



Guide to Science Course of Study at Telra Institute

This gives the framework for the curriculum and progression of science at Telra Institute. In this guide, you will find the progression students will follow based on their numerical grade level through science. Students who demonstrate a need for instruction below the minimum level for their numerical grade level will be referred for intervention and may be retained.

Science at Telra

Core Knowledge

Core Knowledge Science offers comprehensive materials to teach scientific concepts and develop scientific practices through hands-on activities. The curriculum helps students build knowledge in the life, physical, and earth/space sciences, as well as engineering design. This curriculum serves as the core science curriculum at Telra Institute in kindergarten through 6th grade.

William and Mary

Developed by the College of William and Mary's Center for Gifted Education, this curriculum is grounded in the Integrated Curriculum Model which is designed to build on students' precocity, intensity, and complexity. The curriculum focuses on three dimensions, including advanced content, higher level processes and product development, and interdisciplinary concepts, issues, and themes. This curriculum features ambiguous, problem-based learning scenarios. As active investigators, students must take on the role of scientists to solve problems through scientific inquiry. Advanced, in-depth content and a connection to an overarching concept, such as systems, are also emphasized in all unit materials. Units from the College of William and Mary are incorporated into Telra's course of study for science beginning in 1st grade.

Conceptual Integrated Science Explorations

Conceptual Integrated science is taught in 7th and 8th grade at Telra and is designed with late middle and early high school students in mind. This textbook presents a variety of sciences, including physics, chemistry, biology, Earth science, and astronomy, while exploring areas where these disciplines overlap. It's the wide story of science told in terms of its Unifying Concepts—major ideas from gravity to atoms and ecosystems—that cut across the science disciplines. This curriculum emphasizes a deep understanding of concepts in science.

Science Course of Study 2024-2025

Grade Level Course			
Kindergarten			
Physical Science <ul style="list-style-type: none"> • Pushes and Pulls • Water Works 	Life Science <ul style="list-style-type: none"> • Needs of Plants and Animals • Changing Environments • Our Five Senses 	Earth Science <ul style="list-style-type: none"> • How the Sun Makes Our Day 	
1st Grade			
Physical Science <ul style="list-style-type: none"> • Exploring Light and Sound • Simple Machines 	Life Science <ul style="list-style-type: none"> • Human Body Systems • Survive and Thrive • Budding Botanists 	Astronomy <ul style="list-style-type: none"> • Sun, Moon, and Stars 	
2nd Grade			
Physical Science <ul style="list-style-type: none"> • What's the Matter? • Electricity and Magnetism 	Life Science <ul style="list-style-type: none"> • Organisms and Their Habitats • Human Cells and Digestion 	Earth Science <ul style="list-style-type: none"> • Exploring Land and Water 	
3rd Grade			
Physical Science <ul style="list-style-type: none"> • Invitation to Invent 	Life Science <ul style="list-style-type: none"> • Life Cycles, Traits, and Variations • Habitats and Change • Human Senses and Movement 	Earth Science <ul style="list-style-type: none"> • Weather Reporter 	
4th Grade			
Physical Science <ul style="list-style-type: none"> • Energy Transfer and Transformation • Investigating Waves • Thinking Like an Engineer • Using Natural Resources for Energy 	Life Science <ul style="list-style-type: none"> • Structures and Functions of Living Things • Electricity City • Human Respiration and Circulation 	Earth Science <ul style="list-style-type: none"> • Processes that Shape the Earth • The Earth Beneath Our Feet 	Astronomy <ul style="list-style-type: none"> • Astronomy and Space Systems
5th Grade			
Physical Science <ul style="list-style-type: none"> • Investigating Matter • Energy and Matter in Ecosystems • Thinking Like a Scientist 		Earth Science <ul style="list-style-type: none"> • Modeling Earth Systems • Protecting Earth Resources • Acid, Acid Everywhere • Weather, Climate, and Water Cycling • Plate Tectonics and Rock Cycling • Natural Hazards 	
6th Grade			

Physical Science <ul style="list-style-type: none"> • Light and Matter • Nuclear Energy: Friend or Foe? • Thermal Energy • Chemical Reactions and Matter 	Life Science <ul style="list-style-type: none"> • No Quick Fix • Cells and Systems • Animal Populations • Human Hormones and Reproduction
7th/8th Grade Year A	
Physics <ul style="list-style-type: none"> • Newton's Laws • Momentum • Energy • Gravity • Heat • Electricity • Magnetism • Waves and Sound • Light and Color • Properties of Light 	Chemistry <ul style="list-style-type: none"> • The Atom • Nuclear Energy Elements of Chemistry • Bonds and Molecular Attractions • How Chemicals Mix • How Chemicals React • Acids, Bases, and Redox • Organic Compounds
7th/8th Grade Year B	
Biology <ul style="list-style-type: none"> • The Basic Unit of Life: The Cell • How Cells Work • DNA and Genes • How Traits Are Inherited • The Evolution of Life • Diversity of Life • Control and Development • Care and Maintenance • Ecosystems and Environment 	Earth Science <ul style="list-style-type: none"> • Plate Tectonics • Rocks and Minerals • Earth's Surface: Land and Water • Surface Processes • Weather • Earth's History • Environmental Geography

Kindergarten

Science in Kindergarten includes topics in Physical, Life, and Earth Science. The units below are organized by science rather than by course sequence.

Physical Science

Core Knowledge: Pushes and Pulls

- In this unit, students investigate what causes changes in motion by exploring pushes and pulls. Students will then use prior knowledge and information gained from their observations during various tests to design a miniature golf course. Students explore how pushes and pulls can have different strengths and directions. Students also investigate how pushing or pulling on an object can change the speed and direction of its motion.

William & Mary: Water Works

- In this unit, students engage in scientific investigation as they closely observe and experiment with water. Students are transformed into scientists who notice, react to, reflect on, and discover more about force and change. The concept of change is reinforced while students explore the characteristics of items that sink and float, experiment to make objects float, and examine how materials interact with water.

Life Science

Core Knowledge: Needs of Plants and Animals

- In this unit, students learn that all animals need food to live and grow and that they obtain their food from plants or other animals. Students also learn that plants need air, water, mineral nutrients, and light to live and grow. Students learn that all living things need resources from their environment and that they live in places that have the things they need. Humans use natural resources for everything they do.

Students describe the needs of plants and animals and their relationship with the local habitat as well as identify ways landscapes can be transformed into a habitat for plants and animals.

Core Knowledge: Changing Environments

- This unit builds on the study students conduct on the needs of plants and animals by examining the impact of living things on the environment to see how the environment is changed. Students explore how damaging the environment impacts the organisms that live there, the negative and positive ways humans impact the environment, and practical ways to protect the environment.

Core Knowledge: Our Five Senses

- In this unit, students will identify the body's five different senses—seeing, hearing, smelling, tasting, and touching. Students will explore what body parts are involved in each of these senses and experience how the senses interpret their surrounding environment. Students will also learn how we take care of the different senses and that certain devices can enhance or change how the senses work.

Earth Science

William & Mary: How the Sun Makes Our Day

- This unit is an Earth and space-science unit that engages students in investigations and observations about the sun as a source of light and energy, the nature of shadows, man-made sources of energy, and the need for humans to conserve natural resources. This unit contains simulations of real-world problems, and students experience the work of real science by using data-handling skills, analyzing information, and evaluating results.

1st Grade

Science in 1st Grade includes topics in Physical, Life, and Earth Science. The units below are organized by science rather than by course sequence.

Physical Science

Core Knowledge: Exploring Light and Sound

- In this unit, students investigate with sound and light to see how sound and light can be used to communicate with an audience in a theater. Students will determine the relationship between vibrations and sound. Students will explore different light sources, mirrors, and shadows.

Core Knowledge: Simple Machines

- In this unit, students will identify simple machines—the ramp (inclined plane), wheel and axle, pulley, lever, wedge, screw, and gears. Students will explore where these devices are found and experience how they can make a given task easier. Students will also learn that simple machines are combined to make compound machines, which themselves can be familiar and be operated simply.

Life Science

Core Knowledge: Human Body Systems

- In this unit, students will identify several body systems, including the skeletal, muscular, respiratory, circulatory, and nervous systems. Students will explore the different organs, tissues, and cells that are part of each system. Students will also investigate how these systems work in their own bodies.

William & Mary: Survive and Thrive

- This unit provides students an opportunity to study animals, their characteristics, and their natural environments. The overarching concept of change guides students as they use webcams to distinguish the features of animals, determine their basic needs to

survive, and observe animals in their habitats.

William & Mary: Budding Botanists

- This unit engages students in an investigation of plant life as they assume the role of botanists. Team members seek to understand the structure, nature, and life cycle of plants, and to answer questions such as “How can plants be used to fuel cars?”

Astronomy

Core Knowledge: Sun, Moon, and Stars

- In this unit, students will methodically investigate the science of the patterns of the apparent movement of the space objects they can see from Earth. Over the course of the unit, students will record observations of the sun, moon, and stars over periods of time. By recording observations of these objects throughout the school year, students will learn about patterns in the sky.

2nd Grade

Science in 2nd Grade includes topics in Physical, Life, and Earth Science. The units below are organized by science rather than by course sequence.

Physical Science

William & Mary: What's the Matter?

- In this unit, students work on solving real-world scenarios by using their newly discovered knowledge of matter, the measurement of matter, and change in physical properties. At the end of this 15-lesson unit, students present their data in a classroom "science conference." This unit utilizes a hands-on, constructivist approach that allows students to build their knowledge base and skills while they explore science topics through play and planned investigations. The overarching concept of change is used to deepen understanding of the scientific concepts in the unit.

Core Knowledge: Electricity and Magnetism

- In this unit, students will trace the path of electricity from the power plant, through their home, and to wall sockets. They will explore different devices that use electricity, as well as safety precautions around the use of electricity. Students will also investigate how magnets are used to produce electricity. By the end of the unit, students will be familiar with various phenomena associated with electricity and magnetism.

Life Science

Core Knowledge: Organisms and their Habitats

- In this unit, students will plan a butterfly meadow that will come back and spread year after year. They will investigate the dependence of plants on air, water, nutrients and minerals, and light for growth and on the dependence

of animals to pollinate flowers and disperse seeds. Students will also observe the diversity of life in different habitats.

Core Knowledge: Human Cells and Digestion

- In this unit, students will trace the path of the digestive system starting with hunger and the purpose of eating food. Students will explore the digestive system and its different parts, understanding the hierarchy of cells, tissues, organs, and organ systems. Students will also look at the building blocks of the body, cells. Students will end with identifying how waste leaves the body and investigating the nutritional needs of our bodies as well.

Earth Science

Core Knowledge: Exploring Land and Water

- In this unit, students explore the phenomena of different landforms to gather evidence of how Earth events change Earth's surface. Students explore types of landforms, including hills, mountains, valleys, rock arches, plains, geysers, volcanoes, sand dunes, and beaches. By the end of the unit, students will understand the ways landforms are created quickly and slowly and how water can impact landforms.

3rd Grade

Science in 3rd Grade includes topics in Physical, Life, and Earth Science. The units below are organized by science rather than by course sequence.

Physical Science

William & Mary: Invitation to Invent

- In this unit, students engage in investigations and observations that support their learning about simple machines and their uses. Students explore force, motion, and friction as they learn about the six simple machines and how they are put together to form compound machines.

Life Science

Core Knowledge: Life Cycles, Traits, and Variations

- This unit examines the life cycles of various plants and animals, including the defining characteristics that are shared or varied by individuals in the same population. Students investigate how life cycles of various organisms differ and what they have in common: the pattern of birth, growth, reproduction, and death. The focus then shifts to how organisms can be described by their traits and the visible evidence that traits are inherited. Students learn how the environment can affect traits and how traits can impact survival.

Core Knowledge: Habitats and Change

- This unit introduces students to fundamental concepts of habitats, adaptations, ecosystems, and environmental changes over time. Students will learn about the relationships between living things and their environments. They see that organisms are adapted to live in specific habitats. But when the habitats change, suddenly or over millions of years, the

same adaptations that allowed success in one habitat may not be those that ensure survival in another. Students also learn that engineers use their knowledge of ecosystems to develop solutions and build things that respond to or prevent ecosystem damage. As a series of culminating activities, students explore the principles and practices of engineering design, such as scientifically defining a problem to be solved and evaluating and optimizing possible solutions.

Core Knowledge: Human Senses and Movement

- In this unit, students will consider the body structures, systems, and functions that contribute to the ability to play table tennis, particularly to the ability to return a fast serve of a table tennis ball. Vision and hearing provide the perception needed for the response. The interactions of the nervous, skeletal, and muscular systems produce the body's motion in the response.

Earth Science

William & Mary: Weather Reporter

- This unit provides students with opportunities in a scenario-based approach to observe, measure, and analyze weather phenomena. The overarching concept of change reinforces students' decisions as they learn about the changes in the Earth's weather and observe, measure, and forecast the weather.

4th Grade

Science in 4th Grade includes topics in Physical, Life, and Earth Science. The units below are organized by science rather than by course sequence.

Physical Science

Core Knowledge: Energy Transfer and Transformation

- This unit engages students with the idea that whenever there is a change, there is at least one form of energy causing that change. Students investigate evidence of energy all around them.

Core Knowledge: Investigating Waves

- This unit engages students with waves and observable evidence that energy moves from one place to another. Waves produced in one place move to another and can cause a change. Students investigate some of the more common forms of waves around them: water waves, sound waves, and light waves.

William & Mary: Thinking Like an Engineer

- This unit focuses on high-interest, career-related topics in the elementary curriculum related to engineering. Students will explore interdisciplinary content, foster creativity, and develop higher order thinking skills with activities aligned to relevant content area standards. Students will complete design challenges, visit with an engineer, and investigate real-world problems to plan feasible engineering solutions.

Core Knowledge: Using Natural Resources for Energy

- In this unit, students focus on renewable and nonrenewable resources. They study how people use resources for energy. In addition, they examine the engineering design behind new technologies that protect the environment.

Life Science

Core Knowledge: Structures and Functions of Living Things

- This unit helps students to make the connection between structure and function at all levels of biological organization. Cell, tissues, organs, and organ systems are investigated through the lens of structure and function—things look like they do as a reflection of their functions. The cells of a leaf, the tissues of the skin, and the respiratory system of a giant ape—they all can be understood when students know that structure and function are related.

William & Mary: Electricity City

- This unit provides a creative and interdisciplinary approach to introducing fifth- and sixth-grade students to electricity. In this simulated activity, a large recreational complex is being built in the middle of a city, and the students' role is to plan the site's electrical needs, as well as create additional back-up plans. This real-world problem requires students to analyze the situation, determine what type of research is needed, conduct experiments, and evaluate solutions.

Core Knowledge: Human Respiration and Circulation

- In this unit, students will consider the respiratory and circulatory systems and the role those systems play when students participate in a fun run. The circulatory system moves blood and oxygen through the bloodstream, while the respiratory system exchanges the oxygen for the waste product carbon dioxide.

Earth Science

Core Knowledge: Processes that Shape the Earth

- In this unit, students explore the dynamic nature of Earth, including the layers of our planet: the inner and outer core, the mantle, and the crust. Students explore continental drift, weathering, erosion, and other changes over time.

William and Mary: What a Find! Analyzing Natural and Cultural Systems

- In this unit, students are put in the role of junior archeologists at a research museum and discover that construction work has been halted on a new school because historic artifacts were discovered. To determine whether or not the dig is important enough to halt building the school entirely, students learn to excavate and conduct the dig.

Astronomy

Core Knowledge: Astronomy and Space Systems

- In this unit, students will learn about Earth, our solar system, our galaxy the Milky Way, and our place in the universe. They will focus on a big vision, that we are part of a large solar system, which lies within in an even larger galaxy that is but one of many millions of galaxies in the universe.

5th Grade

Science in 5th Grade includes topics in Physical and Earth Science. The units below are organized by science rather than by course sequence.

Physical Science

Core Knowledge: Investigating Matter

- This unit introduces students to real-world examples and fundamental concepts of matter, which will be explored in greater depth in later grades. Students will learn about properties, structures, and interactions of matter as well as the basics of the language of chemistry

Core Knowledge: Energy and Matter in Ecosystems

- This unit focuses on the scientific concept that energy and matter flow through an ecosystem to individual organisms and back to the ecosystem in a continuous cycle.

William & Mary: Thinking Like a Scientist

- In this unit, students will explore interdisciplinary content, foster creativity, and develop higher order thinking skills with activities aligned to relevant content area standards. Through inquiry-based investigations, students will explore what scientists do, engage in critical thinking, learn about scientific tools and research, and examine careers in scientific fields.

Earth Science

Core Knowledge: Modeling Earth Systems

- This unit allows students to investigate a model to comprehend the complexity of the many parts of the Earth. Students learn about and explore the four “spheres” that comprise all the physical and biological factors of Earth. After defining each sphere, the unit then addresses the interactions of these spheres. In this way, students have a model that simplifies the planet we live on.

Core Knowledge: Protecting Earth Resources

- In this unit, students will focus on how humans can preserve and protect the many natural resources we use for modern life—for agriculture, transportation, industry, and daily needs. Students learn about our protection of water resources, air and the atmosphere, and the land. Students become aware that, through scientific practices and technology, we can detect

when air, water, land, and ecosystems are changing, and when they might be threatened.

William & Mary: Acid, Acid Everywhere

- This unit presents the structure of systems through chemistry, ecological habitats, and transportation. The unit poses an ill-structured problem that leads students into an interdisciplinary inquiry about the structure and interaction of several systems, centering around the study of an acid spill on a local highway.

Core Knowledge: Weather, Climate and Water Cycling

- In this unit, students investigate the phenomenon of weather, including the water cycles and climate. This unit allows students to observe weather and climate phenomenon in detail and then start asking questions, formulating explanations, setting up and conducting activities and research, and working with classmates to analyze the shared experience and formulate new questions and developing new strategies for answering them.

Core Knowledge: Plate Tectonics and Rock Cycling

- In this unit, students investigate the phenomena of the building up of Earth’s Surface and the wearing down of Earth’s surface. This unit allows students to observe the phenomena of the shifting landscapes of Earth and ask and answer questions surrounding earthquakes, volcanic eruptions, and more.

Core Knowledge: Natural Hazards

- In this unit, students investigate the phenomenon of natural hazards. Using the phenomenon of a tsunami, this unit examines the causes and effects of tsunamis, ways science can help us understand their origins and paths, and what we can do to protect our communities from damage.

6th Grade

Science in 6th Grade includes topics in Physical and Life Science. The units below are organized by science rather than by course sequence.

Physical Science

Core Knowledge: Light and Matter

- In this unit, students investigate the phenomena of light and its interaction with matter. Students explore properties that allow objects to act as a mirror and window and how light interacts with one-way mirrors.

William & Mary: Nuclear Energy: Friend or Foe?

- This unit creatively explores the effects of nuclear power waste. The topic is introduced through the eyes of the mayor of a town where a nuclear power plant is located. She must decide if the facility can expand its waste disposal techniques. What are the biological implications of radiation? What are the trade-offs with which society must live as we accept nuclear technologies into our lives? These questions are answered by students as they prepare to make recommendations about the use of the nuclear power plant in their fictitious town.

Core Knowledge: Thermal Energy

- In this unit, students investigate the phenomenon of thermal energy and how understanding about the flow of thermal energy can lead to the engineering of containers that retain heat well. This unit allows students to observe this phenomenon in detail and then start asking questions, formulating explanations, setting up and conducting activities and research, and working with classmates to analyze the shared experience and formulate new questions and developing new strategies for answering them.

Core Knowledge: Chemical Reactions and Matter

- In this unit, students investigate the phenomenon of matter and its involvement in chemical reactions. Students explore the gas production in bath bombs, combining substances to form gas bubbles, the formation of new substances from old substances, and our newest understanding of particles.

Life Science

William & Mary: No Quick Fix

- This unit uses systems as the fundamental concept to help students in grades 6-8 understand cell and tuberculosis biology. In a series of widening concentric circles, students learn that cells are elements in larger systems, such as the immune system and the even larger system of the human body. Students also interact with the human social systems: health care and public education. They will take on the role of physician and begin to search for the cause and resolution of the problem. While unraveling the interactions among various systems, students can appreciate the complexities of staying healthy in the modern world.

Core Knowledge: Cells and Systems

- In this unit, students investigate the phenomenon of healing. More than that though, students examine the nature of the human body and the systems and cells that comprise it. Students explore what our bones, skin, and muscles do for us, how medical images and diagrams help us learn about the structures in our bodies, and perceptions of ability and disability. Students use microscopes to look at tissue samples and better understand our cellular make-up.

William & Mary: Animal Populations

- This unit integrates population biology and mathematics. The ill-structured problem puts students in the stakeholder role of assistant to the mayor of a small town in which residents are demanding that something be done about the deer that are eating their landscaped plants. Throughout the unit, students deal with physical models, conceptual models, and mathematical models as they tackle the deer problem and the complication of Lyme Disease.

Core Knowledge: Human Hormones and Reproduction

- The release of hormones is necessary both for day-to-day body functions and for the growth and development of the human body. Students may not be familiar with the different ways in which hormones are released; the different body structures, such as glands, that release hormones; and the effects of hormones on the body.

7th/8th Grade – Year A

Science in Year A is part of a two-year integrated science study and includes physics and chemistry.

Physics

- Chapter 1: About Science – Students begin with a study of the history of and advances in science, including an overview of the scientific method. Students also learn the importance of mathematics to science and dive into the science as an integrated discipline.
- Chapter 2: Newton's First Law – As students dive into their study of physics, they will begin with Newton's First Law, which states that things at rest tend to stay at rest, things in motion tend to stay in motion, also known as the law of inertia.
- Chapter 3: Newton's Second Law – In this chapter, students learn about acceleration in relation to Newton's Second Law, with a focus on the idea that the greater the force, the greater the acceleration when accounting for net force.
- Chapter 4: Newton's Third Law – Students will explore Newton's Third Law and the relationship between action and reaction on objects with the same and different masses.
- Chapter 5: Momentum – In this chapter, students will learn that momentum is inertia in motion and is the product of an object's mass and velocity. Students will use their knowledge of acceleration to help them determine momentum.
- Chapter 6: Energy – Students learn that to calculate work, they must multiply force by distance, but that in order to apply force, you must also apply energy. Energy is defined in physics as the capacity to do work.
- Chapter 7: Gravity – In this chapter, students explore gravity, which is an attractive force exerted between all objects that have mass. Students will learn the equation for the force of gravity and the impact of gravity on moving objects.
- Chapter 8: Heat – This chapter begins by instilling in students that temperature and heat are not the same thing. Instead, heat is a flow of energy. Students will learn about thermal expansion, along with conduction, convection, and radiation.
- Chapter 9: Electricity – Students begin with a study of electrostatics in which they define electrical force, electric charge, conservation of charge, and Coulomb's Law. Then, students explore electricity and gain an understanding of the conditions needed for electricity to flow.
- Chapter 10: Magnetism – Students will understand that the movement of charge generates magnetism. Students will also learn that even permanent magnets lose their magnetism over time.
- Chapter 11: Waves and Sound – Students begin by examining waves, which are a form of energy. Students learn the properties of waves and the types of wave, along with how these related to sound.
- Chapter 12 Light and Color – Students will explore the electromagnetic spectrum, light and color visible to humans, and the reasons behind the way we perceive color.
- Chapter 13: Properties of Light – In this chapter, students focus on reflection and refraction. Reflection is when light bounces off of a surface, which refraction is when the path of light bends as it moves through an object or objects.

Chemistry

- Chapter 14: The Atom – Students are introduced to atoms and learn that all matter in our daily environment is made up of atoms. Students explore the periodic table and how elements can come together to form compounds.
- Chapter 15: Nuclear Energy – In this chapter, students learn about the discovery of radioactivity and the stability of nuclei. Students will learn about half-life, radiometric dating, and transmutation.
- Chapter 16: Elements of Chemistry – Students will explore chemistry, which is the study of matter and the transformations it can undergo.
- Chapter 17: Bonds and Molecular Attractions – In this chapter, students will explore how atoms bond through the use of electron-dot diagrams. Students will learn about ionic, metallic, and covalent chemical bonds.
- Chapter 18: How Chemicals Mix – Students will move from studying atoms and compounds to studying solutions. Students will also be introduced to the idea of moles.
- Chapter 19: How Chemicals React – In this chapter, students will apply their mathematical understanding the chemistry to balance chemical equations.
- Chapter 20: Acids and Bases – Students explore acids and bases and the chemical reaction class of acid/base reactions. Students will also learn about oxidation and reduction as part of chemical reactions.
- Chapter 21: Organic Compounds – During this chapter, students will focus on organic compounds and the element carbon. This chapter introduces students to the basics of organic chemistry.

8th Grade

Science in Year B is part of a two-year integrated science study and includes biology and earth science.

Chemistry

- Chapter 14: The Atom – Students are introduced to atoms and learn that all matter in our daily environment is made up of atoms. Students explore the periodic table and how elements can come together to form compounds.
- Chapter 15: Nuclear Energy – In this chapter, students learn about the discovery of radioactivity and the stability of nuclei. Students will learn about half-life, radiometric dating, and transmutation.
- Chapter 16: Elements of Chemistry – Students will explore chemistry, which is the study of matter and the transformations it can undergo.
- Chapter 17: Bonds and Molecular Attractions – In this chapter, students will explore how atoms bond through the use of electron-dot diagrams. Students will learn about ionic, metallic, and covalent chemical bonds.
- Chapter 18: How Chemicals Mix – Students will move from studying atoms and compounds to studying solutions. Students will also be introduced to the idea of moles.
- Chapter 19: How Chemicals React – In this chapter, students will apply their mathematical understanding the chemistry to balance chemical equations.
- Chapter 20: Acids and Bases – Students explore acids and bases and the chemical reaction class of acid/base reactions. Students will also learn about oxidation and reduction as part of chemical reactions.
- Chapter 21: Organic Compounds – During this chapter, students will focus on organic compounds and the element carbon. This chapter introduces students to the basics of organic chemistry.

Biology

- Chapter 22: The Basic Unit of Life: The Cell – This chapter introduces students to the basic unit of life, which is the cell. Students will begin by exploring the two major types of cells: prokaryotic and eukaryotic.
- Chapter 23: How Cells Work – Students will explore how molecules enter and exit cells, how cells communicate with each other, and how they reproduce. Students will also explore and understand photosynthesis.
- Chapter 24: DNA and Genes – Students will explore how traits of an organism are transferred to offspring with a focus on genes. Students will be introduced to DNA, or deoxyribonucleic acid.
- Chapter 25: How Traits Are Inherited – This chapter dives into Mendelian Genetics and dominant/recessive traits. Students will also discuss applications of molecular genetics, which as the human genome and GMOs.
- Chapter 26: The Evolution of Life – Students will study how life has evolved through the process of natural selection and adaptation to the environment. Students will explore this through larger animals with longer life-spans and creatures with short life spans, such as bacteria.
- Chapter 27: Diversity in Life – Students will explore the classification of living things, including the three domains of life, which are archaea, bacteria, and eukarya.
- Chapter 28: Control and Development – This is the first of two chapters on the human body. In this chapter, students focus on a basic introduction to the components of the human body on both a structural and chemical level.
- Chapter 29: Care and Maintenance – Students continue their study of the human body, with a focus on body systems, nutrition, exercise, and health.
- Chapter 30: Ecosystems and Environment – Throughout their study of biology, students move from the micro to the macro level. This last chapter focuses on ecology, which is the study of how living organisms live and work together.

Earth Science

- Chapter 31: Plate Tectonics – Students begin with a focus on plate tectonics and Earth's internal structure. Students gain an understanding of continental drift, earthquakes, volcanoes, tsunamis, mountains, valleys, and more.
- Chapter 32: Rocks and Minerals – Students will explore rocks and minerals, which provide insight into Earth's processes.
- Chapter 33: Earth's Surface: Land and Water – Students dig into the formation of various features found on Earth's surface, including mountains, plains, and oceans. Students will understand how faults play a role in the formations.
- Chapter 34: Surface Processes – Students will explore how both mechanical and chemical weathering shape the Earth's surface.
- Chapter 35: Weather – Students will explore weather and climate. This chapter will explore atmospheric pressure, wind chill, the Coriolis Effect, the impact of latitude on temperature, the reason for the seasons, and more.
- Chapter 36: Earth's History – In this chapter, students will explore the history of Earth dating back approximately 4.6 billion years through the use of radiometric dating.
- Chapter 37: Environmental Geology – In this chapter, students explore earthquakes, tsunamis, volcanoes, and hurricanes.