

SAUSALITO MARIN CITY SCHOOL DISTRICT

Science Standards – GRADE 5

Physical Sciences

1. Elements and their combinations account for all the varied types of matter in the world. As a basis for understanding this concept, students know:

- a. during chemical reactions, the atoms in the reactants rearrange to form products with different properties.
- b. all matter is made of atoms, which may combine to form molecules.
- c. metals have properties in common, such as electrical and thermal conductivity. Some metals, such as aluminum (Al), iron (Fe), nickel (Ni), copper (Cu), silver (Ag), gold (Au), are pure elements while others, such as steel and brass, are composed of a combination of elemental metals.
- d. each element is made of one kind of atom. These elements are organized in the Periodic Table by their chemical properties.
- e. scientists have developed instruments that can create images of atoms and molecules showing that they are discrete and often occur in well ordered arrays.
- f. differences in chemical and physical properties of substances are used to separate mixtures and identify compounds.
- g. properties of solid, liquid, and gaseous substances, such as sugar ($C_6H_{12}O_6$), water (H_2O), helium (He), oxygen (O_2), nitrogen (N_2), and carbon dioxide (CO_2).
- h. living organisms and most materials are composed of just a few elements.
- i. common properties of salts, such as sodium chloride (NaCl).

Life Sciences

2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept, students know:

- a. many multicellular organisms have specialized structures to support the transport of materials.

- b. how blood circulates through the heart chambers, lungs, and body, and how carbon dioxide (CO_2) and oxygen (O_2) are exchanged in the lungs and tissues.

- c. the sequential steps of digestion, and the roles of teeth and mouth, esophagus, stomach, small intestine, large intestine, and colon in the function of the digestive system.

- d. the role of the kidney in removing cellular wastes from blood and converting them into urine, which is stored in the bladder.

- e. how sugar, water, and minerals are transported in a vascular plant.

- f. plants use carbon dioxide (CO_2) and energy from sunlight to build molecules of sugar and release oxygen.

- g. plant and animal cells break down sugar to obtain energy, forming carbon dioxide (CO_2) and water (respiration).

Earth Sciences

3. Water on Earth moves between the oceans and land through the processes of evaporation and condensation.

As a basis for understanding this concept, students know:

- a. most of the Earth's water is present as salt water in the oceans, which cover most of the Earth's surface.

- b. when liquid water evaporates, it turns into water vapor in the air and can reappear as a liquid when cooled, or as a solid if cooled below the freezing point of water.

- c. water moves in the air from one place to another in the form of clouds or fog, which are tiny droplets of water or ice, and falls to the Earth as rain, hail, sleet, or snow.

- d. the amount of fresh water, located in rivers, lakes, underground sources, and glaciers, is limited, and its availability can be extended through recycling and decreased use.

- e. the origin of water used by their local communities.

4. Energy from the sun heats the Earth unevenly, causing air movements resulting in changing weather patterns.

As a basis for understanding this concept, students know:

- a. uneven heating of the Earth causes air movements (convection currents).
- b. the influence of the ocean on weather, and the role of the water cycle in weather.
- c. causes and effects of different types of severe weather.
- d. how to use weather maps and weather forecasts to predict local weather, and that prediction depends on many changing variables.
- e. the Earth's atmosphere exerts a pressure that decreases with distance above the Earth's surface, and is the same in all directions.

g. record data using appropriate graphic representation (including charts, graphs, and labeled diagrams), and make inferences based on those data.

h. draw conclusions based on scientific evidence and indicate whether further information is needed to support a specific conclusion.

i. write a report of an investigation that includes tests conducted, data collected or evidence examined, and conclusions drawn.

5. The solar system consists of planets and other bodies that orbit the sun in predictable paths. As a basis for understanding this concept, students know:

- a. the sun, an average star, is the central and largest body in the solar system and is composed primarily of hydrogen and helium.
- b. the solar system includes the Earth, moon, sun, eight other planets and their satellites, and smaller objects such as asteroids and comets.
- c. the path of a planet around the sun is due to the gravitational attraction between the sun and the planet.

Investigation and Experimentation

6. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform investigations. Students will:

- a. classify objects (e.g., rocks, plant, leaves) based on appropriate criteria.
- b. develop a testable question.
- c. plan and conduct a simple investigation based on a student-developed question, and write instructions others can follow to carry out the procedure.
- d. identify the dependent and controlled variables in an investigation.
- e. identify a single independent variable in a scientific investigation and explain what will be learned by collecting data on this variable.
- f. select appropriate tools (e.g., thermometers, meter sticks, balances, and graduated cylinders) and make quantitative observations.