Name:_____Teacher:_____Pd.____Date: _____

TEK 8.5C: Periodic Table

TEK 8.5C: Interpret the arrangement of the Periodic Table, including groups and periods, to explain how properties are used to classify elements.

Elements and the Periodic Table

- An **element** is a substance that cannot be separated into simpler substances by physical or chemical means. An element is already in its simplest form.
- The smallest piece of an element that still has the properties of that element is called an **atom**.
- An element is a pure substance, containing only one kind of atom.
- The **Periodic Table of Elements** is a list of all the elements that have been discovered and named, with each element listed in its own element square.
- Elements are represented on the Periodic Table by a one or two letter **symbol**, and its name, **atomic number** and **atomic mass**.

The Periodic Table & Atomic Structure

- The elements are listed on the Periodic Table in **atomic number order**, starting at the upper left corner and then moving from the left to right and top to bottom, just as the words of a paragraph are read.

- The element's **atomic number** is based on the number of protons in each atom of that element. In electrically neutral atoms, the atomic number also represents the number of electrons in each atom of that element.

- For example, the atomic number for neon (Ne) is 10, which means that each atom of neon has 10 protons and 10 electrons. Magnesium (Mg) has an atomic number of 12, which means it has 12 protons and 12 electrons.

- The element's **atomic mass** as shown on the periodic table, is the average sum of protons and neutrons in each atom of that element. It is the numerically larger, non-whole number in the element square. (Note that the atomic mass for a single particular atom is a whole number, because it is not an average of many different atoms. There cannot be fractions of a proton or neutron in an actual atom.)

- The number of neutrons in an atom of a particular element can vary. These are called **isotopes** of that element.

- Because the atomic mass is an average number, it is not a whole number, and has to be rounded up or down to a whole number when used to calculate the number of neutrons in the **most common isotope** of that element.

- To calculate the number of neutrons in the most common isotope of an element, subtract the atomic number from the rounded atomic mass. For example, the atomic mass of iron is 55.84, which rounds up to 56. Iron's atomic number is 26. The number of neutrons is thus 56 – 26 = 30.

Periods

- The horizontal (left-to-right) rows of the periodic table are called **periods**. There are seven periods in the periodic table.

- Within each period, all elements have the same number of occupied Bohr Model electron "shells" (electron energy levels or orbitals).

- The properties of the elements change gradually as you move across each period. For example, the atomic radius of each element gets smaller as you move from left to right within each period.

Groups or Families

- The vertical (up-and-down) columns indicate the 18 different **groups** or chemical **families** of the periodic table, usually numbered 1 through 18, from left to right. The elements within each group have the same general chemical properties and the same number of **valence electrons** in the Bohr Model outer electron "shell."

Practice Questions

1. Each square in the periodic table represents a(n)_____.
2. The numerically smaller whole number in each element square is the_____, which represents the number of_____in an atom of that element.
3. The numerically larger non-whole number in each element square is the_____--_____, which represents the number of_____and_____in an atom of that element.
4. In electrically neutral atoms, the number of protons is the same as the number of_____.
5. The horizontal (left-to-right) rows of elements are called _____, which indicate the number of _____(shells) in an atom of those elements.
6. There are_____different periods.
7. The physical and chemical properties of elements generally change gradually across a_____.

8. The vertical, up-and-down, columns of elements are called _____or_____.

9. There are_____different groups.

10. All of the elements in each column have similar _____ properties because they each have the same number of: _____.