

Trenton Special School District 2024-2025 5th Grade Science

Curriculum: McGraw Hill

FIFTH GRADE: OVERVIEW

The academic standards for fifth grade establish the content knowledge and skills for Tennessee students necessary to prepare them for the rigorous levels of higher education and future job markets. The course provides students with a wealth of scientific practical experiences. The academic standards for science in fifth grade are based on research and the National Research Council's *Framework for K-12 Science Education*.

The academic standards herein establish the core content and practices of science and engineering, as well as what Tennessee students need to know by the end of fifth grade. Disciplinary core ideas for fifth grade include:

Fifth Grade			
Physical Sciences (PS)	Life Sciences (LS)	Earth and Space Sciences (ESS)	Engineering, Technology, and Applications of Science (ETS)
Matter and Its Interactions	From Molecules to Organisms: Structure and Process	Earth's Place in the Universe	Engineering Design
Motion and Stability: Forces and Interactions	Ecosystems: Interactions, Energy, and Dynamics	Earth's Systems	Links Among Engineering, Technology, Science, and Society
Energy	Heredity: Inheritance and Variation of Traits	Earth and Human Activity	Applications of Science
Waves and Their Applications in Technologies for Information Transfer	Biological Change: Unity and Diversity		

By the end of fifth grade, students explore Earth's materials and systems. They use models and data to investigate factors that affect climate and the cycling of water. Students investigate the distribution and role of the Earth's water. Students should explain the impact on earth's resources and climate when analyzing relationships between humans and the environment. Students examine inherited traits and variations and how these variations lead to species survival. In physical science, they learn about physical properties of matter and chemical reactions by discovering matter is not destroyed, only changed. Investigating forces and motion, students focus on balanced and unbalanced forces and explore patterns of change in physical systems along with gravitational forces.

Quarter Introduced	Fifth Grade Academic Standard for Science	Resources	Vocabulary	Learning Targets	
First Quarter					
Physical Science [PS]					
5.PS1: Matter and Its Interactions					
First Quarter	1	5.PS1.1 Analyze and interpret data from observations and measurements of the physical properties of matter to explain phase changes between a solid, liquid, or gas.	STEMScope: Matter Changing States BrainPop: Matter Changes State; Measuring Matter Study Jams: Solid, Liquid, Gas Uncovering Student Ideas in Science: Ice Water pp. 45-51	analyze liquid interpret gas explain observations solid physical properties	I can use data to observe and explain the changes between a solid, a liquid, or a gas.
	1	5.PS1.2 Analyze and interpret data to show that the amount of matter is conserved even when it changes form, including transitions where matter seems to vanish.	STEMScope: matter Changing States BrainPop: Conservation of Mass Uncovering Student Ideas in Science: Sugar Water pp. 11-16; Burning Paper pp. 23-29 Video: Crash Course Kids 23.1	matter conservation	I can understand that the amount of matter stays the same when it changes form.
	1	5.PS1.3 Design a process to measure how different variables (temperature, particle size, stirring) affect the rate of dissolving solids into liquids.	STEMScope: Mixtures Experiment: Dissolving Sugar Cubes	variables temperature dissolving particle thermometer F° C°	I can create an experiment to measure how variables affect the rate of dissolving solids into liquids.

Quarter Introduced	Fifth Grade Academic Standard for Science	Resources	Vocabulary	Learning Targets	
First Quarter (continued)	1	5.PS1.4 Evaluate the results of an experiment to determine whether the mixing of two or more substances result in a change of properties.	STEMScope: Mixtures Teachers Pay Teachers: Chemical Reactions Activity	evaluate mixture substance	I can use my knowledge of physical properties to determine if mixing two or more substances changes their properties.
	5.PS2: Motion and Stability: Forces and Interactions				
	1	5.PS2.1 Test the effects of balanced and unbalanced forces on the speed and direction of motion of objects.	STEMScope: Changes in Force & Motion Motion & Design Kit DOE: Planning & Carrying Out Investigations: Tug of War	balanced/unbalanced forces force net force	I can investigate balanced and unbalanced forces on moving objects.
	1 2	5.PS2.2 Make observations and measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.	STEMScope: Changes in Force & Motion DOE: Using Math & Computational Thinking	predict pattern evidence motion pendulum	I can recognize patterns to predict an object's future motion.
	Engineering, Technology, and Applications of Science [ETS]				
	5.ETS1: Engineering Design				
1 2 3 4	5.ETS1.1 Research, test, re-test, and communicate a design to solve a problem.	STEMScope: Gravity Saving Fred	research test re-test design	prototype solve constraint	I can utilize the engineering design process to solve a problem.

Quarter Introduced	Fifth Grade Academic Standard for Science	Resources	Vocabulary	Learning Targets	
First Quarter (continued)	1 2 3 4	5.ETS1.2 Plan and carry out tests on one or more elements of a prototype in which variables are controlled and failure points are considered to identify which elements need to be improved. Apply the results of tests to redesign the prototype.	STEMScope: Gravity Design a Bridge	prototype evaluate modifications retest	I can test, improve, and redesign specific components of a prototype.
	1 2 3 4	5.ETS1.3 Describe how failure provides valuable information toward finding a solution.	STEMScope: Gravity Aluminum Boats	failure limitations solution	I can find an alternate solution by analyzing failures.
	5.ETS2: Links Among Engineering, Technology, Science, and Society				
	1 2 3 4	5.ETS2.1 Use appropriate measuring tools, simple hand tools, and fasteners to construct a prototype of a new or improved technology.	STEMScope: Constructing a Prototype Prosthetic Arm Video Clip: Dolphin Tale	prototype components simple hand tools	I can use appropriate tools and supplies to construct prototypes and solutions.
	1 2 3 4	5.ETS2.3 Identify how scientific discoveries lead to new and improved technologies.	STEMScope: Scientific Discoveries & Improvements	technological advances	I can identify how scientific discoveries lead to new and improved technologies.
	NOTES:				

Quarter Introduced	Fifth Grade Academic Standard for Science	Resources	Vocabulary	Learning Targets	
Second Quarter					
Second Quarter	5.PS2: Motion and Stability: Forces and Interactions				
	1 2	5.PS2.2 Make observations and measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.	STEMScope: Changes in Force & Motion DOE: Using Math & Computational Thinking	predict pattern evidence motion pendulum	I can recognize patterns to predict an object's future motion.
	2	5.PS2.3 Use evidence to support that the gravitational force exerted by Earth on objects is directed toward the Earth's center.	STEMScope: Gravity Bill Nye: Motion/Gravity Crash Course Kids: Defining Gravity	gravity force exert	I can demonstrate Earth's gravitational force.
	2	5.PS2.4 Explain the cause and effect relationship of two factors (mass and distance) that affect gravity.	STEMScope: Gravitational Forces Bill Nye: Motion Motion & Design Kit	mass distance cause/effect	I can explain how mass and distance affect gravity.
	2	5.PS2.5 Explain how forces can create patterns within a system (moving in one direction, shifting back and forth, or moving in cycles), and describe conditions that affect how fast or slowly these patterns occur.	STEMScope: Forces & Patterns Smithsonian Science: How Can We Predict Patterns of Motion (videos 1,4,5,6)	pattern system force acceleration	I can explain how forces create patterns and I can describe the rate at which patterns occur.

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Second Quarter (continued)	Earth and Space Science [ESS]				
	5.ESS1: Earth's Place in the Universe				
	2	5.ESS1.1 Explain that differences in the apparent brightness of the sun compared to other stars are due to their relative distances from the Earth.	STEMScope: Observing the Stars Mr. Nussbaum: Video/games	sun star apparent distance main sequence giant/white dwarf super giant	I can explain how the distance of a star from Earth impacts its brightness.
	2	5.ESS1.2 Research and explain the position of the Earth and the solar system within the Milky Way galaxy, and compare the size and shape of the Milky Way to other galaxies in the universe.	STEMScope: The Milky Way Galaxy Mr. Nussbaum: Video/games TDOE: Obtaining, Evaluating, & Communicating Information	galaxy spiral elliptical lenticular irregular	I can identify the position of Earth in the Milky Way galaxy. I can compare the Milky Way galaxy to other galaxies.
2 3	5.ESS1.3 Use data to categorize different bodies in our solar system including moons, asteroids, comets, and meteoroids according to their physical properties and motion.	STEMScope: Characteristics of the Solar System Mr. Nussbaum: Video/games TDOE: Asking Questions & Defining Problems	relative position classification planets orbital path moon comet asteroid meteoroids	I can describe the physical properties of different components in of our solar system.	

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Engineering, Technology, and Applications of Science [ETS]						
5.ETS1: Engineering Design						
Second Quarter (continued)	1 2 3 4	5.ETS1.1 Research, test, re-test, and communicate a design to solve a problem.	STEMScope: Gravity Saving Fred	research test re-test design	prototype solve constraint	I can utilize the engineering design process to solve a problem.
	1 2 3 4	5.ETS1.2 Plan and carry out tests on one or more elements of a prototype in which variables are controlled and failure points are considered to identify which elements need to be improved. Apply the results of tests to redesign the prototype.	STEMScope: Gravity Design a Bridge	prototype evaluate modifications retest		I can test, improve, and redesign specific components of a prototype.
	1 2 3 4	5.ETS1.3 Describe how failure provides valuable information toward finding a solution.	STEMScope: Gravity Aluminum Boats	failure limitations solution		I can find an alternate solution by analyzing failures.
	5.ETS2: Links Among Engineering, Technology, Science, and Society					
	1 2 3 4	5.ETS2.1 Use appropriate measuring tools, simple hand tools, and fasteners to construct a prototype of a new or improved technology.	STEMScope: Constructing a Prototype Prosthetic Arm Video Clip: Dolphin Tale	prototype components simple hand tools		I can use appropriate tools and supplies to construct prototypes and solutions.

Quarter Introduced	Fifth Grade Academic Standard for Science	Resources	Vocabulary	Learning Targets	
Second Quarter (continued)	2 3	5.ETS2.2 Describe how human beings have made tools and machines (X-ray cameras, microscopes, satellites, computers) to observe and do things that they could not otherwise sense or do at all, or as quickly or efficiently.	STEMScope: Tools to Improve Our Senses	x-ray cameras microscopes satellites efficiently	I can describe how the advances in technology have made tools and machines more efficient.
	1 2 3 4	5.ETS2.3 Identify how scientific discoveries lead to new and improved technologies.	STEMScope: Scientific Discoveries & Improvements	technological advances	I can identify how scientific discoveries lead to new and improved technologies.
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Quarter Introduced	Fifth Grade Academic Standard for Science	Resources	Vocabulary	Learning Targets	
Third Quarter					
5.LS4: Biological Change: Unity and Diversity					
Third Quarter	3 4	5.LS.4.1 Analyze and interpret data from fossils to describe types of organisms and their environments that existed long ago. Compare similarities and differences of those to living organisms and their environments. Recognize that most kinds of animals (and plants) that once lived on Earth are now extinct.	STEMScope: Ancient & Modern Animals Carolina Fossil DOE: Engaging in Argument from Evidence	fossil extinct organism	I can use fossils to compare and contrast similarities and differences between living and extinct organisms and their environment.
	3 4	5.LS.4.2 Use evidence to construct an explanation for how variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction.	STEMScope: Survival of the Fittest Meet the Super Cow	variations species reproduction	I can describe how change over time may provide advantages to organisms for survival and reproduction.
	Earth and Space Science [ESS]				
	5.ESS1: Earth's Place in the Universe				
2 3	5.ESS1.3 Use data to categorize different bodies in our solar system including moons, asteroids, comets, and meteoroids according to their physical properties and motion.	STEMScope: Characteristics of the Solar System Mr. Nussbaum: Video/games TDOE: Asking Questions & Defining Problems	relative position classification planets orbital path	moon comet asteroid meteoroids	I can describe the physical properties of different components of our solar system.

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Third Quarter (continued)	3	5.ESS1.4 Explain the cause and effect relationship between the positions of the sun, earth, and moon and resulting eclipses, position of constellations, and appearance of the moon.	STEMScope: Patterns of Motion; Earth, Sun, & Moon System; stars in the Sky Mr. Nussbaum: Video Moon on a Stick TDOE: Developing & Using Models	eclipse solar eclipse lunar eclipse constellation phases of the moon	I can explain how the position of the sun, earth, and moon cause eclipses, moon phases, position of constellations, and the appearance of the moon.	
	3	5.ESS1.5 Relate the tilt of the Earth's axis, as it revolves around the sun, to the varying intensities of sunlight at different latitudes. Evaluate how this causes changes in day-lengths and seasons.	STEMScope: Earth, sun & Moon System StudyJams: Carolina Science- Seasons	rotation revolution tilt axis	day year seasons latitude	I can explain how Earth's tilt and revolution effect days-lengths and seasons.
	3	4.ESS1.2 Use a model to explain how the orbit of the Earth and sun cause observable patterns: a. day and night; b. changes in length and direction of shadows over a day.				
	3	5.ESS1.6 Use tools to describe how stars and constellations appear to move from the Earth's perspective throughout the seasons.	STEMScope: Stars in the Sky	constellation Earth's perspective star	I can utilize tools to describe how stars and constellations change throughout the seasons.	
	3	5.ESS1.7 Use evidence from the presence and location of fossils to determine the order in which rock strata were formed.	STEMScope: Rock Patterns Bill Nye: Fossils	rock strata fossil evidence	I can use fossils to determine rock strata.	

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Third Quarter (continued)	Engineering, Technology, and Applications of Science [ETS]				
	5.ETS1: Engineering Design				
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	1 2 3 4	5.ETS1.2 Plan and carry out tests on one or more elements of a prototype in which variables are controlled and failure points are considered to identify which elements need to be improved. Apply the results of tests to redesign the prototype.	STEMScope: Gravity Design a Bridge	prototype evaluate modifications retest	I can test, improve, and redesign specific components of a prototype.
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Third Quarter (continued)	2 3	5.ETS2.2 Describe how human beings have made tools and machines (X-ray cameras, microscopes, satellites, computers) to observe and do things that they could not otherwise sense or do at all, or as quickly or efficiently.	STEMScope: Tools to Improve Our Senses	x-ray cameras microscopes satellites efficiently	I can describe how the advances in technology have made tools and machines more efficient.
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Fourth Quarter					
Fourth Quarter	Life Science [LS]				
	5.LS1: From Molecules to Organisms: Structures and Processes				
	4	5.LS1.1 Compare and contrast animal responses that are instinctual versus those that are gathered through the senses, processed, and stored as memories to guide their actions.	STEMScope: Animal Responses Disney Imagineers: Animal Adaptations	compare contrast instructional touch receptors taste receptors	I can compare and contrast animal responses that are instinctual versus those that are learned through the senses.
	5.LS3: Heredity: Inheritance and Variation of Traits				
	4	5.LS3.1 Distinguish between inherited characteristics and those characteristics that result from a direct interaction with the environment. Apply this concept by giving examples of characteristics of living organisms that are influenced by both inheritance and the environment.	STEMScope: Inherited & Learned Characteristics StudyJams: Heredity	inherited acquired interaction characteristic distinguish influenced	I can distinguish between and give examples of inherited characteristics and those that are influenced by the environment.
	4	5.LS3.2 Provide evidence and analyze data that plants and animals have traits inherited from parents and that variations of these traits exist in a group of similar organisms.	STEMScope: Inheritance & Variation of Traits	traits inherited organisms	I can interpret data to provide evidence that plants and animals inherit traits from their parents which creates variations within similar groups.

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Fourth Quarter (continued)	5.LS4: Biological Change: Unity and Diversity				
	3 4	5.LS4.1 Analyze and interpret data from fossils to describe types of organisms and their environments that existed long ago. Compare similarities and differences of those to living organisms and their environments. Recognize that most kinds of animals (and plants) that once lived on Earth are now extinct.	STEMScope: Ancient & Modern Animals Carolina Fossil DOE: Engaging in Argument from Evidence	fossil extinct organism	I can use fossils to compare and contrast similarities and differences between living and extinct organisms and their environment.
	3 4	5.LS4.2 Use evidence to construct an explanation for how variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction.	STEMScope: Survival of the Fittest Meet the Super Cow	variations species reproduction	I can describe how change over time may provide advantages to organisms for survival and reproduction.
	4.PS4: Waves and their Application in Technologies for Information Transfer				
	4	4.PS4.1 Use a model of a simple wave to explain regular patterns of amplitude, wavelength, and direction.			
	4	4.PS4.2 Describe how the colors of available light sources and the bending of light waves determine what we see.			
	4	4.PS4.3 Investigate how lenses and digital devices like computers or cell phones use waves to enhance human senses.			

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