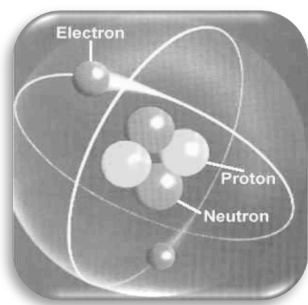
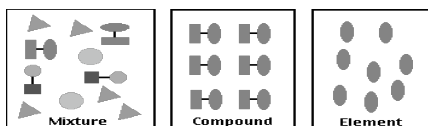


S8P1a: Distinguish between atoms and molecules

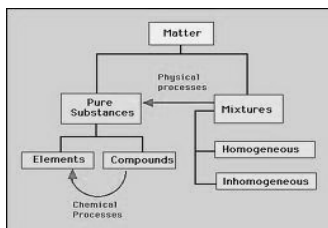
Matter is anything that has mass and takes up space. Energy is anything with the ability to do work or cause change. Mass is a measure of how much matter is in an object. Volume is the amount of space an object takes up. Elements are the purest form of matter. They can not be broken down into any simpler substances. Atoms are made of smaller particles called protons (positive charge), electrons (negative charge), and neutrons (neutral). Protons and neutrons are found in the nucleus and make up the mass of an atom. Electrons are found outside of the nucleus

**S8P1b: Describe the difference between pure substance (elements and compounds) and mixtures.**

A molecule is made of 2 or more atoms. The atoms can be the same or different. A compound is 2 different atoms chemically joined together. Compounds are always made of molecules. Compounds lose their individual properties when forming a new substance. They have a fixed ratio and are hard to break down. A pure substance is when everything is the same. Ex) gold and pure water. A mixture is formed when 2 or more different substances are mixed together. Mixtures can be physically broken back into their original properties. They do not have fixed ratios.



There are 2 types of mixtures: Homogeneous (also called a solution) and Heterogeneous. Homogeneous the mixture looks the same and may be chemically or physically combined. Ex) tap water, milk. Heterogeneous you can see the different parts and is put together physically. Ex) salad.

**S8P1d: Distinguish between physical and chemical properties of matter as physical or chemical.****S8P1e: Distinguish between changes in matter as physical or chemical.**

Physical properties include but are not limited to density, texture, appearance, solubility, melting point and boiling point. Chemical properties include but are not limited to reactivity and combustibility. Physical changes alter the form or appearance of a substance but do not change the material into another substance. Chemical changes produce new substances, which have new properties. Evidence of a chemical reaction include but are not limited to development of a gas, formation of a precipitate, and change in color. During a chemical change energy is released or absorbed and a 3rd substance is made. Exothermic Reaction is when energy is released (hot). Endothermic Reaction is when energy is absorbed (cold). In a closed system mass can not escape or join the chemical reaction, therefore the mass of your reactants will equal the mass of your products. In an open system, matter may escape or join the reaction and a loss of mass could mean a gas was produced. While an inc. in mass might mean a solid has been produced.

S8P1f: Recognize that there are more than 100 elements and some have similar properties as shown on the Periodic Table of the Elements.**MAIN IDEAS**

- Mass remains constant throughout a chemical reaction. The amount of atoms you have on the reactants side must equal the amount of atoms on the product side. This is stated in the Law of Conservation of Matter/Mass.
- A mixture is formed when two or more different substances are mixed together (usually physically).
- A compound is formed when 2 or more elements become chemically together.
- Compounds react in definite amounts but mixtures can be present in any amounts.
- While it may be possible to separate components of a mixture, it is often not possible to convert back the elements of a compound.
- Physical changes include but are not limited to changes of state
- Chemical reactions form new substances by breaking and making new chemical bonds

The periodic table is organized by each element's atomic number which also represents the number of protons an atom may have. Each element is made up of its own atoms. Neutrons are found by subtracting the atomic number from the atomic mass.

The table also displays which elements are metals (luster, malleable, ductile, good conductors, and to the left of the staircase), nonmetals (poor conductors, dull, and brittle, and to the right of the staircase), and metalloids (properties of each and found on the staircase). Periods are rows which represent the number of shells an atom has. Groups are columns which represent the number of valence electrons an atom has. Lewis dot structures represent the elements symbol surrounded by dots (the dots are determined by an atom's valence electrons).

An element's ability to combine with another element is determined by its valence electrons. Nonmetals combining with nonmetals will form a covalent bond (sharing of electrons).

The Law of Conservation of Matter/Mass states that matter may not be created nor destroyed. The number of atoms on the reactants side of a chemical formula (left of the arrow) must equal the number of atoms on the products side (right of the arrow).

Vocabulary

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|---------------------|--------------------------|-------------|
| • Group | • Luster | • Magnetic |
| • Physical Change | • Conservation of Matter | • Conductor |
| • Physical Property | • Nucleus | • Solid |
| • Chemical Change | • Atomic Number | • Liquid |
| • Chemical Property | • Group | • Gas |
| • Density | • Malleable | • Plasma |
| • Valence Electron | • Period | |