

LIFE SCIENCES

GRADE	TOPICS	STANDARDS (NGSS ALIGNMENT)	BY DESIGN CHAPTER CORRELATION
Essential Question: How do living organisms give evidence of God as the Designer, Creator, and Sustainer of life?		Big Idea: The complexity, order, and design of living organisms provide strong evidence of God as the Designer, Creator and Sustainer of life.	Bold = included content <i>Italic =</i> related content
K-2	Molecules to Organisms: Structures and Processes	S.K-2.LS.1 Use observations to describe patterns (e.g., animals need to take in food but plants do not, different kinds of food needed by different types of animals, requirement of plants to have light, all living things need water) of what plants and animals (including humans) need to survive. (K-LS1-1)	Level 1 – Ch. 1.1, 1.2, Ch. 2.3, Ch. 3.2 Level 2 – Ch. 1.1, 1.4, Ch. 2.1
		S.K-2.LS.2 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs (e.g., designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills). (1-LS1-1)	Level 1 – Ch. 1.1, 1.2, Ch. 2.1, 2.2, 2.3 Level 2 – Ch. 1.2, 1.5
		S.K-2.LS.3 Make observations to determine patterns in behavior of parents and offspring that help offspring survive (e.g., signals that offspring make such as crying, cheeping and the responses of parents such as feeding, comforting, protecting). (1-LS1-2)	Level 1 – Ch. 2.3 Level 2 – Ch. 1.4
	Ecosystems: Interactions, Energy, and Dynamics	S.K-2.LS.4 Plan and conduct an investigation to determine if plants need sunlight and water to grow, ensuring that only one variable is tested at a time. (2-LS2-1)	Level 1 – Ch. 1.2 Level 2 – Ch. 1.1, 1.2
		S.K-2.LS.5 Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants. (2-LS2-2)	Level 1 – Ch. 1.2 <i>Level 2 – Ch. 1.2</i>
	Heredity: Inheritance and Variation of Traits	S.K-2.LS.6 Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents (e.g., leaves from same kind of plant are the same shape but can differ in size, young animals look similar to their parents but are not exactly the same). (1-LS3-1)	Level 1 – Ch. 1.2, Ch. 2.3
	Life: Origins, Unity, and Diversity	S.K-2.LS.7 Make observations of plants and animals to compare the diversity of life in different habitats. (2-LS4-1)	Level 1 – Ch. 3.1 Level 2 – Ch. 2.1
		S.K-2.LS.8 Apply scientific principles to begin to construct a personal model that explains how life began on earth and acknowledges God as the Creator.	<i>Level 1 – Ch. 1.1, Ch. 2.2, Ch. 8.1</i> <i>Level 2 – Ch. 8.1, 8.2</i>
3-5	Molecules to Organisms: Structures and Processes	S.3-5.LS.1 Develop models (e.g., drawings, diagrams) to describe that organisms have unique and diverse life cycles but all have birth, growth, reproduction, and death in common. (3-LS1-1)	Level 3 – Ch. 1.3, Ch. 2.1, 2.2 Level 4 – Ch. 1.4 Level 5 – Ch. 1.3, Ch. 5.1, 5.2, 5.3, Ch. 6.1, 6.2
		S.3-5.LS.2 Construct an argument that plants and animals have internal and external structures (e.g., thorns, stems, roots, colored petals, heart, stomach, lung, brain, skin) that function to support survival, growth, behavior, and reproduction. (4-LS1-1)	Level 3 – Ch. 2.1, Ch. 5.1, Ch. 6.1 Level 4 – Ch. 1.1, 1.3, 1.4, Ch. 2.1, 2.2 Level 5 – Ch. 3.1, 3.2, 3.3, 3.4, Ch. 4.3, Ch. 5.2, 5.3, Ch. 6.1, 6.2
		S.3-5.LS.3 Use a model to describe systems of information transfer (e.g., nerves, hormones) that animals use to receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. (4-LS1-2)	Level 4 – Ch. 4.1, Ch. 5.2
		S.3-5.LS.4 Support an argument that plants get the materials they need for growth chiefly from air and water. (5-LS1-1)	Level 3 – Ch. 2.1, 2.3 Level 4 – Ch. 1.1
	Ecosystems: Interactions, Energy, and Dynamics	S.3-5.LS.5 Construct an argument that some animals form groups that help members survive. (3-LS2-1)	Level 4 – Ch. 2.2, Ch. 3.2 Level 5 – Ch. 3.3, Ch. 4.1, 4.3
		S.3-5.LS.6 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. (5-LS2-1)	Level 3 – Ch. 3.1 Level 4 – Ch. 3.1, 3.2, 3.3, 3.4 Level 5 – Ch. 4.1, 4.2, 4.3
	Heredity: Inheritance and Variation of Traits	S.3-5.LS.7 Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. (3-LS3-1)	Level 3 – <i>Ch. 1.1, 1.3, Ch. 2.2</i> Level 4 – Ch. 1.1, 1.4 Level 5 – Ch. 1.3, <i>Ch. 6.1</i>
		S.3-5.LS.8 Use evidence to support the explanation that traits can be influenced by the environment (e.g., Galapagos finches, peppered moth). (3-LS3-2)	Level 3 – <i>Ch. 3.1, 3.2, 3.3, 3.4</i> Level 4 – Ch. 2.1, 2.2, Ch. 3.3 Level 5 – Ch. 3.1, 3.2, 3.3, 3.4
	Life: Origins, Unity, and Diversity	S.3-5.LS.9 Analyze and interpret data (e.g., type, size, distributions) from fossils to provide evidence of the organisms and the environments (e.g., marine fossils on dry land, tropical plant fossils in Arctic areas, fossils of extinct organisms) in which they lived long ago. (3-LS4-1)	Level 4 – Ch. 8.2
		S.3-5.LS.10 Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing (e.g., plants with larger thorns are less likely to be eaten by predators, animals with better camouflage coloration are more likely to survive and to reproduce). (3-LS4-2)	Level 4 – Ch. 2.1, 2.2 Level 5 – Ch. 3.1, 3.2, 3.3
		S.3-5.LS.11 Construct an argument with evidence (e.g., needs, characteristics) that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. (3-LS4-3)	Level 3 – Ch. 3.1, 3.2, 3.3, 3.4 Level 4 – Ch. 2.1, 2.2, Ch. 3.3
		S.3-5.LS.12 Make a claim about the merit of a plant or animal adaptation in response to an environmental change (e.g., land characteristics, water distribution, temperature, food, other organisms). (3-LS4-4)	<i>Level 3 – Ch. 3.2, 3.3, 3.4</i> Level 4 – Ch. 2.1, 2.2, Ch. 3.2, 3.3 Level 5 – Ch. 3.1, 3.2, 3.3, 3.4, Ch. 4.3
		S.3-5.LS.13 Construct an argument with evidence to support that God has created within living things a pool of variations that allows organisms to adapt to changes in the environment.	Level 4 – Ch. 2.1, 2.2 Level 5 – Ch. 3.1, 3.2, 3.3, 3.4
		S.3-5.LS.14 Apply scientific principles to construct a personal model that explains origins of life on earth and acknowledges God as the Creator.	Level 3 – Ch. 1.1 Level 4 – Ch. 1.1, 1.2, Ch. 4.1 Level 5 – Ch. 1.1, 1.2, 1.3

LIFE SCIENCES CONTINUED

GRADE	TOPICS	STANDARDS (NGSS ALIGNMENT)	BY DESIGN CHAPTER CORRELATION
6-8	Molecules to Organisms: Structures and Processes	S.6-8.LS.1 Conduct an investigation to provide evidence that living things are made of cells, either one cell or many different numbers and types of cells. (MS-LS1-1)	Level 6 – Ch. 1.1, Ch. 2.1, 2.2, 2.3 Level 7 – Ch. 1.1
		S.6-8.LS.2 Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. (MS-LS1-2)	Level 6 – Ch. 2.1, 2.2, 2.3, 2.4, Ch. 3.1, 3.2, 3.3 Level 7 – Ch. 4.1, Ch. 6.1
		S.6-8.LS.3 Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. (MS-LS1-3)	Level 6 – Ch. 2.3, Ch. 4.1, 4.2, 4.3, 4.4, 4.5
		S.6-8.LS.4 Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors (e.g., nest building, herding, vocalization, colorful plumage) and specialized plant structures (e.g., bright flowers, flower nectar, odors that attract insects that transfer pollen, hard shells on nuts that squirrels bury) affect the probability of successful reproduction of animals and plants respectively. (MS-LS1-4)	Level 6 – Ch. 1.1 Level 7 – Ch. 3.3, 3.4 Level 8 – Ch. 1.1, Ch. 2.4, Ch. 3.3, Ch. 4.2, 4.4
		S.6-8.LS.5 Construct a scientific explanation based on evidence (e.g., drought decreasing plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates in different conditions, fish growing larger in large ponds) for how environmental (e.g., availability of food, light, space, water) and genetic (e.g., large breed cattle and species of grass affecting growth) factors influence the growth of organisms. (MS-LS1-5)	Level 7 – Ch. 1.1, 1.2, 1.3, 1.4, Ch. 4.2, 4.3 Level 8 – Ch. 3.2, 3.3, Ch. 4.1, 4.3, 4.4
		S.6-8.LS.6 Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. (MS-LS1-6)	Level 6 – Ch. 2.3, 2.4 Level 8 – Ch. 3.1
		S.6-8.LS.7 Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. (MS-LS1-7)	Level 6 – Ch. 1.3, Ch. 2.4, Ch. 3.2 Level 7 – Ch. 1.2, 1.3, 1.4 Level 8 – Ch. 2.1
		S.6-8.LS.8 Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. (MS-LS1-8)	Level 6 – Ch. 4.2, 4.4, 4.5
	Ecosystems: Interactions, Energy, and Dynamics	S.6-8.LS.9 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. (MS-LS2-1)	Level 8 – Ch. 4.1, 4.3, 4.4
		S.6-8.LS.10 Construct an explanation that predicts patterns of interactions (e.g., competitive, predatory, mutually beneficial) among organisms across multiple ecosystems. (MS-LS2-2)	Level 8 – Ch. 4.1, 4.3, 4.4, 4.5
		S.6-8.LS.11 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. (MS-LS2-3)	Level 6 – Ch. 1.1, 1.2, 1.3 Level 8 – Ch. 3.1, Ch. 4.1, 4.3
		S.6-8.LS.12 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. (MS-LS2-4)	Level 8 – Ch. 4.1, 4.3, 4.4
		S.6-8.LS.13 Evaluate competing design solutions (e.g., scientific, economic, social considerations) for maintaining biodiversity and ecosystem services (e.g., water purification, nutrient recycling, soil erosion prevention, habitat enhancement). (MS-LS2-5)	Level 8 – Ch. 3.3, Ch. 4.1, Ch. 9.1, 9.2, 9.3, 9.4
	Heredity: Inheritance and Variation of Traits	S.6-8.LS.14 Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. (MS-LS3-1)	Level 6 – Ch. 3.1, 3.2 Level 7 – Ch. 4.1
		S.6-8.LS.15 Develop and use a model (e.g., Punnett squares, diagrams, simulations) to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. (MS-LS3-2)	Level 6 – Ch. 3.1 Level 7 – Ch. 4.1, 4.2, 4.3 Level 8 – Ch. 2.2, 2.3, 2.4
	Life: Origins, Unity, and Diversity	S.6-8.LS.16 Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth, comparing and contrasting creationist and naturalist perspectives. (MS-LS4-1)	Level 6 – Ch. 10.1, 10.2, 10.3 Level 8 – Ch. 1.2, 1.3, Ch. 10.3
		S.6-8.LS.17 Apply scientific principles to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms, comparing and contrasting creationist and naturalist perspectives. (MS-LS4-2)	Level 6 – Ch. 10.1, 10.2, 10.3 Level 8 – Ch. 1.3, Ch. 10.3
		S.6-8.LS.18 Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. (MS-LS4-4)	Level 6 – Ch. 1.1 Level 7 – Ch. 4.2, 4.3 Level 8 – Ch. 1.1, Ch. 3.2, Ch. 4.2, 4.4
		S.6-8.LS.19 Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms. (MS-LS4-5)	Level 7 – Ch. 4.4
		S.6-8.LS.20 Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. (MS-LS4-6)	Level 7 – Ch. 4.1, 4.2 Level 8 – Ch. 1.1, Ch. 4.2, 4.3, 4.4
		S.6-8.LS.21 Apply scientific principles to construct and share a personal model that explains origins of life on earth and acknowledges God as the Creator.	Level 6 – Ch. 1.1, 1.2, 1.3 Level 7 – Ch. 1.1, Ch. 4.1 Level 8 – Ch. 1.1, 1.2, Ch. 10.2, 10.3

HEALTH SCIENCES

GRADE	TOPICS	STANDARDS (NGSS ALIGNMENT)	BY DESIGN CHAPTER CORRELATION
<p>Essential Question: Why does God want human beings to choose to have a healthy mind and body?</p>		<p>Big Idea: God designed a plan for healthful living that leads to optimum spiritual, physical, mental, and emotional health.</p>	<p>Bold = included content <i>Italic =</i> related content</p>
K-2	Health Promotion and Disease Prevention	S.K-2.HS.1 Read texts and use media to determine the dimensions of health (e.g., nutrition, exercise) and patterns of behavior (e.g., eating healthy foods, daily exercise) that impact personal health.	Level 1 – Ch. 4.3, Ch. 5.2, 5.3, Ch. 6.2, 6.3 Level 2 – Ch. 3.2, 3.4, Ch. 4.3, Ch. 5.1, 5.2
		S.K-2.HS.2 Demonstrate ways to prevent communicable diseases and reduce accidental injuries.	Level 1 – Ch. 6.3 Level 2 – Ch. 5.2, 5.3
		S.K-2.HS.3 Role play how to tell a trusted adult if threatened or harmed.	<i>Not specifically addressed</i>
	Health Resources	S.K-2.HS.4 Conduct an investigation to identify health professionals and other adults who can help to promote health.	Level 2 – 4.3, Ch. 5.3
	Healthy Lifestyle Choices	S.K-2.HS.5 Construct an argument that media influences personal decisions relating to healthy choices.	Level 1 – Ch. 5.2, 5.3, Ch. 6.2, 6.3 Level 2 – Ch. 3.3, Ch. 5.2
		S.K-2.HS.6 Use a model to differentiate between situations when a health-related decision can be made individually or when assistance is needed.	Level 1 – Ch. 4.3, Ch. 5.3, Ch. 6.3 Level 2 – Ch. 3.1, 3.3, 5.2, 5.3
		S.K-2.HS.7 Identify a short-term personal health goal and implement a plan to attain that goal.	Level 1 – Ch. 5.2, 5.3, Ch. 6.2, 6.3
		S.K-2.HS.8 Ask questions and obtain information about God's plan for healthy living.	Level 2 – Ch. 3.3, Ch. 4.3, Ch. 5.2
3-5	Health Promotion and Disease Prevention	S.3-5.HS.1 Make observations to construct an evidence-based link between healthy behaviors and personal health.	Level 3 – Ch. 4.1, 4.2, 5.3, Ch. 6.2, 6.3 Level 4 – Ch. 4.2, 4.3, Ch. 5.3 Level 5 – Ch. 7.1, 7.2, 7.3
		S.3-5.HS.2 Construct an argument that spiritual, emotional, intellectual, physical, and social health are interrelated and dependent on one another.	Level 4 – Ch. 4.2, 4.3, Ch. 5.2, Ch. 6.2, 6.3
		S.3-5.HS.3 Analyze patterns of accidental injuries in different locations; develop a specific action plan designed to reduce accidents; evaluate the success of the plan.	<i>Level 4 – Ch. 4.2</i>
		S.3-5.HS.4 Develop a model that demonstrates effective verbal and nonverbal communication skills to enhance health and reduce health risks.	Level 3 – Ch. 6.3 Level 4 – Ch. 5.3, Ch. 6.1, 6.3
		S.3-5.HS.5 Use scientific evidence to develop a family health plan designed to strengthen and enhance personal health.	Level 3 – Ch. 4.1, Ch. 5.3, Ch. 6.3 Level 4 – Ch. 4.2, Ch. 5.3 Level 5 – Ch. 7.1
	Health Resources	S.3-5.HS.6 Analyze and communicate the reliability of health information, products, and local services.	Level 3 – Ch. 5.3, Ch. 6.3 Level 5 – Ch. 7.3
	Healthy Lifestyle Choices	S.3-5.HS.7 Construct a model that illustrates the various influences that impact personal health.	Level 3 – Ch. 4.1, Ch. 5.3, Ch. 6.3 Level 4 – Ch. 4.2, 4.3, Ch. 5.3 Level 5 – Ch. 7.3
		S.3-5.HS.8 Conduct an investigation to evaluate the accuracy/influence of the media on health.	Level 5 – Ch. 7.2
		S.3-5.HS.9 Construct a model that demonstrates the ability to use decision-making skills to enhance health.	Level 4 – Ch. 5.3, Ch. 6.1, 6.2, 6.3
		S.3-5.HS.10 Select a personal health goal, evaluate health resources to develop and implement a plan aimed at achieving the goal, and monitor progress toward the goal.	Level 3 – Ch. 4.1, Ch. 5.1, 5.3, Ch. 6.2, 6.3 Level 4 – Ch. 4.2, Ch. 5.1, 5.3, Ch. 6.2
		S.3-5.HS.11 Gather, synthesize, and present information from the Bible about God's plan for healthy living.	Level 3 – Ch. 5.3, Ch. 6.3 Level 4 – Ch. 4.2, Ch. 5.3, Ch. 6.2
6-8	Health Promotion and Disease Prevention	S.6-8.HS.1 Collect data from family members to compile evidence that supports the claim that personal health is influenced by the environment and genetics.	Level 7 – Ch. 4.2 Level 8 – Ch. 5.2, 5.3, Ch. 6.3, 6.4
		S.6-8.HS.2 Construct a model that demonstrates the link between appropriate health care and personal health.	Level 6 – Ch. 6.1, 6.2 Level 8 – Ch. 6.3, 6.4, Ch. 7.1, 7.2, 7.3
		S.6-8.HS.3 Gather and synthesize information to identify barriers to obtaining appropriate health care and to practicing healthy behaviors, and suggest ways to overcome these barriers.	Level 8 – Ch. 5.1, Ch. 6.3, Ch. 7.3
		S.6-8.HS.4 Construct an evidenced-based argument that demonstrates the importance of assuming responsibility for personal health behaviors.	Level 6 – Ch. 6.2, 6.3 Level 7 – Ch. 5.3, Ch. 6.1, 6.2, 6.3 Level 8 – Ch. 5.5, Ch. 6.2, 6.3, 6.4, Ch. 7.1, 7.2, 7.3
		S.6-8.HS.5 Evaluate behaviors in relation to the degree to which they benefit or harm personal health and the health of others.	Level 6 – Ch. 6.2, 6.3 Level 7 – Ch. 5.2, 5.3, Ch. 6.3 Level 8 – Ch. 5.3, Ch. 6.1, 6.2, 6.3
		S.6-8.HS.6 Choose a health-enhancing practice and develop a presentation designed to persuade others to adopt a similar practice.	Level 6 – Ch. 5.1, 5.2, 5.3, 5.4, Ch. 6.2, 6.3 Level 7 – Ch. 5.2, 5.3, Ch. 6.2, 6.3, 6.4 Level 8 – Ch. 5.2, 5.3, Ch. 6.2, 6.3, 6.4, Ch. 7.1, 7.2, 7.3
	Health Resources	S.6-8.HS.7 Develop guidelines for evaluating health information, products, and services, and conduct an investigation designed to assess the validity of health-related resources.	Level 8 – Ch. 6.4, Ch. 7.2, 7.3
	Healthy Lifestyle Choices	S.6-8.HS.8 Construct an argument that supports the claim that modifying unhealthy behaviors can enhance personal health.	Level 6 – Ch. 4.4, 4.5, Ch. 5.3, 5.4, Ch. 6.2 Level 7 – Ch. 5.3, Ch. 6.3, 6.4 Level 8 – Ch. 5.3, Ch. 6.2, 6.3, 6.4, Ch. 7.1
		S.6-8.HS.9 Plan and conduct an investigation that provides evidence that peers and perceptions of norms influence the health of adolescents.	Level 6 – Ch. 6.2 Level 7 – Ch. 5.3, Ch. 6.3 Level 8 – Ch. 6.2, 6.3, 6.4, Ch. 7.1, 7.2
		S.6-8.HS.10 Construct a model that demonstrates how public health policies can influence health promotion and disease prevention.	Level 6 – Ch. 6.2, 6.3 Level 7 – Ch. 6.2, 6.3 Level 8 – Ch. 6.1, 6.2, 6.3, Ch. 7.2, 7.3
		S.6-8.HS.11 Analyze and interpret data that provides evidence to support the claim that traditional Adventist health practices promote optimal health.	Level 6 – Ch. 5.3, 5.4 Level 7 – Ch. 5.2, 5.3, Ch. 6.2, 6.4, Ch. 7.1 Level 8 – Ch. 5.2, 5.3, Ch. 6.2, 6.3

EARTH AND SPACE SCIENCES

GRADE	TOPICS	STANDARDS (NGSS ALIGNMENT)	BY DESIGN CHAPTER CORRELATION
Essential Question: How do the structure and physical phenomena of Earth and space provide evidence of God as Designer, Creator, and Sustainer of the universe?		Big Idea: The structure and processes of Earth and space are organized and governed by natural laws that give evidence of God as Designer, Creator, and Sustainer.	Bold = included content <i>Italic =</i> related content
K-2	Earth's Systems	S.K-2.ES.1 Use and share observations of local weather conditions to describe patterns over time. (K-ESS2-1)	Level 1 – Ch. 7.1, 7.2 Level 2 – Ch. 7.1, 7.2
		S.K-2.ES.2 Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. (K-ESS2-2)	Level 1 – Ch. 3.1 Level 2 – Ch. 2.1
		S.K-2.ES.3 Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. (2-ESS2-1)	Level 2 – Ch. 6.3, Ch. 7.2
		S.K-2.ES.4 Develop a model to represent the shapes and kinds of land and bodies of water in an area. (2-ESS2-2)	Level 1 – Ch. 8.2 Level 2 – Ch. 6.1, 6.3
		S.K-2.ES.5 Obtain information to identify where water is found on Earth and that it can be solid or liquid. (2-ESS2-3)	Level 1 – Ch. 7.2 Level 2 – Ch. 6.1, 7.2
	Earth and Human Activity	S.K-2.ES.6 Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live. (K-ESS3-2)	Level 1 – Ch. 3.1, 3.2, 3.3 Level 2 – Ch. 1.1, 1.4, Ch. 2.2, 2.3
		S.K-2.ES.7 Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather. (K-ESS3-2)	Level 1 – Ch. 7.1 Level 2 – Ch. 7.1
		S.K-2.ES.8 Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment. (K-ESS3-3)	Level 1 – Ch. 3.3 Level 2 – Ch. 2.3
	Earth's Place in the Universe	S.K-2.ES.9 Use observations of the sun, moon, and stars to describe patterns (e.g., sun and moon appear to track across the sky, stars visible at night) that can be predicted. (1-ESS1-1)	Level 1 – Ch. 8.1 Level 2 – Ch. 8.1, 8.2, 8.3
		S.K-2.ES.10 Make observations at different times of year to relate the amount of daylight to the time of year. (1-ESS1-2)	Level 1 – Ch. 7.3 Level 2 – Ch. 7.3
		S.K-2.ES.11 Use information from several sources to provide evidence that Earth events (e.g., volcanic explosions, earthquakes, rock erosion) can occur quickly or slowly. (2-ESS1-1)	Level 2 – Ch. 6.3
3-5	Earth's Systems	S.3-5.ES.1 Represent data (e.g., average temperature, precipitation, wind direction) in tables and graphical displays to describe typical weather conditions expected during a particular season. (3-ESS2-1)	Level 3 – Ch. 8.1, 8.2, 8.3 Level 5 – Ch. 8.1, 8.3
		S.3-5.ES.2 Obtain and combine information to describe climates in different regions of the world. (3-ESS2-2)	Level 3 – Ch. 8.2, 8.3 Level 5 – Ch. 8.4
		S.3-5.ES.3 Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation (e.g., angle of slope in downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing water, cycles of heating and cooling, volume of water flow). (4-ESS2-1)	Level 4 – Ch. 7.3, 7.4
		S.3-5.ES.4 Analyze and interpret data from maps, including topographic maps, to describe patterns of Earth's features. (4-ESS2-2)	Level 3 – Ch. 7.1 Level 4 – Ch. 7.1
		S.3-5.ES.5 Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact (e.g., influence of ocean on ecosystems, landform shape, climate; influence of the atmosphere on landforms and ecosystems; influence of mountain ranges on winds and clouds). (5-ESS2-1)	Level 3 – Ch. 7.1, Ch. 8.2 Level 4 – Ch. 7.1, 7.3
		S.3-5.ES.6 Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. (5-ESS2-2)	Level 3 – Ch. 7.1 Level 4 – Ch. 7.1 Level 5 – Ch. 8.2, Ch. 10.1, 10.3
	Earth and Human Activity	S.3-5.ES.7 Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard (e.g., barriers to prevent flooding, wind resistant roofs, lightning rods). (3-ESS3-1)	Level 3 – Ch. 8.2 Level 5 – Ch. 8.3
		S.3-5.ES.8 Obtain and combine information to describe that energy and fuels are derived from natural resources (e.g., wind energy, water behind dams, sunlight, fossil fuels, fissile materials) and their uses affect the environment (e.g., loss of habitat due to dams, surface mining, air pollution). (4-ESS3-1)	Level 3 – Ch. 3.4, 3.5 Level 4 – Ch. 3.4, Ch. 8.1, 8.3 Level 5 – Ch. 10.3, 10.4
		S.3-5.ES.9 Generate and compare multiple solutions (e.g., earthquake resistant building, monitoring volcanic activity) to reduce the impacts of natural Earth processes on humans. (4-ESS3-2)	Level 4 – Ch. 7.2, 7.3
		S.3-5.ES.10 Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. (5-ESS3-1)	Level 3 – Ch. 3.5 Level 4 – Ch. 8.3 Level 5 – Ch. 10.2, 10.3, 10.4
	Earth's Place in the Universe	S.3-5.ES.11 Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. (4-ESS1-1)	Level 4 – Ch. 7.1, 7.2, 7.4, Ch. 8.2
		S.3-5.ES.12 Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from the Earth. (5-ESS1-1)	Level 4 – Ch. 9.4
		S.3-5.ES.13 Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. (5-ESS1-2)	Level 3 – Ch. 8.3, Ch. 9.2, 9.3 Level 4 – Ch. 9.2 Level 5 – Ch. 8.4

EARTH AND SPACE SCIENCES CONTINUED

GRADE	TOPICS	STANDARDS (NGSS ALIGNMENT)	BY DESIGN CHAPTER CORRELATION
6-8	Earth's Systems	S.6-8.ES.1 Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. (MS-ESS2-1)	Level 6 – Ch. 7.2, Ch. 8.1, 8.2, 8.3, Ch. 9.1, 9.2, 9.3 Level 8- Ch. 8.1, 8.2, 8.3, Ch. 10.1
		S.6-8.ES.2 Construct an explanation based on evidence for how geoscience processes (e.g., surface weathering and deposition by movements of water, ice, and wind) have changed Earth's surface at varying time and spatial scales (e.g., slow plate motions, uplift of large mountain ranges, rapid landslides, microscopic geochemical reactions). (MS-ESS2-2)	Level 6 – Ch. 7.2, Ch. 8.1, 8.2, 8.3, Ch. 9.1, 9.2, 9.3 Level 8 – Ch. 10.1
		S.6-8.ES.3 Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. (MS-ESS2-3)	Level 6 – Ch. 8.1, 8.2, 8.3, Ch. 10.1, 10.2 Level 8 – Ch. 10.1, 10.2
		S.6-8.ES.4 Develop a model (conceptual or physical) to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. (MS-ESS2-4)	Level 8 – Ch. 8.2, 8.3
		S.6-8.ES.5 Collect data (e.g., weather maps, diagrams, visualizations, laboratory experiments) to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions. (MS-ESS2-5)	Level 8 – Ch. 8.1, 8.2, 8.3, 8.4
		S.6-8.ES.6 Develop and use a model (e.g., diagrams, maps and globes, digital representations) to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. (MS-ESS2-6)	Level 7 – Ch. 8.1, Ch. 9.1, 9.2, 9.3 Level 8 – Ch. 8.3, 8.5
	Earth and Human Activity	S.6-8.ES.7 Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the results of past and current geoscience processes (e.g., plate tectonics, the Flood). (MS-ESS3-1)	Level 6 – Ch. 7.3, Ch. 8.1, 8.2, 8.3, Ch. 9.3 Level 8 – Ch. 9.3, Ch. 10.1, 10.2, 10.3
		S.6-8.ES.8 Analyze and interpret data (e.g., locations, magnitudes, frequencies) on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. (MS-ESS3-2)	Level 6 – Ch. 8.3, Level 7 – Ch. 8.2, 8.3 Level 8 – Ch. 10.1
		S.6-8.ES.9 Apply scientific principles to design a method for monitoring and minimizing a human impact (e.g., water usage, soil usage, pollution) on the environment. (MS-ESS3-3)	Level 8 – Ch. 9.1, 9.2, 9.3, 9.4
		S.6-8.ES.10 Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. (MS-ESS3-4)	Level 6 – Ch. 7.3 Level 8 – Ch. 8.5, Ch. 9.1, 9.2, 9.3, 9.4
		S.6-8.ES.11 Ask questions to clarify evidence (e.g., tables, graphs, maps of global and regional temperatures, atmospheric levels of gases, rates of human activities) of the factors that have caused the rise in global temperatures over the past century (e.g., fossil fuel combustion, cement production, agricultural activity, change in incoming solar radiation, volcanic activity). (MS-ESS3-5)	Level 6 – Ch. 8.3 Level 8 – Ch. 9.1, 9.2, 9.3, 9.4
	Earth's Place in the Universe	S.6-8.ES.12 Develop and use a model (physical, graphical, or conceptual) of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. (MS-ESS1-1)	Level 7 – Ch. 9.1, 9.2, 9.3 Level 8 – Ch. 8.5
		S.6-8.ES.13 Develop and use a model (physical or conceptual) to describe the role of gravity in the motions within galaxies and the solar system. (MS-ESS1-2)	Level 7 – Ch. 8.1, 8.2, Ch. 9.1, 9.2, 9.3, Ch. 10.2
		S.6-8.ES.14 Analyze and interpret data (e.g., statistical information, drawings and photographs, models) to determine scale properties (e.g., size, surface features, orbital radius) of objects in the solar system. (MS-ESS1-3)	Level 7 – Ch. 8.1, 8.2, Ch. 9.3
		S.6-8.ES.15 Apply scientific principles to construct an explanation, based on evidence from rock strata, for how the geologic column is used to organize Earth's relative age and geologic history, comparing and contrasting creationist and naturalistic perspectives. (MS-ESS1-4)	Level 6 – Ch. 10.1, 10.2, 10.3 Level 8 – Ch. 1.1, 1.2, Ch. 10.2, 10.3

PHYSICAL SCIENCES

GRADE	TOPICS	STANDARDS (NGSS ALIGNMENT)	BY DESIGN CHAPTER CORRELATION
<p>Essential Question: How does the order and consistency of natural laws provide evidence of God as the Designer, Creator, and Sustainer of the physical world?</p>		<p>Big Idea: Matter and energy are organized and behave according to natural laws that cannot be explained by chance but are consistent and give evidence of God as the Designer, Creator, and Sustainer.</p>	<p>Bold = included content <i>Italic =</i> related content</p>
K-2	Matter and Its Interactions	S.K-2.PS.1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties (e.g., color, texture, hardness, flexibility). (2-PS1-1)	Level 2 – Ch. 9.1, 9.2
		S.K-2.PS.2 Analyze data obtained from testing different materials to determine which materials have the properties (e.g., strength, flexibility, hardness, texture, absorbency) that are best suited for an intended purpose. (2-PS1-2)	<i>Level 2 – Ch. 9.1</i>
		S.K-2.PS.3 Make observations to construct an evidence-based account of how an object made of a small set of pieces (e.g., blocks, building bricks, other assorted small objects) can be disassembled and made into a new object. (2-PS1-3)	Level 2 – Ch. 9.2, 9.3
		S.K-2.PS.4 Construct an argument with evidence that some changes caused by heating or cooling can be reversed (e.g., water, butter) and some cannot (e.g., cooking an egg, freezing a plant leaf, heating paper). (2-PS1-4)	Level 1 – Ch. 10.1 Level 2 – Ch. 9.2, 9.3, Ch. 10.2
	Motion and Stability: Forces and Interactions	S.K-2.PS.5 Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls (e.g., string attached to an object being pulled, pushing an object, stopping a rolling ball, two objects colliding and pushing on each other) on the motion of an object. (K-PS2-1)	Level 1 – Ch. 9.2, 9.3
		S.K-2.PS.6 Analyze data to determine if a design solution (e.g., ramp to increase speed of an object, structure that causes an object to turn) works as intended to change the speed or direction of an object with a push or a pull. (K-PS2-2)	Level 1 – Ch. 9.2, 9.3
	Energy	S.K-2.PS.7 Make observations to determine the effect of sunlight on Earth's surface (e.g., sand, soil, rocks, water). (K-PS3-1)	Level 1 – Ch. 10.1 Level 2 – Ch. 10.2
		S.K-2.PS.8 Use tools and materials to design and build a structure (e.g., umbrellas, canopies, tents) that will reduce the warming effect of sunlight on an area. (K-PS3-2)	Level 2 – Ch. 7.3, Ch. 10.2
	Waves and Their Applications in Technologies for Information Transfer	S.K-2.PS.9 Plan and conduct investigations to provide evidence that vibrating materials (e.g., tuning forks, plucking a stretched string) can make sound and that sound can make materials vibrate (e.g., holding a piece of paper near a speaker, holding an object near a vibrating tuning fork). (1-PS4-1)	Level 1 – Ch. 10.2 Level 2 – Ch. 10.3
		S.K-2.PS.10 Make observations (e.g., those made in a completely dark room, pinhole box, video of a cave explorer) to construct an evidence-based account that objects can be seen only when illuminated (e.g., external light source, object giving off its own light). (1-PS4-2)	Level 2 – Ch. 10.3
		S.K-2.PS.11 Plan and conduct an investigation to determine the effect of placing objects made with different materials (e.g., transparent, translucent, opaque, reflective) in the path of a beam of light. (1-PS4-3)	Level 2 – Ch. 10.3
		S.K-2.PS.12 Use tools and materials to design and build a device (e.g., light source, paper cup and string "telephones," drum beats pattern) that uses light or sound to solve the problem of communicating over a distance. (1-PS4-4)	<i>Level 1 – Ch. 10.2</i> <i>Level 2 – Ch. 10.3</i>
3-5	Matter and Its Interactions	S.3-5.PS.1 Develop a model to describe that matter is made of particles too small to be seen (e.g., add air to expand a basketball, compress air in a syringe, dissolve sugar in water, evaporate salt water). (5-PS1-1)	Level 4 – Ch. 10.1, 10.2, 10.3
		S.3-5.PS.2 Measure and graph quantities to provide evidence that the total weight of matter is conserved regardless of the type of change (e.g., phase changes, dissolving, mixing) that occurs when heating, cooling, or mixing substances. (5-PS1-2)	Level 4 – Ch. 10.1, 10.4, 10.5
		S.3-5.PS.3 Make observations and measurements to identify materials (e.g., powders, metals, minerals, liquids) based on their properties (e.g., color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, solubility). (5-PS1-3)	Level 4 – Ch. 8.1, Ch. 10.1, 10.2, Ch. 11.1, 11.2
		S.3-5.PS.4 Conduct an investigation to determine whether the mixing of two or more substances results in new substances. (5-PS1-4)	Level 4 – Ch. 10.4, 10.5
	Motion and Stability: Forces and Interactions	S.3-5.PS.5 Plan and conduct an investigation to provide evidence of the effects of balanced (e.g., pushing two opposite sides of a box) and unbalanced (e.g., pushing one side of a box) forces on the motion of an object. (3-PS2-1)	Level 3 – Ch. 11.2, 11.3 Level 5 – Ch. 13.1, 13.2, 13.3
		S.3-5.PS.6 Observe and/or measure an object's motion to provide evidence that a pattern can be used to predict future motion (e.g., child swinging, ball rolling in a bowl, pendulum). (3-PS2-2)	Level 3 – Ch. 11.1, 11.2 Level 5 – Ch. 13.1, 13.2, 13.3
		S.3-5.PS.7 Ask questions to determine cause and effect relationships (e.g., distance between objects affects strength of the force, orientation of magnets affect direction of magnetic force) of electric or magnetic interactions between two objects not in contact with each other. (3-PS2-3)	Level 4 – Ch. 11.1, 11.2, 11.3
		S.3-5.PS.8 Define a simple design problem (e.g., constructing a door latch, creating a device to keep two moving objects from touching) that can be solved by applying scientific ideas about magnets. (3-PS2-4)	Level 4 – Ch. 11.1, 11.2
		S.3-5.PS.9 Support an argument that the gravitational force exerted by Earth on objects is directed down toward the center of the earth. (5-PS2-1)	Level 3 – Ch. 9.2, Ch. 11.2 Level 5 – Ch. 13.3
	Energy	S.3-5.PS.10 Use evidence to construct an explanation relating the speed of an object to the energy of that object. (4-PS3-1)	Level 3 – Ch. 10.1, 10.3, Ch. 11.1, 11.2 Level 4 – 10.2 Level 5 – Ch. 13.2, 13.3
		S.3-5.PS.11 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. (4-PS3-2)	Level 3 – Ch. 10.2, 10.3, 10.4 Level 4 – Ch. 11.2 Level 5 – Ch. 11.2, 11.3, Ch. 12.1, 12.3
		S.3-5.PS.12 Ask questions and predict outcomes about the changes in energy that occur when objects collide. (4-PS3-3)	Level 3 – Ch. 11.2 Level 5 – Ch. 13.2, 13.3
		S.3-5.PS.13 Apply scientific principles to design, test, and refine a device (e.g., electric motor, solar heater) that converts energy from one form to another. (4-PS3-4)	Level 3 – Ch. 10.2, 10.3 Level 4 – Ch. 11.2, 11.3 Level 5 – Ch. 14.2, 14.3
		S.3-5.PS.14 Use models (e.g., diagrams, flow charts) to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun. (5-PS3-1)	Level 3 – Ch. 2.3 <i>Level 4 – Ch. 3.1</i> Level 5 – Ch. 4.2, 4.3
	Waves and their Applications in Technologies for Information Transfer	S.3-5.PS.15 Develop a model (e.g., diagrams, analogies, physical models) of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. (4-PS4-1)	Level 3 – Ch. 10.2, 10.3, Level 5 – Ch. 11.3
		S.3-5.PS.16 Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. (4-PS4-2)	<i>Level 3 – Ch. 10.4</i> <i>Level 5 – Ch. 12.3</i> See Level 6 – Ch. 4.5
		S.3-5.PS.17 Generate and compare multiple solutions (e.g., drum sending codes through sound waves, grid of 1's and 0's representing black and white to send information about a picture, Morse code) that use patterns to transfer information. (4-PS4-3)	<i>Level 3 – Ch. 10.3</i> <i>Level 5 – Ch. 11.3</i>

PHYSICAL SCIENCES CONTINUED

GRADE	TOPICS	STANDARDS (NGSS ALIGNMENT)	BY DESIGN CHAPTER CORRELATION
6-8	Matter and Its Interactions	S.6-8.PS.1 Develop models (e.g., drawings, 3D ball and stick structures, computer representations) to describe the atomic composition of simple molecules (e.g., ammonia, methanol) and extended structures (e.g., sodium chloride, diamonds). (MS-PS1-1)	Level 6 – Ch. 12.1, 12.3 Level 8 – Ch. 13.1, 13.2, 13.3
		S.6-8.PS.2 Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction (e.g., burning sugar or steel wool, fat reacting with sodium hydroxide, mixing zinc with hydrogen chloride) has occurred. (MS-PS1-2)	Level 6 – Ch. 11.3, 11.4, Ch. 12.2 Level 8 – Ch. 11.3, Ch. 14.1, 14.2
		S.6-8.PS.3 Gather and make sense of information to describe that synthetic materials come from natural resources and impact society (e.g., new medicines, foods, alternative fuels). (MS-PS1-3)	Level 6 – Ch. 7.3 Level 8 – Ch. 9.1
		S.6-8.PS.4 Develop a model (e.g., drawings, diagrams) that predicts and describes changes in particle (e.g., molecules, inert atoms) motion, temperature, and state of a pure substance (e.g., water, carbon dioxide, helium) when thermal energy is added or removed. (MS-PS1-4)	Level 6 – Ch. 11.2 Level 7 – Ch. 14.1, 14.3 Level 8 – Ch. 11.1, Ch. 14.3
		S.6-8.PS.5 Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. (MS-PS1-5)	Level 6 – Ch. 11.3 Level 8 – Ch. 14.2, 14.3, 14.4
		S.6-8.PS.6 Design, construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. (MS-PS1-6)	Level 8 – Ch. 12.1, Ch. 14.1, 14.2
	Motion and Stability: Forces and Interactions	S.6-8.PS.7 Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects (e.g., two cars, car and stationary objects, meteor and space vehicle). (MS-PS2-1)	Level 7 – Ch. 12.2, 12.3
		S.6-8.PS.8 Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. (MS-PS2-2)	Level 7 – Ch. 12.1, 12.2, 12.3
		S.6-8.PS.9 Ask questions about data (e.g., effect of the number of turns of wire on the strength of an electromagnet, effect of increasing the number or strength of magnets on speed of an electric motor) to determine the factors that affect the strength of electric and magnetic forces (e.g., electromagnets, electric motors, generators). (MS-PS2-3)	Level 6 – Ch. 14.1, 14.2, 14.3
		S.6-8.PS.10 Construct and present arguments using evidence (e.g., data generated from simulations or digital tools; charts displaying mass, strength of interaction, distance from the Sun, orbital periods of objects within the solar system) to support the claim that gravitational interactions exert attraction and depend on the masses of interacting objects. (MS-PS2-4)	Level 7 – Ch. 8.1, 8.2, Ch. 9.1, 9.3
		S.6-8.PS.11 Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact (e.g., interactions of magnets, electrically-charged strips of tape, electrically-charged pith balls). (MS-PS2-5)	Level 6 – Ch. 13.1, 14.1, 14.2, 14.3 Level 7 – Ch. 12.3, 12.4
	Energy	S.6-8.PS.12 Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and the speed of an object (e.g., riding a bicycle at different speeds, rolling different sizes of rock downhill, getting hit by a Wiffle® ball versus a tennis ball). (MS-PS3-1)	Level 7 – Ch. 12.2, Ch. 14.1, 14.2
		S.6-8.PS.13 Develop a model (e.g., representations, diagrams, pictures, written descriptions) to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system (e.g., the Earth and either a roller coaster cart at varying positions on a hill or objects at varying heights on shelves, changing direction/orientation of a magnet, balloon with static electrical charge brought close to a classmate's hair). (MS-PS3-2)	Level 6 – Ch. 13.1, Ch. 14.1 Level 7 – Ch. 12.3, Ch. 14.1, 14.2
		S.6-8.PS.14 Apply scientific principles to design, construct, and test a device (e.g., insulated box, solar cooker, Styrofoam® cup) that either minimizes or maximizes thermal energy transfer. (MS-PS3-3)	Level 7 – Ch. 14.3, 14.4
		S.6-8.PS.15 Plan an investigation (e.g., comparing final water temperatures after different masses of ice are melted in the same volume of water with the same initial temperature) to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. (MS-PS3-4)	Level 7 – Ch. 14.3, 14.4
		S.6-8.PS.16 Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. (MS-PS3-5)	Level 7 – Ch. 12.2, 12.3, Ch. 14.1, 14.2
	Waves and their Applications in Technologies for Information Transfer	S.6-8.PS.17 Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. (MS-PS4-1)	Level 7 – Ch. 11.1, 11.2
		S.6-8.PS.18 Develop and use a model (e.g., drawings, simulations, written descriptions) to describe that waves are reflected, absorbed, or transmitted through various materials. (MS-PS4-2)	Level 7 – Ch. 11.1, 11.2, 11.4
		S.6-8.PS.19 Integrate qualitative scientific and technical information to support the claim that digitized signals (e.g., fiber optic cable transmits light pulses, radio wave pulses in Wi-Fi devices, conversion of stored binary patterns to make sound or text on a computer screen) are a more reliable way to encode and transmit information than analog signals. (MS-PS4-3)	Level 7 – Ch. 11.3

ENGINEERING, TECHNOLOGY, AND APPLICATIONS OF SCIENCE

GRADE	TOPICS	STANDARDS (NGSS ALIGNMENT)	BY DESIGN CHAPTER CORRELATION
Essential Question: How has God equipped humans to apply knowledge of science to solve problems for the benefit of His Creation?		Big Idea: God designed humans to wonder, question, and develop an attitude of inquiry as scientific principles are applied to the materials and forces of nature for the benefit of His Creation.	Bold = included content <i>Italic =</i> related content
K-2	Engineering Design	S.K-2.ET.1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)	These performance standards are found in multiple places throughout the By Design program.
		S.K-2.ET.2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object functions to solve a given problem. (K-2-ETS1-2)	
		S.K-2.ET.3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. (K-2-ETS1-3)	
3-5	Engineering Design	S.3-5.ET.1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1)	These performance standards are found in multiple places throughout the By Design program.
		S.3-5.ET.2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. (3-5-ETS1-2)	
		S.3-5.ET.3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. (3-5-ETS1-3)	
6-8	Engineering Design	S.6-8.ET.1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. (MS-ETS1-1)	These performance standards are found in multiple places throughout the By Design program.
		S.6-8.ET.2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. (MS-ETS1-2)	
		S.6-8.ET.3 Analyze data from tests to determine similarities and difference among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. (MS-ETS1-3)	
		S.6-8.ET.4 Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. (MS-ETS1-4)	