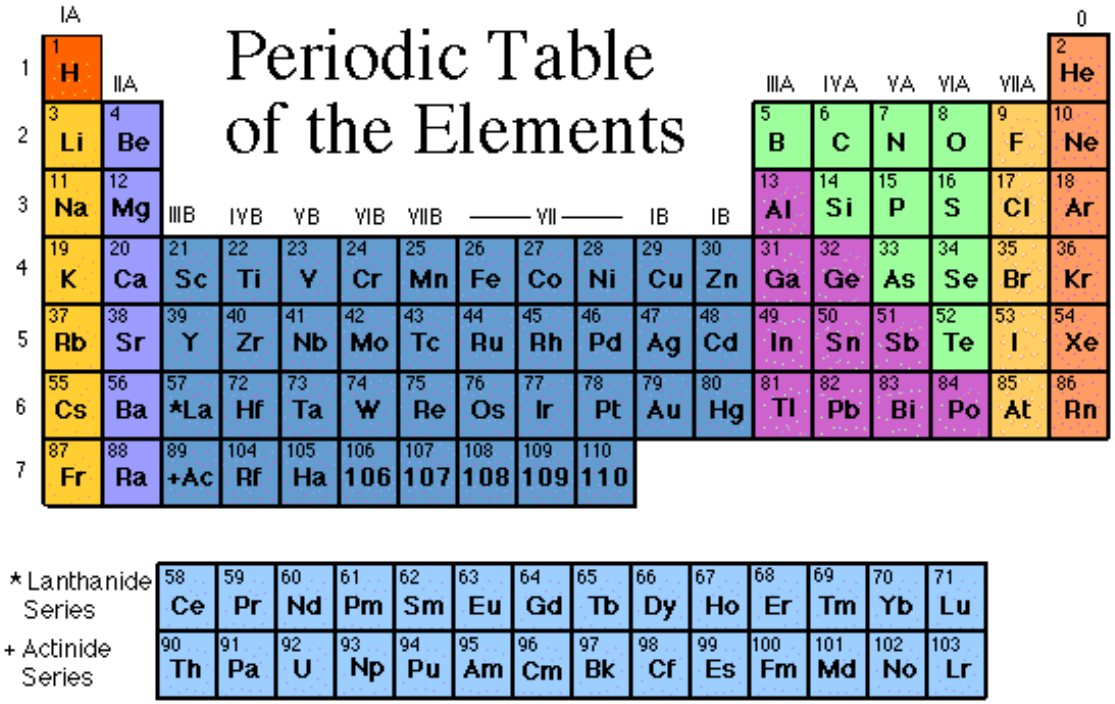
ThePeriodic Table



Why is the Periodic Table important to me?

The periodic table is the most useful tool to a chemist.

You get to use it on every test.

It organizes lots of information about all the known elements.

Pre-Periodic Table Chemistry …

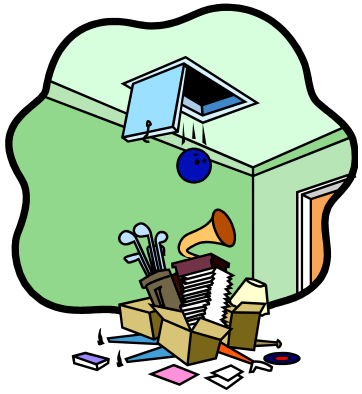
…was a mess!!!

No organization of elements.

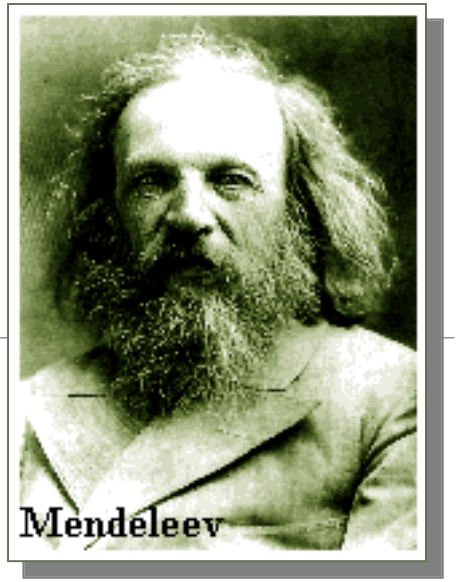
Imagine going to a grocery store with no organization!!

Difficult to find information.

Chemistry didn't make sense.



Dmitri Mendeleev: Father of the Table



HOW HIS WORKED…

Put elements in rows by increasing atomic weight.

Put elements in columns by the way they reacted.

SOME PROBLEMS…

He left blank spaces for what he said were undiscovered elements. (Turned out he was right!)

He broke the pattern of increasing atomic weight to keep similar reacting elements together.

The Current Periodic Table

Mendeleev wasn't too far off.

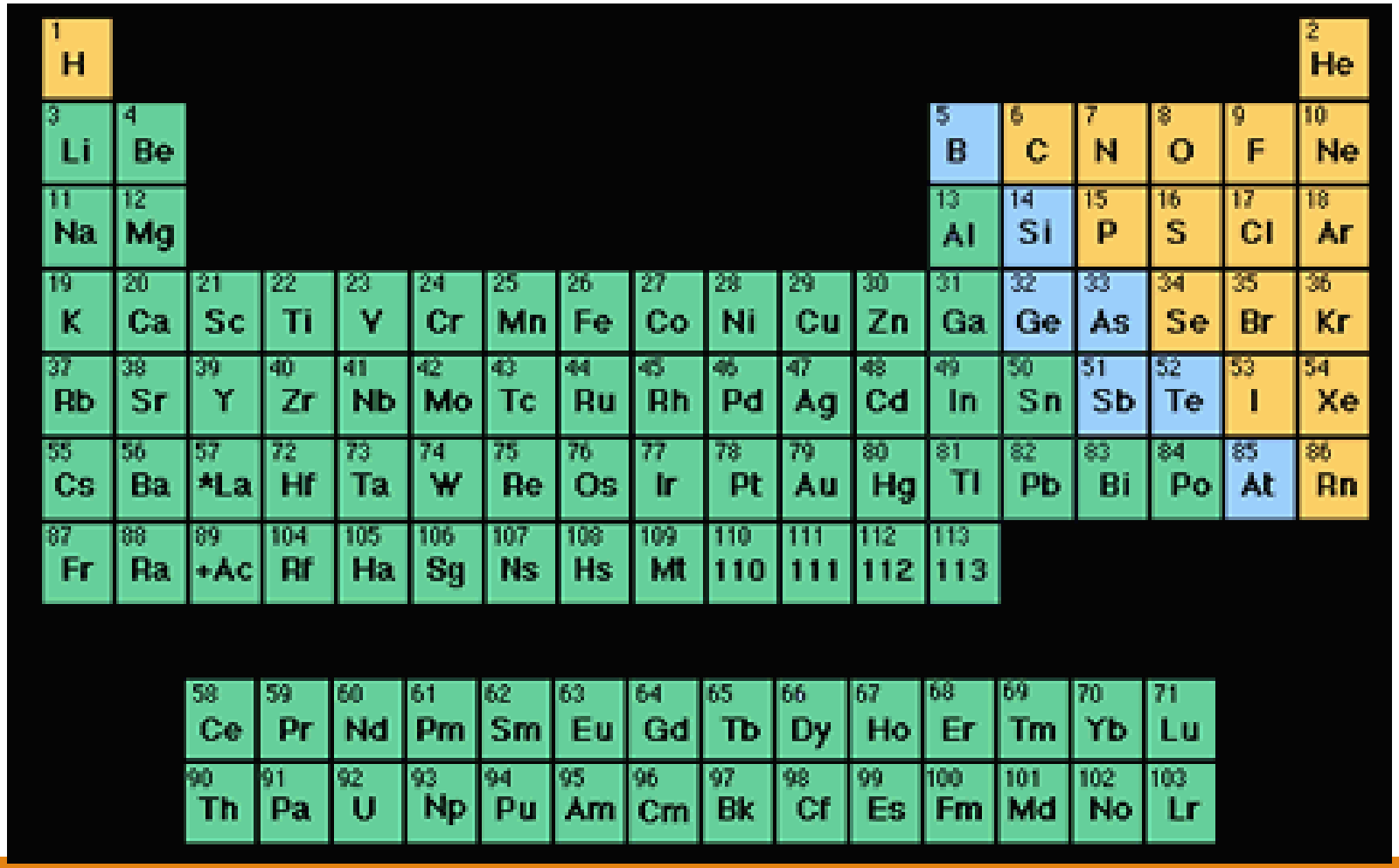
Now the elements are put in rows by increasing **ATOMIC NUMBER!!**

It is also separated by metals, metalloids, and non-metals.

METALS are on the LEFT (GREEN)

METALLOIDS are in between , along the staircase (BLUE)

NON-METALS are on the RIGHT (YELLOW)

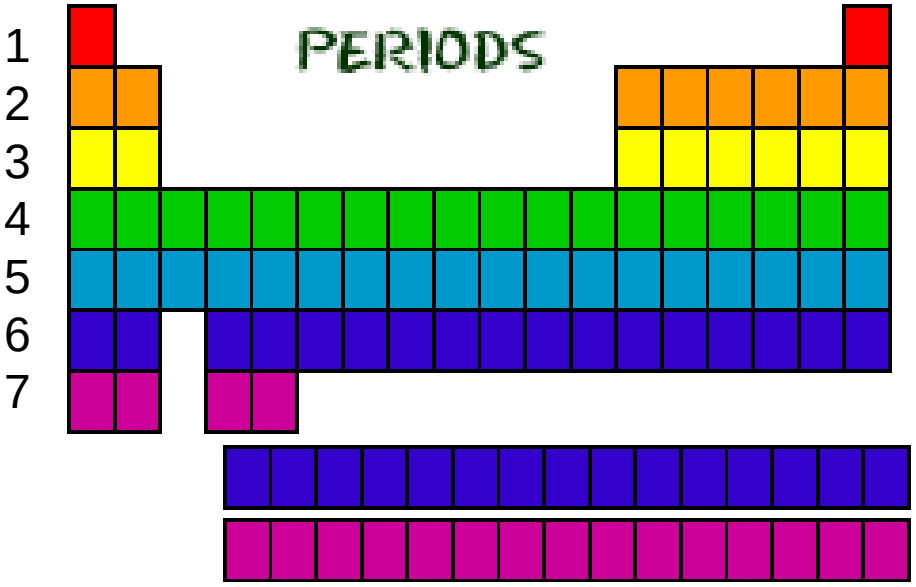


Grouping elements together according to their properties helps predict how they might react!

list the properties for each group of elements below.

	METALS	NON-METALS	METALLOIDS
Lustre			
Malleability			
Ductility			
Conductivity			
State			
Density			
Reactivity			

The Periods…



- Even though they skip some squares in between, all of the rows go left to right. When you look at a periodic table, each of the rows is considered to be a different **period.**

Periods = Rows

- In the periodic table, elements have something in common if they are in the same row.
- All of the elements in a period have the same number of atomic orbitals.
- Every element in the top row (the first period) has one orbital for its electrons. All of the elements in the second row (the second period) have two orbitals for their electrons. It goes down the periodic table like that.

Families on the Periodic Table

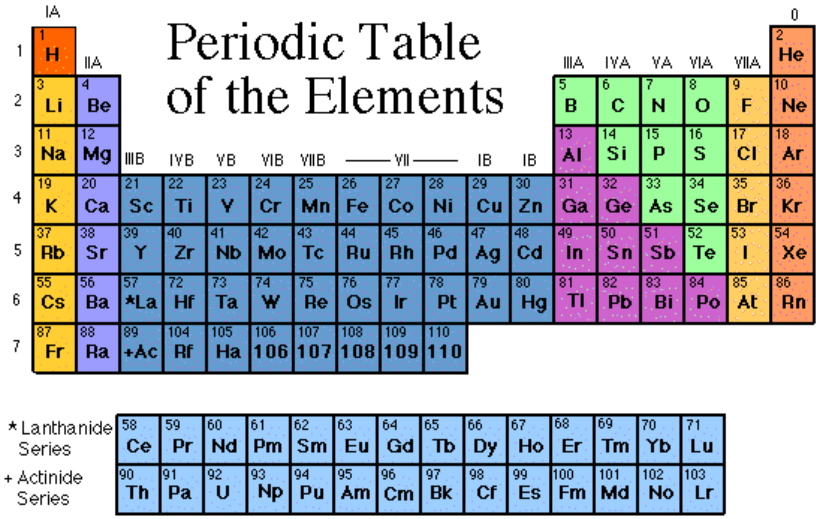
Elements on the periodic table can be grouped into families (vertical columns) based on their similar **chemical** properties.

Each family has a **specific name** to differentiate it from the other families in the periodic table.

Elements in each family

react differently with

other elements.



On your Periodic Table…

Color each family a specific color (you may choose which colors to use, but don't use the same one twice!)

Lightly shade in the corresponding family box from your notes with the same color that you used for that family on your table. This will serve as your key.

ALKALI METALS

Group 1

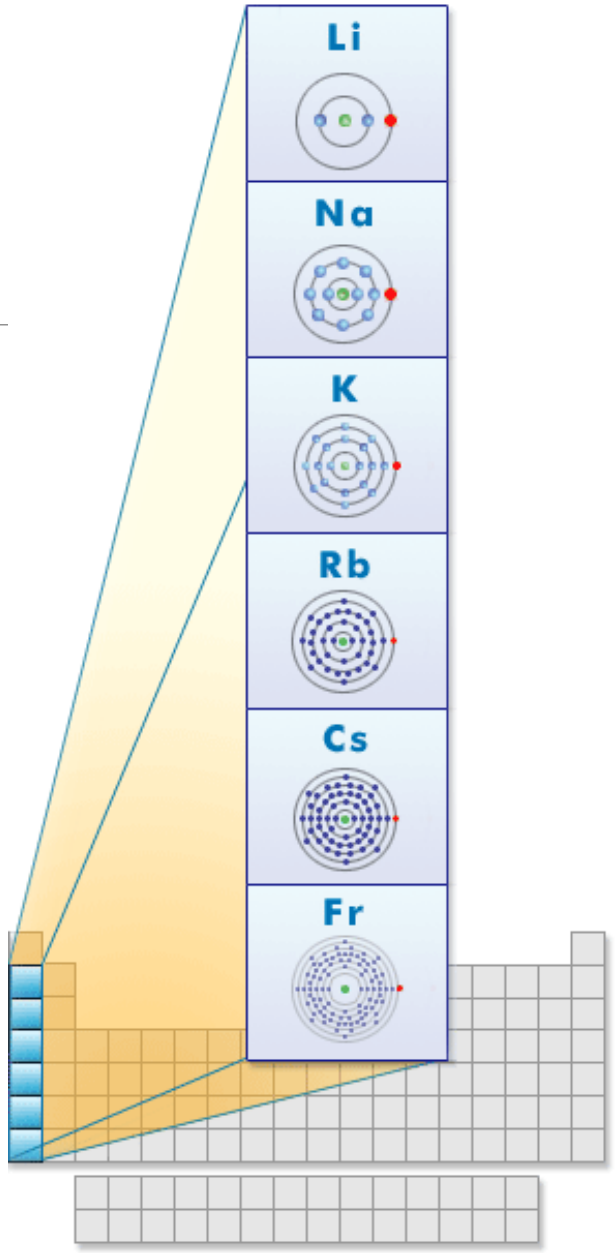
Hydrogen is ***not*** a member, it is a **non-metal**

1 electron in the outer shell

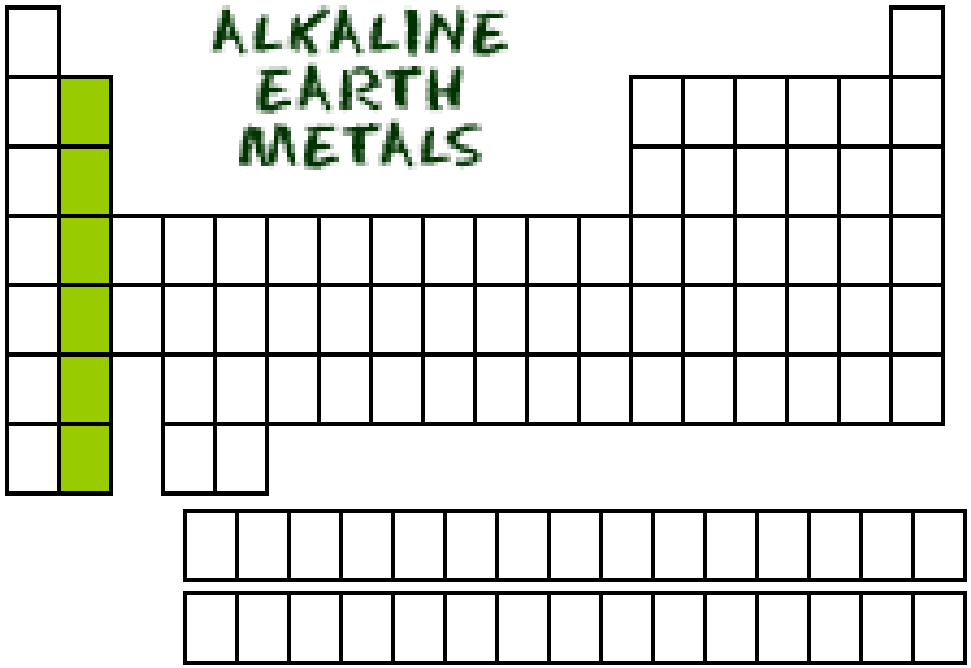
Soft metals; soft enough to cut with a butter knife

Very reactive, can explode when they are exposed to water

Conduct electricity



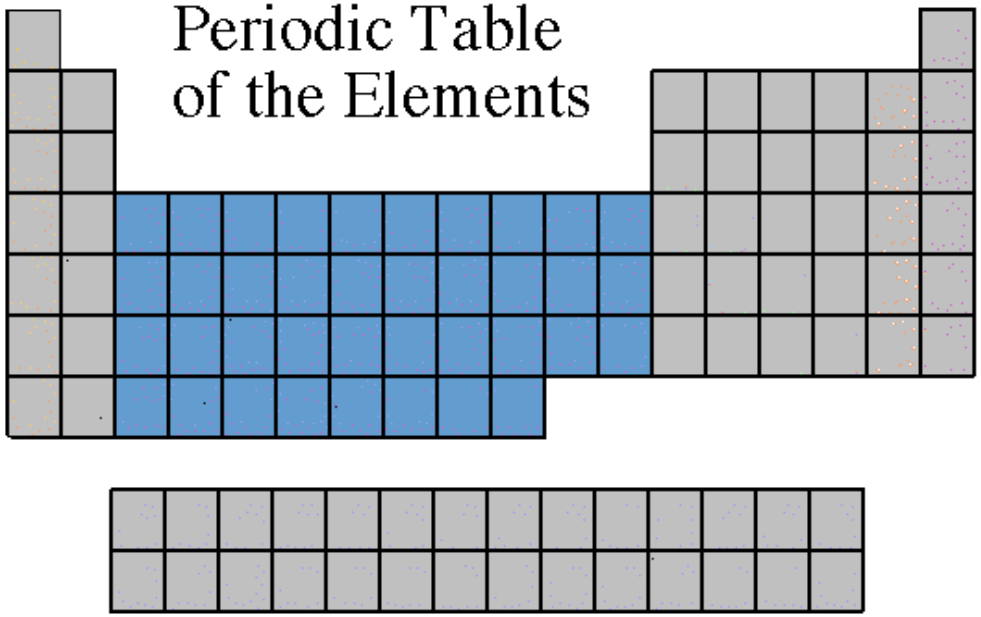
ALKALINE EARTH METALS



Group 2

- 2 electrons in the outer shell
- Reactive, but less than Alkali metals
- Conduct electricity

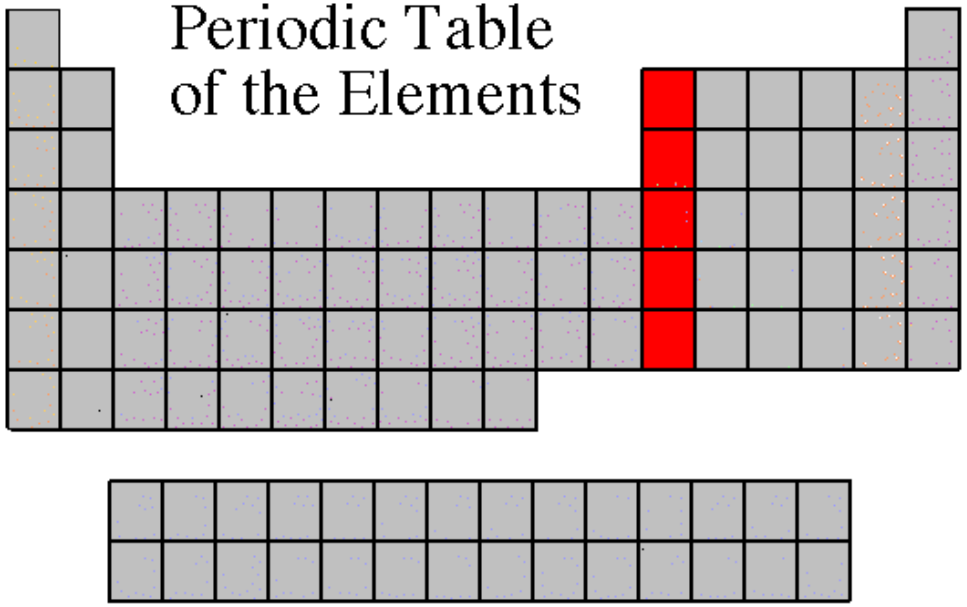
TRANSITION METALS



Groups 3-12

- Good conductors of heat and electricity.
- Some are used for jewelry.
- The transition metals are able to put up to 32 electrons in their second to last shell.

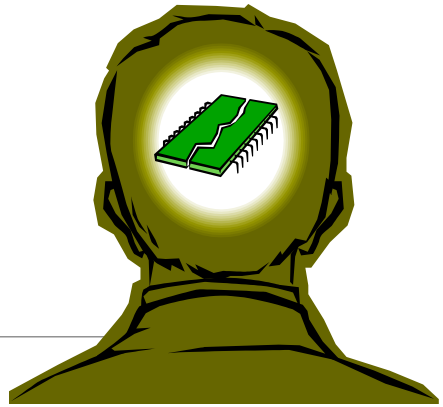
BORON FAMILY

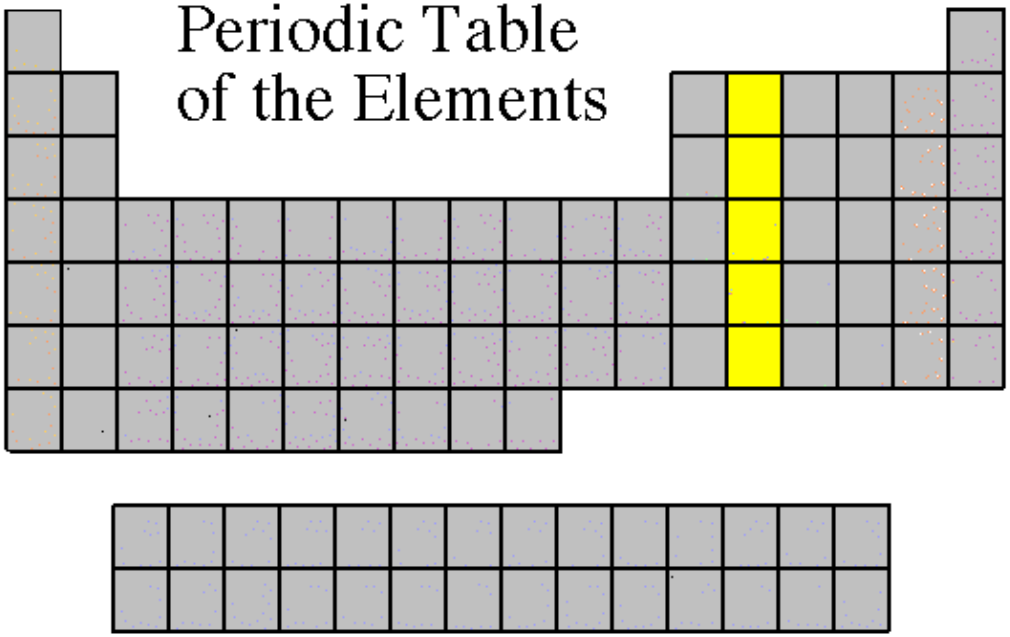


Group 13

- 3 electrons in the outer shell
- Most are metals
- Boron is a **metalloid**
- Aluminum metal was once rare and expensive, not a “disposable metal.”

CARBON FAMILY

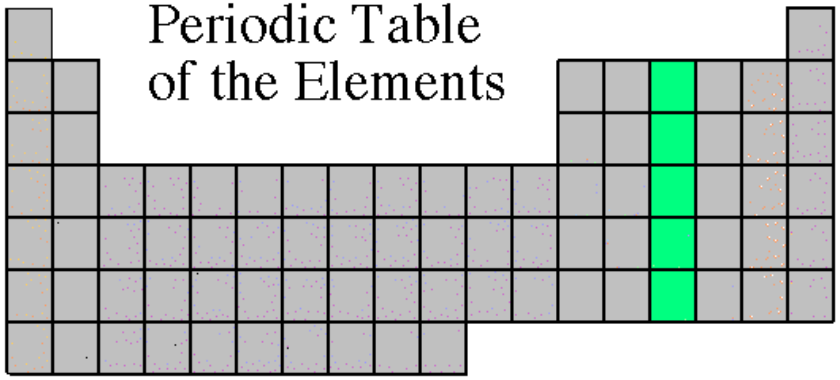


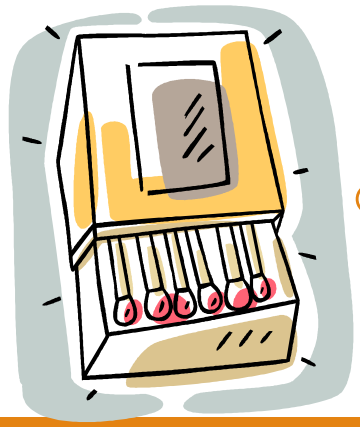


Group 14

- 4 electrons in the outer shell
- Contains elements important to life and computers.
- Carbon is the basis for an **entire branch** of chemistry.
- Silicon and Germanium are important semiconductors.

NITROGEN FAMILY

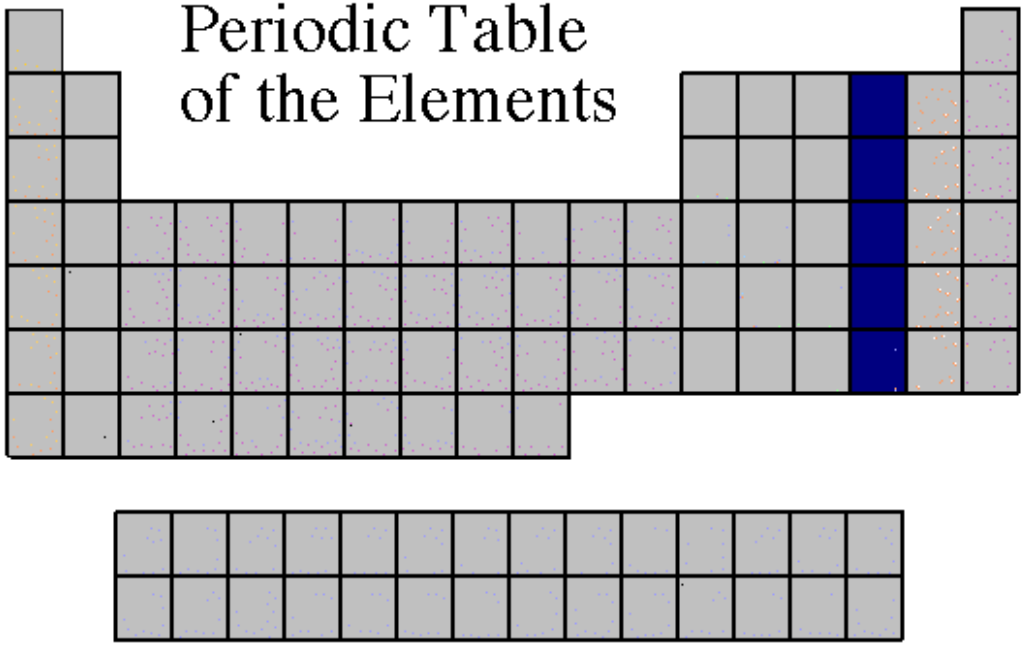




Group 15

- 5 electrons in the outer shell
- Nitrogen makes up over ¾ of the atmosphere.
- Nitrogen and phosphorus are both important in living things.
- The red stuff on the tip of matches is phosphorus.

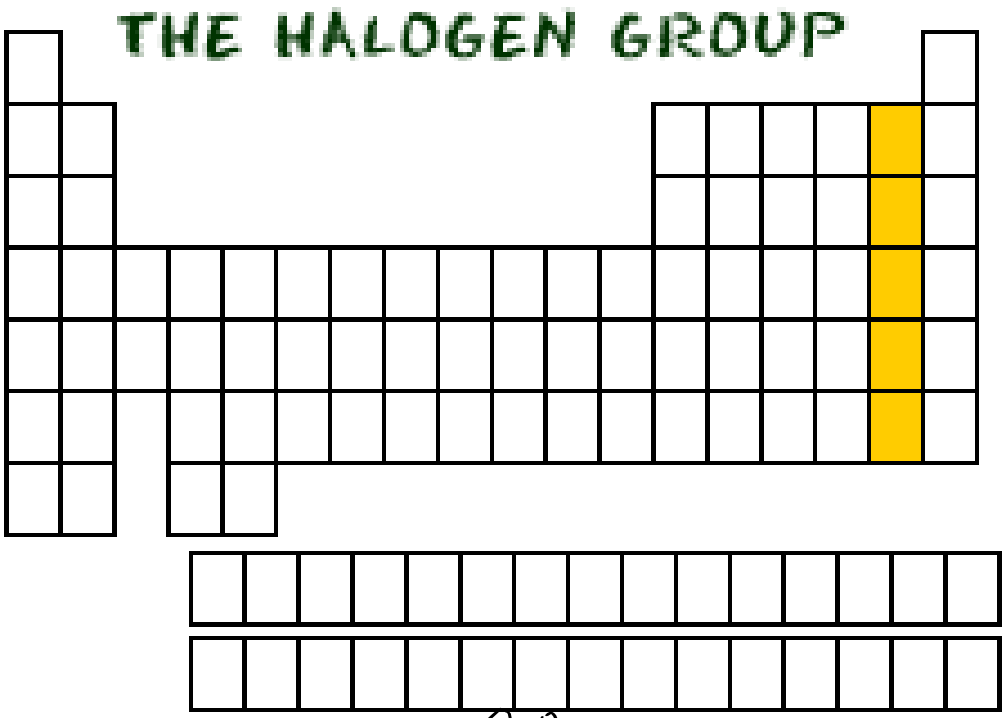
OXYGEN FAMILY

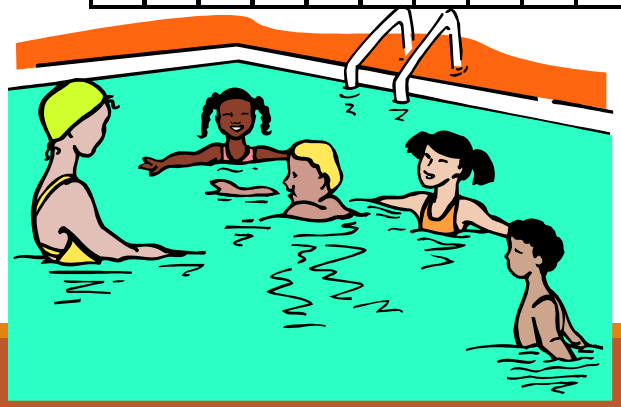


Group 16

- 6 electrons in the outer shell
- Reactive
- Oxygen is necessary for respiration.
- Many things that stink, contain sulfur (rotten eggs, garlic, skunks,etc.)

Halogens

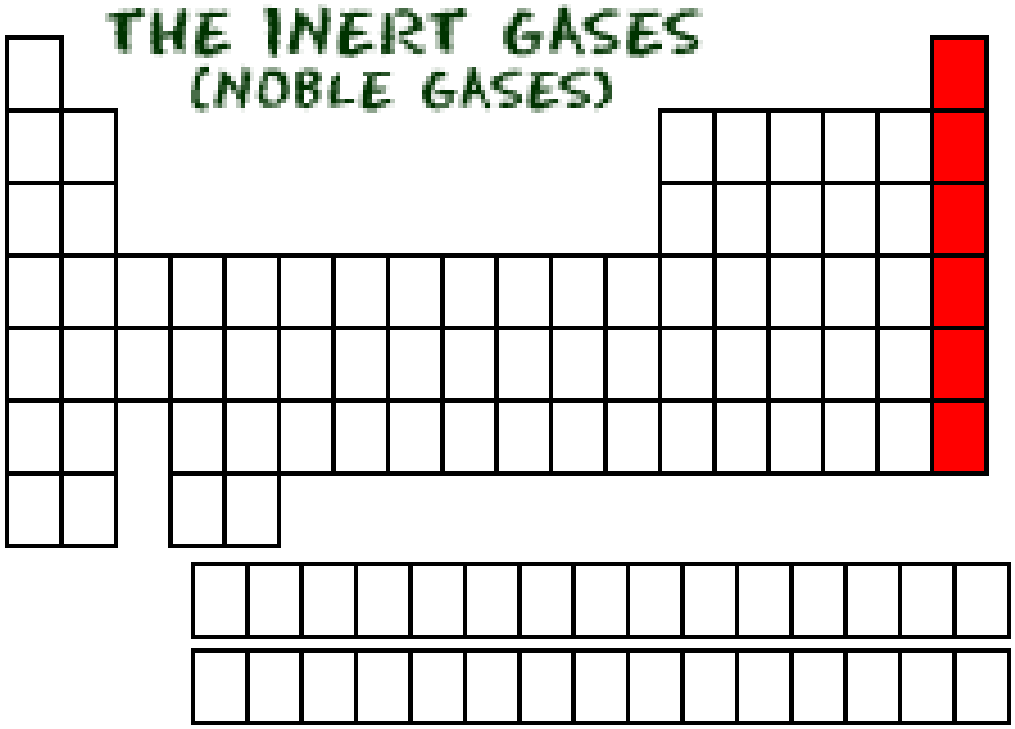




Group 17

- 7 electrons in the outer shell
- All are **non-metals**
- **Very reactive,** are often bonded with elements from Group 1
- Used as disinfectants and to strengthen teeth.

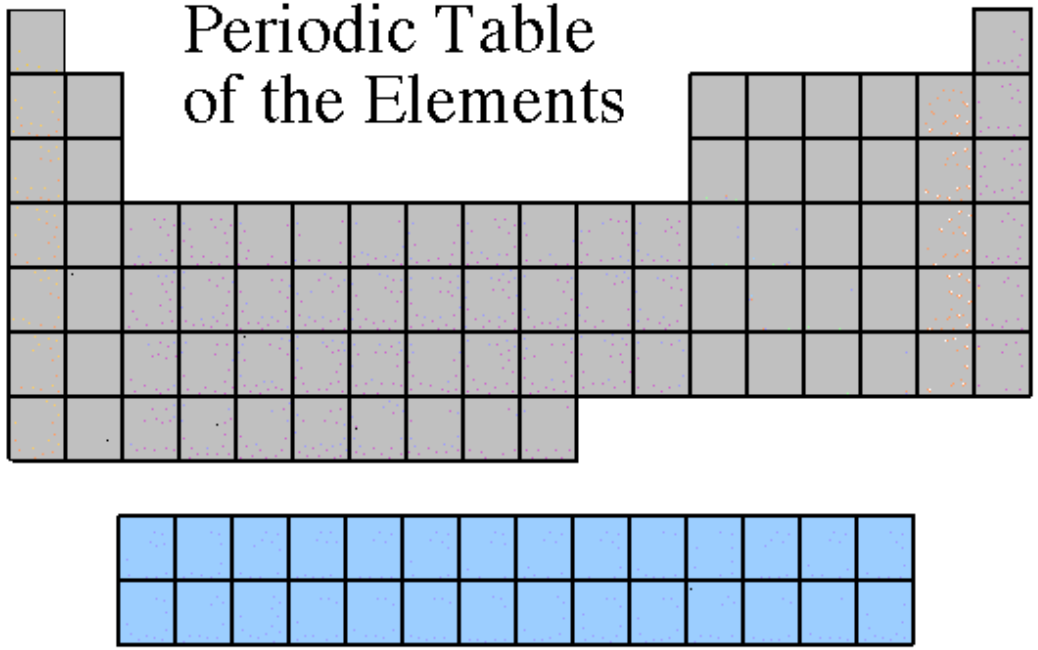
Noble Gases



Group 18

- Exist as gases
- Non-metals
- Not reactive with other elements because outer shell is full
- Used in lighted “neon” signs.

Rare Earth Metals



- The rare earths are silver, silvery-white, or gray metals.
- Conduct electricity
- Found in the earth
- Some are radioactive