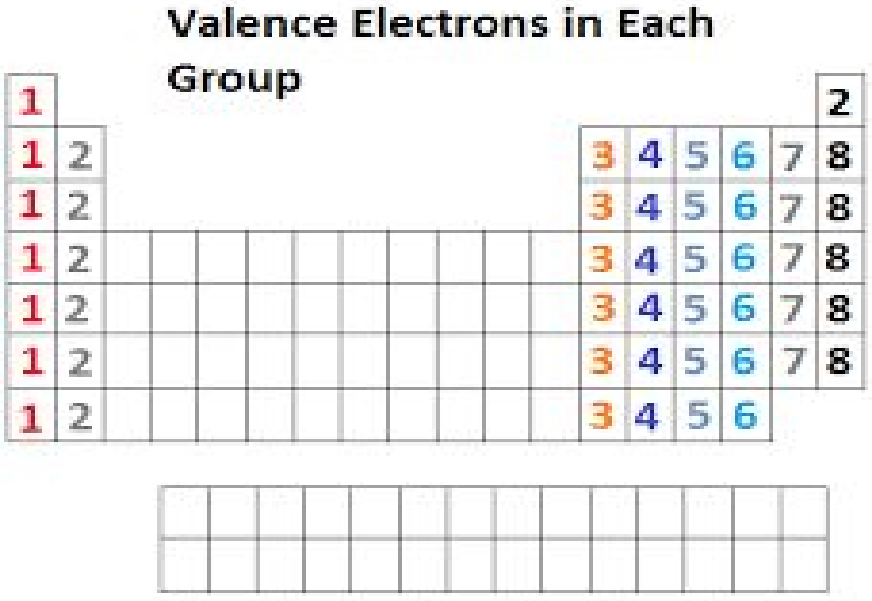
Valence electrons (a super brief intro)

An atom's electrons orbit the nucleus at specific, but varied, distances. The one's furthest from the nucleus are called...

Valence electrons: Electrons on the outermost orbital of an atom. The amount of valence electrons an element has will determine the kinds of bonds this the element can make.

The periodic trend for valence electrons

As you go across a row LEFT to RIGHT, the number of valence electrons in the outermost orbital **increases.** An orbit is full once it has 8 valence electrons.

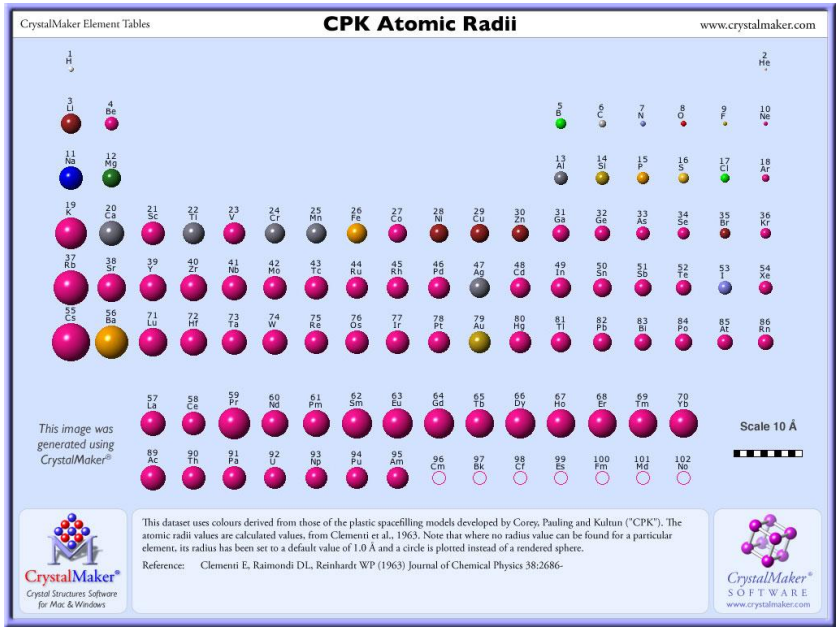


Helium is an exception!

Notice how the stable and non-reactive Noble gas group has 8 valence electrons...

This explains the atomic radius trend...

The more electrons on the outer orbit, the stronger the attraction to the nucleus!



Ionization energy

Ionization energy: The amount of energy required to remove one of an atom's valence electrons.

Atoms want to be "stable," aka have 8 electrons in their outer orbital. They do this by forming bonds!

For elements on the left side of the table (like Na) it's easier to GET RID OF electrons to be stable. Elements on the right side of the table (like Cl) find it easier to ACCEPT electrons. Atoms with 8 valence electrons DO NOT GET RID OF OR ACCEPT.

It takes less energy to take an electron off an element on the left side of the table, so…

Ionization energy **increases** from LEFT to RIGHT across a period.

Ionization energy **increases** going UP a group.