Grade 6 Science Curriculum Maps

Grade: 6 **Subject:** Science	**Unit 1: Minerals of the Earth's Crust**
Big Idea/Rationale	• The students will learn to determine whether something is a mineral or not. By being able to answer four essential questions, they will be able to categorize whether something is a mineral or not. They will make tables and use concept maps to understand how minerals are classified. They will understand minerals from the inside out by learning about atoms, elements and compounds. The students will observe different types of minerals from a mineral collection and will be able to classify minerals as being silicate and nonsilicate minerals. The students will also learn how to classify minerals using common mineral-identification techniques. They will observe minerals and understand that a mineral's color, luster, streak, cleavage, fracture, hardness, and density can help to identify minerals. They will also learn that some minerals have special properties such as fluorescence and magnetism and that those properties can only be found in certain minerals. The students will use the microscope to observe the crystalline structure of a mineral and will also do numerous activities to help them better understand the minerals of the Earth's crust.
Enduring Understanding (Mastery Objective)	• Explain the four characteristics of a mineral • Classify minerals according to the two major compositional groups and according to common mineral-identification techniques.
Essential Questions (Instructional Objective)	• What are the differences between atoms, compounds, and minerals? • How are silicate minerals different from nonsilicate minerals? • How can you explain why something is or is not a mineral? • What are the different properties that can help you identify minerals? • What are some special properties of minerals?
Content (Subject Matter)	• Minerals • Types of minerals • Mineral identification • Mineral composition and structure
Skills/ Benchmarks (CCSS Standards)	• 5.2.8.A.1- Explain that all matter is made of atoms, and give examples of common elements • 5.2.8.A.2- Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams. • 5.2.6.A.3 Determine the identity of an unknown substance using data about intrinsic properties • 5.4.4.C.2: Categorize unknown samples as either rocks or minerals
Materials and Resources	• **Inside the Restless Earth** (textbook and supplemental materials) Chapter I

Notes	

Grade: 6 **Subject:** Science	**Unit 2: Rocks – Mineral Mixtures**
Big Idea/Rationale	• The students will learn the definition of rock and will be able to describe how each type of rock changes into another as it moves through the rock cycle. The students will study the three main types of rock, igneous, sedimentary and metamorphic and learn how each one is part of the rock cycle. They will do a project on the rock cycle and will include the concepts of weathering, erosion, deposition, compaction and cementation and metamorphism. They will do an activity on classifying objects in order to better understand how to classify rocks. The students will learn how Earth scientists know how to classify different rocks. They will learn that two important criteria, composition and texture are tools scientists use to classify rocks. The students will study, in detail, the origins of Igneous, Sedimentary and Metamorphic rocks. They will also learn about the compositions and textures of each of these types of rocks.
Enduring Understanding (Mastery Objective)	• Describe how each type of rock changes into another as it moves through the rock cycle. • Explain how the properties of igneous rock are affected by how fast magma cools. • List different types of igneous rocks • Describe how the three types of sedimentary rock form • List different types of sedimentary rocks • Describe two ways a rock can undergo metamorphism • List different types of metamorphic rocks
Essential Questions (Instructional Objective)	• What are the three major rock types, and how can they change from one type to another type? • How is lava different from magma? • How does the cooling rate of lava or magma affect the texture of an igneous rock? • Describe the process by which clastic, organic and chemical sedimentary rock form. • What environmental factors cause rock to undergo metamorphism?
Content (Subject Matter)	• Understanding Rocks • Igneous Rock • Sedimentary Rock • Metamorphic Rock
Skills/ Benchmarks (CCSS Standards)	• 5.4.6.C.2 Distinguish physical properties of sedimentary, igneous, or metamorphic rocks and explain how one kind of rock could eventually become a different kind of rock

Materials and Resources	
Notes	

Grade: 6 **Subject:** Science	**Unit 3: Plate Tectonics**
Big Idea/Rationale	• Structure of the Earth • Continental drift • Plate tectonics theory • Types of boundaries
Enduring Understanding (Mastery Objective)	• Identify and describe the layers of the Earth by what they are made of and by their physical properties • Explain how scientists know about the structure of Earth's interior • Describe Wegener's theory of continental drift • Describe the three forces thought to move tectonic plates • Describe the three types of tectonic plate boundaries
Essential Questions (Instructional Objective)	• What is the difference between continental and oceanic crust? • How do scientists know about the structure of the Earth's interior? • What are three possible driving forces of tectonic plate motion?
Content (Subject Matter)	• Inside the Earth • Restless Continents • The Theory of Plate Tectonics
Skills/ Benchmarks (CCSS Standards)	• 5.4.6.D.1 Apply understanding of the motion of lithospheric plates to explain why the Pacific Rim is referred to as the Ring of Fire • 5.4.8.D.2 Present evidence to support arguments for the theory of plate motion.
Materials and Resources	• **Inside The Restless Earth-** and supplemental materials.
Notes	

Grade: 6 **Subject:** Science	**Unit 4: Earthquakes**
Big Idea/Rationale	• Seismology • Features of earthquakes • Earthquake safety • Current events (if applicable)
Enduring Understanding (Mastery Objective)	• Determine where earthquakes come from and what causes them • Identify different types of earthquakes • Describe how earthquakes are detected • Demonstrate how to locate earthquakes • Describe how the strength of an earthquake is measured • Explain earthquake hazard • Compare methods of earthquake forecasting • List ways to safeguard buildings against earthquakes
Essential Questions (Instructional Objective)	• Where do earthquakes occur • What directly causes earthquakes • What is the difference between a seismogram and a seismograph • What is the Richter Scale • How is earthquake magnitude related to estimated effects of earthquake • How is an area's earthquake hazard determined • How are buildings reinforced against earthquakes
Content (Subject Matter)	• What are earthquakes • Earthquake measurement • Earthquakes and Society
Skills/ Benchmarks (CCSS Standards)	• 5.4.8.D.2 Present evidence to support arguments for the theory of plate motion.
Materials and Resources	
Notes	

Grade: 6 **Subject:** Science	**Unit 5: Volcanoes**
Big Idea/Rationale	• Types of volcanoes and eruptions • Types of lava and pyroclastic material • Craters versus calderas • Sites and conditions for volcano formation • Predicting eruptions
Enduring Understanding (Mastery Objective)	• Distinguish between nonexplosive and explosive volcanic eruptions • Explain how the composition of magma determines the type of volcanic Eruption that will occur • Classify the main types of lava and volcanic debris • Describe the effects that volcanoes have on Earth • Compare the different types of volcanoes • Describe the formation and movement of magma • Explain the relationship between volcanoes and plate tectonics • Summarize the methods scientists use to predict volcanic eruptions
Essential Questions (Instructional Objective)	• Is a nonexplosive volcanic eruption more likely to produce lava or pyroclastic material? • How would you predict whether a volcanic eruption will be nonexplosive, explosive or somewhere in between? • What is the basis for classifying lava and pyroclastic material? • Why can ash from a volcanic eruption be hazardous? • Explain the differences between shield volcanoes, cinder cone volcanoes and composite volcanoes • What is technology used in predicting volcanic eruptions
Content (Subject Matter)	• Volcanic Eruptions • Volcanoes' Effects on Earth • What Causes Volcanoes?
Skills/ Benchmarks (CCSS Standards)	• 5.4.8.D.2 Present evidence to support arguments for the theory of plate motion.
Materials and Resources	• **Inside the Restless Earth** textbook and supplemental materials
Notes	

Grade: 6 **Subject:** Science	**Unit 6: The Energy of Waves**
Big Idea/Rationale	• Properties of waves • Types of waves • Reflection and refraction • Diffraction and interference
Enduring Understanding (Mastery Objective)	• Describe how waves transfer energy without transferring matter • Distinguish between waves that require a medium and waves that do not • Explain the difference between transverse and longitudinal waves • Identify and describe four wave properties • Explain how amplitude and frequency are related to the energy of a wave • Describe reflection, refraction, diffraction, and interference • Compare destructive interference with constructive interference • Describe resonance, and give examples
Essential Questions (Instructional Objective)	• Explain why supernova explosions in space can be seen but not heard on Earth • How do transverse waves differ from longitudinal waves • Explain how amplitude and frequency are related to the energy of a wave • Performing wave calculations: When given either wavelength, frequency or wave speed (2 given) calculate third wave property. • Draw a transverse wave and a longitudinal wave • Describe what happens when a wave is refracted
Content (Subject Matter)	• The Nature of Waves • Properties of Waves • Wave Interactions
Skills/ Benchmarks (CCSS Standards)	• 5.1.12.D.2 Represent ideas using literal representations, such as graphs, tables, journals, concept maps and diagrams • 5.2.4.C.1 Compare various forms of energy as observed in everyday life and describe their applications
Materials and Resources	• Textbook: Sound and Light
Notes	

Grade: 6 **Subject:** Science	**Unit 7: The Nature of Sound**
Big Idea/Rationale	• Properties of sound waves • Structure of the human ear • Pitch and the Doppler Effect • Infrasonic versus ultrasonic sound • Sound reflections and echolocation • Sound barrier • Interference, resonance, diffraction and standing waves • Sound quality of instruments
Enduring Understanding (Mastery Objective)	• Describe how sound is caused by vibrations • Explain how sound is transmitted through a medium • Explain how the human ear works, and identify its parts • Compare the speed of sound in different media • Explain how frequency and pitch are related • Describe the Doppler effect, and give examples of it • Explain how amplitude and loudness are related • Explain how echoes are produced, and describe their use in locating objects • Give examples of constructive and destructive interference of sound waves • Identify three sound-wave interactions, and give examples of each • Explain how noise is different from music
Essential Questions (Instructional Objective)	• Explain why a person at a rock concert will not feel gusts of wind coming out of the speakers • Name the three main parts of the ear, and briefly explain the function of each part • Explain how changing the temperature of a medium affects the speed of sound through that medium • Describe the properties of waves that affect the pitch and loudness of sound • Describe a place in which you would expect to hear echoes • How is a sound barrier formed?
Content (Subject Matter)	• What is sound? • Properties of Sound • Interactions of Sound Waves
Skills/ Benchmarks (CCSS Standards)	• 5.2.4.C.1- Compare various forms of energy as observed in everyday life and describe their applications
Materials and Resources	
Notes	

Grade: 6 **Subject:** Science	**Unit 8: The Nature of Light**
Big Idea/Rationale	• Electromagnetic waves • Electromagnetic Spectrum • Law of Reflection • Absorption and scattering • Reflection and refraction • Diffraction and interference
Enduring Understanding (Mastery Objective)	• Explain why electromagnetic waves are transverse waves • Describe how electromagnetic waves are produced • Give examples of how infrared waves and visible light are important in your life • Explain how ultraviolet light, X rays, and gamma rays can be both helpful and harmful • Compare regular reflection with diffuse reflections • Describe absorption and scattering of light • Explain how refraction can create optical illusions and separate white light into colors • Describe diffraction and interference of light • Name and describe the three ways light interacts with matter • Explain how the color of an object is determined • Compare the primary colors of light and the primary pigments
Essential Questions (Instructional Objective)	• Why are electromagnetic waves transverse waves? • How is a sound wave different from an EM wave • How does a charged particle produce an EM wave • Explain why EM waves do not require a medium through which to travel • How do infrared waves differ from radio waves in terms of frequency and wavelength • Describe two ways that radio waves are used for transmitting information • Explain why ultraviolet light, X rays, and gamma rays can be both helpful and harmful. • Compare the wavelengths and frequencies of infrared, ultraviolet, and visible light. How does the energy carried by each type of wave compare with the others? • Explain the difference between absorption and scattering • Why does a straw look bent in a glass of water? • Describe three different ways light interacts with matter • What are the primary colors of light, and why are they called primary colors
Content (Subject Matter)	• What is Light? • The Electromagnetic Spectrum • Interactions of Light Waves

	• Light and color
Skills/ Benchmarks (CCSS Standards)	• 5.2.6.C.2 Describe how prisms can be used to demonstrate that visible light from the Sun is made of different colors • 5.2.4.A.4 Categorize objects based on the ability to absorb or reflect light and conduct heat or electricity. • 5.2.2.C.2 Apply a variety of strategies to collect evidence that validates the principle that if there is no light, objects cannot be seen. • 5.2.4.C.4 Illustrate and explain what happens when light travels from air into water.
Materials and Resources	
Notes	

Grade: 6 **Subject:** Science	**Unit 9: Light and Our World**
Big Idea/Rationale	• Luminosity • Types of lighting • Types of mirrors and lenses • Structure of the human eye
Enduring Understanding (Mastery Objective)	• Compare luminous and illuminated objects • Name four ways light can be produced • Compare plane mirrors, concave mirrors, and convex mirrors • Identify the parts of the human eye, and describe their functions • Describe some common vision problems, and explain how they can be corrected
Essential Questions (Instructional Objective)	• Describe places where you might use incandescent light, fluorescent light, neon light, and vapor light • Describe how fluorescent light is similar to neon light • How is a concave mirror different from a convex mirror? • Name the parts of the human eye, and describe what each part does. • What kind of lens would help a person who is nearsighted? What kind would help someone who is farsighted?
Content (Subject Matter)	• Light Sources • Mirrors and Lenses • Light and Sight
Skills/ Benchmarks (CCSS Standards)	• 5.2.4.A.4 Categorize objects based on the ability to absorb or reflect light and conduct heat or electricity. • 5.2.2.C.2 Apply a variety of strategies to collect evidence that validates the principle that if there is no light, objects cannot be seen. • 5.2.6.C.1 Predict the path of reflected or refracted light using reflecting and refracting telescopes as examples.
Materials and Resources	
Notes	

Grade: 6 **Subject:** Science	**Unit 10: Body Organization and Structure**
Big Idea/Rationale	• Homeostasis • Types of tissue • Organ systems • Structure and function of the skeletal system, muscular system, and integumentary system
Enduring Understanding (Mastery Objective)	• Identify the major tissues found in the body • Compare an organ with an organ system • Describe a major function of each organ system • Identify the major organs of the skeletal system • Describe the functions of bones • Illustrate the internal structure of bones • Compare three types of joints • List the major parts of the muscular system • Describe the different types of muscle • Describe how skeletal muscles move bones • Describe the major functions of the integumentary system • List the major parts of the skin, and discuss their functions • Describe the structure and function of hair and nails • Describe some common types of damage that can affect the skin
Essential Questions (Instructional Objective)	• Explain the relationship between cells, tissues, organs, and organ systems • Compare the four kinds of tissue found in the human body • Make a chart that lists the major organ systems and their functions • Describe four important functions of bones • Draw a bone, and label the inside and outside structures. • List three hinge joints in your body • List three types of muscle tissue, and describe their functions in the body • Why does skin color vary from person to person • List six structures found in the dermis and the function of each one
Content (Subject Matter)	• Body Organization • The Skeletal System • The Muscular System • The Integumentary System
Skills/ Benchmarks (CCSS Standards)	• 5.3.6.A.1- Model the interdependence of the human body's major systems in regulating its internal environment. • 5.3.8.A.2-Relate the structures of cells, tissues, organs, and systems to their functions in supporting life. • 5.3.4.A.3-Describe the interactions of systems involved in carrying out everyday life activities.

Materials and Resources	• Textbook: Human Body Systems and Health
Notes	

Grade: 6 **Subject:** Science	**Unit 11: Circulation and Respiration**
Big Idea/Rationale	• Structure and function of the cardiovascular system, lymphatic system, and respiratory system • Respiratory disorders
Enduring Understanding (Mastery Objective)	• Describe the functions of the cardiovascular system • Compare and contrast the three types of blood vessels • Describe the path that blood travels as it circulates through the body • Distinguish between blood types • Discuss the functions of the lymphatic system • Identify the relationship between lymph and blood • Describe the organs of the lymphatic system • Describe the flow of air through the respiratory system • Discuss the relationship between the respiratory system and the cardiovascular system • Indentify respiratory disorders
Essential Questions (Instructional Objective)	• What is the function of the cardiovascular system? • What are the three kinds of blood vessels? Compare their functions • Where does blood travel to and from during pulmonary circulation? During systemic circulation? • What are the main functions of the lymphatic system? • Where does lymph go when it leaves the lymphatic system? • Describe the path that air travels as it moves through the respiratory system
Content (Subject Matter)	• The Cardiovascular System • The Lymphatic System • The Respiratory System
Skills/ Benchmarks (CCSS Standards)	• 5.3.4.A.3 Describe the interactions of systems involved in carrying out everyday life activities. ○ CONTENT: Essential functions of the human body are carried out by specialized systems: Digestive, Circulatory, Respiratory, Nervous, Skeletal, Muscular, Reproductive
Materials and Resources	
Notes	

Grade: 6 **Subject:** Science	**Unit 12: The Digestive and Urinary Systems**
Big Idea/Rationale	• Structure and function of the digestive system • Structure and function of the urinary system
Enduring Understanding (Mastery Objective)	• Describe the parts and functions of the digestive system • Compare mechanical digestion with chemical digestion • Describe some disorders of the digestive system • Describe the parts and functions of the urinary system • Explain how the kidneys filter blood • Describe some disorders of the urinary system
Essential Questions (Instructional Objective)	• What is the difference between mechanical digestion and chemical digestion? • Explain why it is said that "digestion begins in the mouth'? • What happens to the food that you eat when it gets to the stomach? • Describe the roles of the liver, the gallbladder and the pancreas in digestion • How would the inability to make saliva affect digestion? • What is the main function of the urinary system?
Content (Subject Matter)	• The Digestive System • The Urinary System
Skills/ Benchmarks (CCSS Standards)	• 5.3.4.A.3 Describe the interactions of systems involved in carrying out everyday life activities.
Materials and Resources	
Notes	

Grade: 6 **Subject:** Science	**Unit 13: Communication and Control**
Big Idea/Rationale	• Structure and Function of the nervous system and endocrine system • The senses
Enduring Understanding (Mastery Objective)	• Explain how neurons in the nervous system work together • Compare the central nervous system with the peripheral nervous system • Describe the major functions of the brain and the spinal cord • Explain the function of the endocrine system • List the glands of the endocrine system and describe some of their functions
Essential Questions (Instructional Objective)	• Explain how the peripheral nervous system connects with the central nervous system • List the three major parts of the brain, and describe their functions • What is the function of the endocrine system? • Name four endocrine glands, and tell what each one does in the body
Content (Subject Matter)	• The Nervous System • The Endocrine System
Skills/ Benchmarks (CCSS Standards)	• 5.3.4.A.3 Describe the interactions of systems involved in carrying out everyday life activities.
Materials and Resources	
Notes	