

Science Content Standards: Grade Five

Physical Sciences

1.0 God has set up physical laws which govern our universe. Elements and their combinations account for all the varied types of matter in the world. As a basis for understanding this concept:

- 1.a *Students know* that during chemical reactions the atoms in the reactants rearrange to form products with different properties.
- 1.b *Students know* metals have properties in common, such as high electrical and thermal conductivity. Some metals, such as aluminum (Al), iron (Fe), nickel (Ni), copper (Cu), silver (Ag), and gold (Au), are pure elements; others, such as steel and brass, are composed of a combination of elemental metals.
- 1.c *Students know* differences in chemical and physical properties of substances are used to separate mixtures and identify compounds.

2.0 God has set up physical laws with govern our universe. Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature. As a basis for understanding this concept:

- 2.a *Students know* energy can be carried from one place to another by heat flow or by waves, including water, light and sound waves, or by moving objects.
- 2.b *Students know* heat energy is also transferred between objects by radiation (radiation can travel through space).

3.0 God designed connections among the physical phenomena of light, heat, sound, electricity, magnetism, and the motion of objects using the transfer of energy. As a basis for understanding this concept:

- 3.a *Students know* that energy is a property of many substances and is associated with heat, light, electricity, mechanical motion, and sound.
- 3.b *Students know* that heat moves in predictable ways, flowing from warmer objects to cooler ones, until both reach the same temperature.
- 3.c *Students know* that light interacts with matter by transmission (including refraction), absorption, or scattering (including reflection).
- 3.d *Students know* that electrical circuits provide a means of transferring electrical energy when heat, light, and sound are produced.

Life Sciences

4.0 God planned for His created organisms in ecosystems to exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:

- 4.a *Students know* energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.
- 4.b *Students know* matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.
- 4.c *Students know* populations of organisms can be categorized by the functions they serve in an ecosystem.
- 4.d *Students know* different kinds of organisms may play similar ecological roles in similar biomes.
- 4.e *Students know* the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.
- 4.f *Students know* the world is the creation of God and that it glorifies Him as its sustainer and upholder. (Psalm 90:1-2)

5.0 God planned for His created plants and animals to have structures for respiration, digestion,

waste disposal, and transport of materials. As a basis for understanding this concept:	
5.a	<i>Students know</i> many multicellular organisms have specialized structures to support the transport of materials.
5.b	<i>Students know</i> 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.
5.c	<i>Students know</i> the sequential steps of digestion and the roles of teeth and the mouth, esophagus, stomach, small intestine, large intestine, and colon in the function of the digestive system.
5.d	<i>Students know</i> the role of the kidney in removing cellular waste from blood and converting it into urine, which is stored in the bladder.
5.e	<i>Students know</i> how sugar, water, and minerals are transported in a vascular plant.
5.f	<i>Students know</i> plants use carbon dioxide (CO ₂) and energy from sunlight to build molecules of sugar and release oxygen.
5.g	<i>Students know</i> plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO ₂) and water (respiration).
Earth Sciences	
6.0	The properties of rocks and minerals reflect the processes that formed them. As a basis for understanding this concept:
6.a	<i>Students differentiate</i> between igneous, sedimentary, and metamorphic rocks by referring to their properties and methods of formation (the rock cycle).
6.b	<i>Students identify</i> common rock-forming minerals (including quartz, calcite, feldspar, mica, and hornblende) and ore minerals by using a table of diagnostic properties.
7.0	God allows energy from the Sun to heat Earth unevenly, causing air movements that result in changing weather patterns. As a basis for understanding this concept:
7.a	<i>Students know</i> uneven heating of Earth causes air movements (convection currents).
7.b	<i>Students know</i> the influence that the ocean has on the weather and the role that the water cycle plays in weather patterns.
7.c	<i>Students know</i> the causes and effects of different types of severe weather.
7.d	<i>Students know</i> how to use weather maps and data to predict local weather and know that weather forecasts depend on many variables.
7.e	<i>Students know</i> that the Earth's atmosphere exerts a pressure that decreases with distance above Earth's surface and that at any point it exerts this pressure equally in all directions.
8.0	In God's orderly universe, the solar system consists of planets and other bodies that orbit the Sun in predictable paths. As a basis for understanding this concept:
8.a	<i>Students know</i> the Sun, an average star, is the central and largest body in the solar system and is composed primarily of hydrogen and helium.
8.b	<i>Students know</i> the solar system includes the planet Earth, the Moon, the Sun, eight other planets and their satellites, and smaller objects, such as asteroids and comets.
8.c	<i>Students know</i> the path of a planet around the Sun is due to the gravitational attraction between the Sun and the planet.
Investigation and Experimentation	
9.0	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other

three strands, students should develop their own questions and perform investigations. Students will:	
9.a	Classify objects in accordance with appropriate criteria.
9.b	Develop a testable question.
9.c	Plan and conduct a simple investigation based on a student-developed question and write instructions others can follow to carry out the procedure.
9.d	Identify the dependent and controlled variables in an investigation.
9.e	Interpret data of properties of matter and scientific phenomena.
9.f	Identify a single independent variable in a scientific investigation and explain how this variable can be used to collect information to answer a question about the results of the experiment.
9.g	Identify quantitative relationships given in graphs.
9.g	Select appropriate tools (e.g., thermometers, meter sticks, balances, and graduated cylinders) and make quantitative observations.
9.h	Record data by using appropriate graphic representations (including charts, graphs, and labeled diagrams) and make inferences based on those data.
9.i	Use models to depict scientific phenomena.
9.j	Draw conclusions from scientific evidence and indicate whether further information is needed to support a specific conclusion.
9.k	Write a report of an investigation that includes conducting tests, collecting data or examining evidence, and drawing conclusions.
Health	
10.0	God created the human body as His temple. As a basis for understanding this concept, students must demonstrate an understanding of the body's functions and proper care:
10.a	<i>Students know</i> the importance of regular exercise for the maintenance and improvement of health.
10.b	<i>Students know</i> the importance of using precaution and recognizing risks to ensure safety.
10.c	<i>Students know</i> that God values the life of every person He creates (Sanctity of Life).
10.d	<i>Students know</i> their role in recognizing and affirming others (Social Justice).
10.e	<i>Students know</i> God's gifts of chastity, future marriage, and family (Purity).
10.f	<i>Students know</i> how the body grows and develops (Human Growth and Development).