Sixth Grade Science

5.1 Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.

TSW = The Student Will

Objective(s)	NJCCCS Alignment	Essential Questions	Understandings	Suggested Assessment Activities
• TSW use mathematical, physical, and computational tools to build conceptual-based models and to pose theories • TSW design investigations and use scientific instrumentation to collect, analyze, and evaluate evidence • TSW revise predictions or explanations on the basis of discovering new evidence, learning new information, or using models • TSW engage in multiple forms of discussion	5.1.8.A 5.1.8.B 5.1.8.C 5.1.8.D	- What is a control? - Why is it important to understand science globally? - What measures are used to analyze data? - How do science and technology affect our world? - What does it mean to think systematically?	• Scientific theories develop over time • Science content areas and disciplines interrelate and interconnect • Mathematics is the language of science since it can express relationships efficiently and accurately • Technology is influenced by cultural, political, and environmental values	Ongoing observation & questioning during class discussions and hands-on project work Use estimation to determine the reasonableness of measurements and computations Create and interpret a variety of charts, diagrams, tables, and graphs. Students should offer reasons for their findings Explain how you can determine the volume of a solid object (i.e. small rock) using only water and either a measuring cup or a graduated cylinder Use current events to research and report on scientific happenings

Sixth Grade Science

5.2 Physical Science: All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.

TSW = The Student Will

Objective(s)	NJCCCS Alignment	Essential Questions	Understandings	Suggested Assessment Activities
• TSW **c**alculate the density of objects or substances after determining volume and mass • TSW determine the identity of an unknown substance using data about intrinsic properties • TSW compare the properties of reactants with the properties of the products when two or more substances are combined and react chemically • TSW describe how to prisms can be used to demonstrate that visible light from the Sun is made up of different colors • TSW relate the transfer of heat from oceans and land masses to the evolution of a hurricane	5.2.6.A 5.2.6.A 5.2.6.B 5.2.6.C 5.2.6.C	- Is friction important? - How can light be changed? - Why is everything on or near the earth pulled toward the earth's center by gravitational force? - How can objects be physically changed? - What are things made of? - What is a chemical reaction? - How is energy transferred during a chemical reaction?	• Electrical circuits provide a means of transferring electrical energy when heat, light, sound, and chemical changes are produced • Energy is a property of many substances and is associated with heat, light, electricity, mechanical motion, sound, nuclei, and the nature of a chemical. • Energy is transferred in many ways • Light interacts with different surfaces and materials in different ways • Matter can be physically changed without rearranging the structure of its molecules	Ongoing observation & questioning during class discussions and hands-on project work Describe a chemical reaction indicating an energy transfer Illustrate how light is reflected, refracted, and absorbed Describe the effects of friction on a moving object Prepare solutions using various combinations of solids and liquids. Observe acid-base reactions by adding a specific amount of an indicator to equal volumes of acid (vinegar) and a base (ammonia) to observe color changes

• TSW use simple circuits involving batteries & motors to compare and predict the current flow with different circuit arrangements • TSW demonstrate and explain the frictional force acting on an object with the use of a physical model • TSW predict if an object will sink or float using evidence and reasoning	5.2.6.D 5.2.6.E 5.2.6.E		• All matter is made of atoms, which may combine to form molecules • Elements are organized in the Periodic Table by their chemical properties	

Grade 6 **Physical Science** continued

Sixth Grade Science

5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.

TSW = The Student Will

Objective(s)	NJCCCS Alignment	Essential Questions	Understandings	Suggested Assessment Activities
• TSW model and explain ways in which organelles work together to meet the cell's needs • TSW describe the sources of the reactants of photosynthesis and trace the pathway to the products • TSW predict the impact that altering biotic and abiotic factors has on an ecosystem • TSW describe how one population or organisms may affect other plants and/or animals in an ecosystem • TSW explain how knowledge of inherited variations within and between generations is applied to farming and animal breeding • TSW distinguish between inherited and acquired traits/characteristics	5.3.6.A 5.3.6.B 5.3.6.C 5.3.6.C 5.3.6.D 5.3.6.D	- What is energy and how does it move through a system? - How do we affect the world around us? - Is there a purpose for classifying organisms? - Are there similarities in all living things?	• Changes in the environment can lead to changes in populations and communities • There is a delicate balance between the links of a food chain or food web, and any change to any one of the links could change the entire food web and community • Humans can affect the survival of a food web and community • In order to survive plants and animals may have to adapt	Ongoing observation & questioning during class discussions and hands-on project work Illustrate the systems of the body to show how they work together Identify multiple means of how human behavior could be changed for the benefit of the local environment Categorize lists of plants and animals based on similarities and differences in structure Research the structure of a bird egg and trace the development of the embryo through its hatching. Diagram stages of chick embryonic development

• TSW describe the impact on the survival of species during specific times in geologic history when environmental conditions changed	5.3.6.E			

Grade 6 **Life Science** continued

Sixth Grade Science

5.4 Earth Systems Science: All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.

TSW = The Student Will

Objective(s)	NJCCCS Alignment	Essential Questions	Understandings	Suggested Assessment Activities
• TSW construct and evaluate models demonstrating the rotation of Earth on its axis and the orbit of Earth around the Sun • TSW predict what would happen to an orbiting object if gravity were increased, decreased, or taken away • TSW compare and contrast the major physical characteristics (including size and scale) of solar system objects • TSW examine Earth's surface features and identify those created on a scale of human life or on a geologic time scale • TSW determine if landforms were created by processes of erosion based on evidence • TSW predict the types of ecosystems that unknown soil samples could support based on soil properties	5.4.6.A 5.4.6.A 5.4.6.A 5.4.6.B 5.4.6.B 5.4.6.C	- What is changing our world? - How does the ocean affect our world? - How does the Earth's rotation, wind, and landforms affect surface currents? - What global patterns of atmospheric movement influence the weather? - How are planets and other objects in the Solar System similar and different to Earth? - What does the life cycle of a star have to do with human existence?	• The water cycle is made of three major processes including evaporation, condensation, and precipitation • Fossils provide important evidence of how life and environmental conditions have changed • Most of Earth's surface is covered by water • There are five major oceans that have unique features and properties • Land forms are the result of a combination of constructive and destructive forces • Physical characteristics of planets depend on their distance from the Sun and their size	Ongoing observation & questioning during class discussions and hands-on project work Research the historical evidence of fossils and relate the story that it may portray Research and report on the evolution of various landforms Draw pictures of day and night sky. Record observations pictorially, orally, and in writing

• TSW deduce the story of the tectonic conditions and erosion forces that created sample rocks or rock formations • TSW apply understanding of the motion of lithospheric plates to explain why the Pacific Rim is referred to as the Ring of Fire • TSW apply knowledge of Earth's magnetic fields to successfully complete an orienteering challenge • TSW generate a conclusion about energy transfer and circulation by observing a model of convection currents • TSW create climatographs for various locations around Earth • TSW categorize the climate based on the yearly patterns of temperature and precipitation • TSW illustrate global winds and surface currents	5.4.6.C 5.4.6.D 5.4.6.D 5.4.6.E 5.4.6.F 5.4.6.F 5.4.6.G		• Standardized measures allow people to more accurately describe the physical world	

Grade 6 **Earth Systems Science** continued