

8TH GRADE SCIENCE CONTENT STANDARDS

(simplified from CA State Science Standards)

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1. MOTION

- a) In order to describe your **position**, you must use another position (**reference point**) to compare yourself to.
- b) **Average speed** is the total distance traveled divided by how long the trip took.
- c) **Distance traveled** = speed x time, **Travel time** = distance / speed.
- d) In order to know **velocity**, you must know the speed **and** direction of an object.
- e) If you change your speed, direction, or both, you have changed your **velocity**.
- f) On a motion graph, straight lines and curved lines mean very different things.

2. FORCES

- a) A **force** is a push or pull. A force has a strength and a direction.
- b) If more than one force is affecting the same object, they can add up or cancel each other out.

2. FORCES cont.

- c) If all forces pushing or pulling on an object are in **balance**, then it's motion will not change.
- d) There are many types of forces such as gravity, magnetism, and friction.
- e) If all forces pushing or pulling on an object are out of balance, it will change speed, direction, or both.
- f) It takes more **force** to change the motion of an object with more **mass**.
- g) The shapes and motions of our sun, planets, and moon are due to the force of **gravity**.

3. STRUCTURE OF MATTER

- a) All atoms are made from **protons**, **neutrons**, and **electrons**. There are many different types of atoms called **elements**.

3. STRUCTURE OF MATTER cont.

- b) Two or more elements can combine to form a **compound**. Compounds have different characteristics from the elements that they are made of.
- c) Atoms and molecules form solids by building repeating patterns. These patterns form definite shapes such as crystals or fibers.
- d) All matter exists as a **solid, liquid, or gas**. These **states** of matter depend on how much molecular motion the atoms have.
- e) In a solid, the atoms are stuck together and can only vibrate in place. In a liquid, the atoms are loosely connected and can slide past each other. In a gas, the atoms are free to fly around and run into each other.
- f) The **periodic table of the elements** is a chart which describes all of the known types of atoms.

4. EARTH IN THE SOLAR SYSTEM (EARTH SCIENCE)

- a) A **galaxy** is a cluster of many billions of **stars**. Galaxies come in several shapes.

4. EARTH IN THE SOLAR SYSTEM cont.

- b) Our **sun** is one of billions of stars in our "Milky Way" galaxy. Stars come in different sizes, temperatures, and colors.
- c) Large distances in space can be measured using **astronomical units** or **light years**. One astronomical unit (A.U.) is equal to the average distance between the Earth and the sun. One light year is equal to the distance that light can travel in one year.
- d) Stars provide all of the light from bright objects in the sky. Planets and moons don't shine with their own light, they reflect sunlight like a mirror.
- e) The solar system is filled with many objects like **planets, moons, asteroids, and comets**. Each one has a different size, shape, composition, and motion around the sun.

5. CHEMICAL REACTIONS

- a) The ingredients before a **chemical reaction** happens have different characteristics from the **products** after the reaction.

5. CHEMICAL REACTIONS cont.

- b) The mass of all atoms **before** a chemical reaction is equal to the mass **after** a chemical reaction.
- c) Some chemical reactions give off heat and some absorb heat.
- d) **Physical changes** such as freezing or boiling are different from **chemical changes**.
- e) A **solution** can be classified as either an **acid, base, or neutral**.

6. CHEMISTRY OF LIVING SYSTEMS (LIFE SCIENCE)

- a) **Carbon** combines in many ways with itself and other elements. This makes carbon very important to living things.
- b) Living things are made mostly from the elements **carbon, hydrogen, nitrogen, oxygen, sulfur, and phosphorus**.

6. CHEMISTRY OF LIVING SYSTEMS (LIFE SCIENCE) cont.

- c) Living things are made from many different types of molecules. Some are small such as water or salt. Some are large such as DNA or proteins.

7. PERIODIC TABLE

- a) The periodic table has different regions such as **metals**, **nonmetals** and **inert gases**.
- b) The **atomic number** of an element represents the number of **protons** in its **nucleus**. Most elements have one or more **isotopes** which have the same number of protons but a different number of **neutrons**.
- c) Chemicals can be grouped or arranged based on their properties such as **density**, **melting temperature**, and **hardness**.

8. DENSITY AND BUOYANCY

- a) **Density** is a measure of how much mass is contained in a certain space. Density equals mass divided by volume.

8. DENSITY AND BUOYANCY cont.

- b) You must use different methods to measure the density of regular solids, irregular solids, and liquids.
- c) The **buoyant force** helps things to float. This force is equal to the weight of the water **displaced** by the floating object.
- d) If you compare the density of an object with water, you can predict whether it will sink or float.