REGENTS CHEMISTRY NAME: Key

# PERIODIC TABLE ACTIVITY

Objectives:

- To make a colorful, educational periodic table that shows reactivity of elements.
- To make connections with the arrangement of the elements on the periodic table to the arrangements with electron configuration.

Procedure:

1. Color a box around each of the alkali metals, Group 1, in red, because alkali metals are WILDLY reactive. Shade lithium the lightest at the top through darkest at the bottom to indicate the increasing reactivity of the group members.

Complete the chart on the alkali metals.

| SYMBOL | ELEMENT NAME | ELECTRON CONFIGURATION | ELECTRON DOT |
|---|---|---|---|
| Li | Lithium | 2-1 | $Li^{\cdot}$ |
| Na | Sodium | 2-8-1 | $Na^{\cdot}$ |
| K | Potassium | 2-8-8-1 | $K^{\cdot}$ |
| Rb | Rubidium | 2-8-18-8-1 | $Rb^{\cdot}$ |
| Cs | Cesium | 2-8-18-18-8-1 | $Cs^{\cdot}$ |
| Fr | Francium | 2-8-18-32-18-8-1 | $Fr^{\cdot}$ |

Reactivity is a measure of how intense an element gains or loses electrons. The alkali metals lose 1 electron. Suggest a reason why francium would be more reactive than lithium in losing electrons.

The 1 electron is further from the nucleus, thus more likely wanting to lose electron.

2. Color a box around each of the alkaline earth metals, Group 2, in orange because they are less reactive than the alkali metals. Color beryllium the lightest at the top through darkest at the bottom to indicate increasing reactivity of the group members.

Complete the chart on the alkaline earth metals.

| SYMBOL | ELEMENT NAME | ELECTRON CONFIGURATION | ELECTRON DOT |
|---|---|---|---|
| Be | Beryllium | 2-2 | Be |
| Mg | Magnesium | 2-8-2 | Mg |
| Ca | Calcium | 2-8-8-2 | Ca |
| Sr | Strontium | 2-8-18-8-2 | Sr |
| Ba | Barium | 2-8-18-18-8-2 | Ba |
| Ra | Radium | 2-8-18-32-18-8-2 | Ra |

3. Color a box around each of the transition elements in Group 3-11 pale yellow because they are only slightly reactive compared to the other groups of metals.

4. Color a box around the metalloids (semi-metals) with atomic numbers 5, 14, 32, 33, 51 and 52 in green. Metalloids have both properties of metals, like transitions metals (yellow) and non-metals like the halogens (blue).

5. Color a box around the halogens, Group 17, in blue because they are very reactive and at the other end of the spectrum of chemical behavior of the alkali metals. Color fluorine the darkest because it has the greatest reactivity and lighten to astatine because it is least chemically reactive in the group.

Complete the chart on the halogens.

| SYMBOL | ELEMENT NAME | ELECTRON CONFIGURATION | ELECTRON DOT |
|---|---|---|---|
| F | Fluorine | 2-7 | F |
| Cl | Chlorine | 2-8-7 | Cl |
| Br | Bromine | 2-8-18-7 | Br |
| I | Iodine | 2-8-18-18-7 | I |
| At | Astatine | 2-8-18-32-18-7 | At |

Reactivity is a measure of how intense an element gains or loses electrons. The halogens gain 1 electron. Suggest a reason why fluorine would be more reactive than astatine in gaining electrons.

Fluorine is the smallest and wants to gain 1 $e^-$ the most.

6. Color a box around each of the noble gases, Group 18, and lightly shade them in black because they are chemically unreactive hence the other name for this group: the inert gases

Complete the chart on the noble gases.

| SYMBOL | ELEMENT NAME | ELECTRON CONFIGURATION | ELECTRON DOT |
|---|---|---|---|
| He | Helium | 2 | :He: |
| Ne | Neon | 2-8 | :Ne: |
| Ar | Argon | 2-8-8 | :Ar: |
| Kr | Krypton | 2-8-18-8 | :Kr: |
| Xe | xenon | 2-8-18-18-8 | :Xe: |
| Rn | Radon | 2-8-18-32-18-8 | :Rn: |

7. Use a fluorescent highlighter on elements 84-118 and element 43, technetium, to indicate the radioactive nature of these elements. All of elements have at least one radioactive isotope but the elements you highlighted are strictly radioactive with no stable isotopes.

Reminder: What are isotopes?

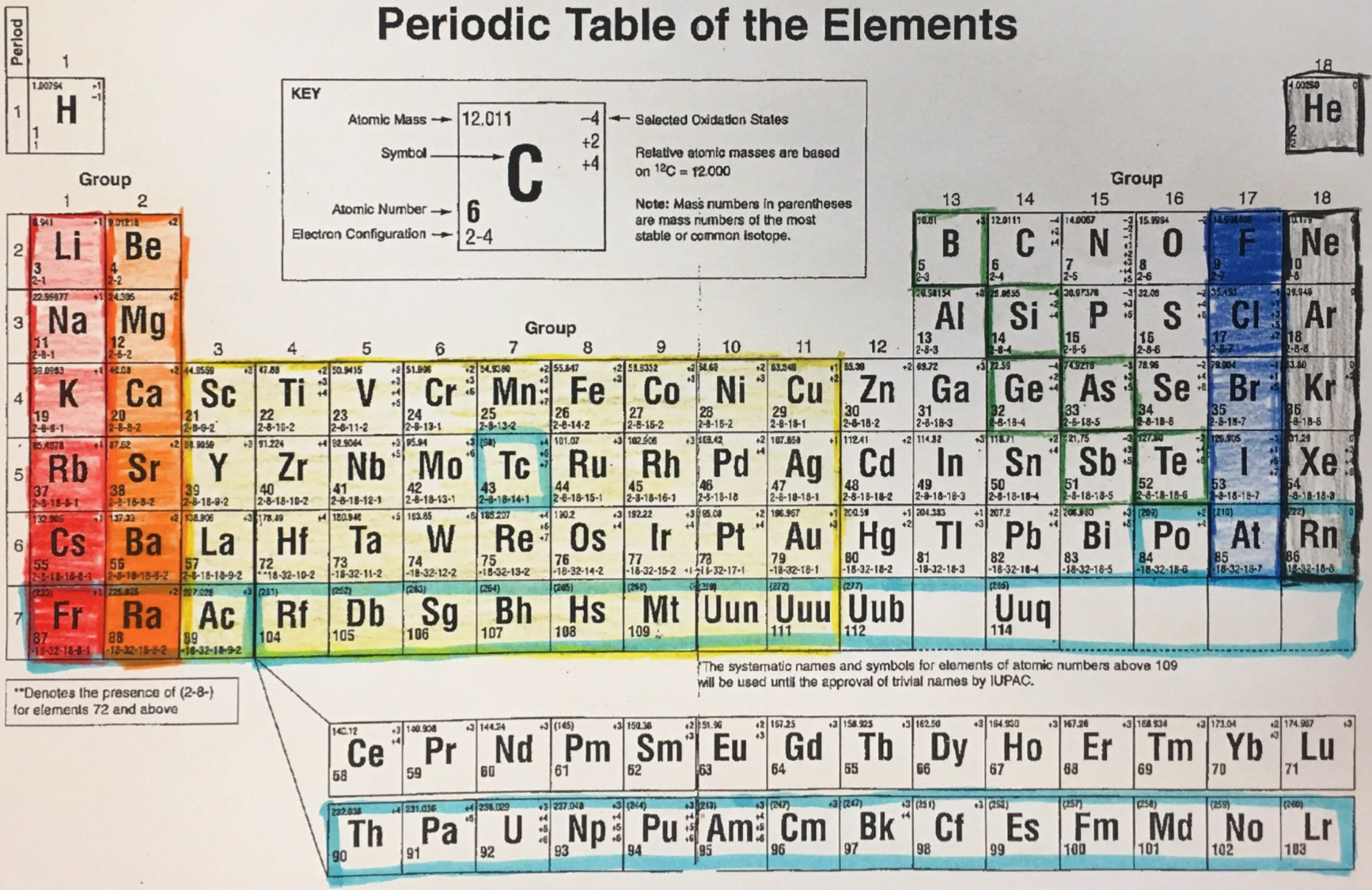
Isotopes are forms of the same element that have equal protons but a different number of neutrons.

Isotopes are related to the calculation of average atomic mass of an element. What information is necessary to determine the average atomic mass of any element? Circle all that apply.

- Atomic mass of artificially produced isotopes of that element
- (•) Relative abundance of each isotope
- Number of protons in each atom of the sample
- (•) Atomic mass of all the naturally occurring isotopes of that element
- Exactly 100 atoms of the element
- Number of neutrons in each isotope
- Whether the atoms of the element will gain or lose electrons

Leave this Periodic Table in your notebooks to refer to during this unit.

# Periodic Table of the Elements




**Denotes the presence of (2-8-) for elements 72 and above

*The systematic names and symbols for elements of atomic numbers above 109 will be used until the approval of trivial names by IUPAC.