Diocese of Greensburg Curriculum
Science Grade 6

Unit	Standards	Content	Skills
Earth and Universe	**CCSS: Literacy in History/Social Studies, Science, & Technical Subjects 6-12** **CCSS: Grades 6-8** **Capacities of the Literate Individual** **Students Who are College and Career Ready in Reading, Writing, Speaking, Listening, & Language** They use technology and digital media strategically and capably. **Reading: Science & Technical Subjects** **Key Ideas and Details** **1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.** RST.6-8.1. Cite specific textual evidence to support analysis of science and technical texts**.** **Integration of Knowledge and Ideas** **7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.** RST.6-8.7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). **10. Read and comprehend complex literary and informational texts independently and proficiently.** RST.6-8.10. By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.	The students will know and understand the following concepts: • The Sun, planets, dwarf planets, satellites, space objects, and vast areas of space make up the solar system • Gravity is the force that acts on space objects • Scale models can be used to represent objects in the solar system • Planetary objects move in measurable and predictable patterns • The Earth is a planet with unique characteristics Scientific Terminology: • phases • eclipses • gravity • asteroids • meteor • meteoroid • meteorite • axis • revolution • rotation • tides • galaxy • universe • proportion	The students will be able to: • Recognize God's hand in the creation of the universe • Explore the relationship from the parts of a system to the whole system. • Compare and contrast the influence that a variation in scale will have on the way an object or system works. • Define characteristics of planet Earth • Differentiate between revolution and rotation. • Explain what causes seasons. • Demonstrate phases of the moon. • Identify causes of solar and lunar eclipses. • Interpret what the moon surface features may reveal about its history. • Design a model of the solar system. • Relate meteors, meteoroids, and meteorites. • Simulate gravitational pull with magnets • Explore gravity's affects within systems (i.e. tides)

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	Writing **2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.** WHST.6-8.2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. **NGSS: Science Performance Expectations (2013)** **NGSS: MS Physical Science** **MS.Forces and Interactions** **Performance Expectations** MS-PS2-4. Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects**.** **MS.Waves and Electromagnetic Radiation** **Performance Expectations** MS-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. **NGSS: MS Earth & Space Science** **MS.Space Systems** **Performance Expectations** MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system. **NGSS: Science and Engineering Practices** **NGSS: 6-8** **Practice 1. Asking questions (for science) and defining problems (for engineering)** Asking questions and defining problems in 6–8 builds on K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models. Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public	• ratio • astronomical unit • motions	• Locate a point in space using coordinates. • Describe asteroids.

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	facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles. **Practice 2. Developing and using models** **Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.** Develop a model to describe unobservable mechanisms**.** **Practice 3. Planning and carrying out investigations** **Planning and carrying out investigations in 6-8 builds on K-5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions.** Collect data about the performance of a proposed object, tool, process or system under a range of conditions. **Practice 4. Analyzing and interpreting data** **Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.** Use graphical displays (e.g., maps, charts, graphs, and/or tables) of large data sets to identify temporal and spatial relationships. Distinguish between causal and correlational relationships in data. **Practice 5. Using mathematics and computational thinking** **Mathematical and computational thinking in 6–8 builds on K–5 experiences and progresses to identifying patterns in large data sets and using mathematical concepts to support explanations and arguments.** Use mathematical representations to describe and/or support scientific conclusions and design solutions. **NGSS: Disciplinary Core Ideas** **NGSS: 6-8** **ESS1: Earth's Place in the Universe** **ESS1.A: The Universe and Its Stars** Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models. (MS-ESS1-1)		

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	Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe. (MS-ESS1-2) **ESS1.B: Earth and the Solar System** The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them. (MS-ESS1-2),(MSESS1-3) This model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short-term but tilted relative to its orbit around the sun. The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year. (MS-ESS1-1) The solar system appears to have formed from a disk of dust and gas, drawn together by gravity. (MS-ESS1-2) **ESS2: Earth's Systems** **ESS2.A: Earth Materials and Systems** All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. (MS-ESS2-1) The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future. (MS-ESS2-2) **PS1: Matter and Its Interactions** **PS1.A: Structure and Properties of Matter** Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. (MS-PS1-4) In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. (MS-PS1-4) Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals). (MS-PS1-1)		

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	The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. (MS-PS1-4) 		
Earth's Dynamics	**CCSS: English Language Arts 6-12** **CCSS: Grade 7** **Capacities of the Literate Individual** **Students Who are College and Career Ready in Reading, Writing, Speaking, Listening, & Language** They value evidence. **CCSS: Literacy in History/Social Studies, Science, & Technical Subjects 6-12** **CCSS: Grades 6-8** **Reading: Science & Technical Subjects** **Key Ideas and Details** **1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.** RST.6-8.1. Cite specific textual evidence to support analysis of science and technical texts. **2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.** RST.6-8.2. Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. **Integration of Knowledge and Ideas** **7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.** RST.6-8.7. Integrate quantitative or technical information expressed in words in a text with a version of that information	Students will know and understand the following content: • Fossil records and rocks provide clues to Earth's History • Weathering, erosion, and deposition change the Earth's surface • Processes that are observed today acted in the same way over long periods of time • Earth's materials change over time • Humans interact with and are impacted by natural occurrences • Earth has many renewable and nonrenewable resources Scientific Terminology for this unit: • Plate tectonics • Fault types • Minerals • Rock cycle • Fossil • Sedimentary • Metamorphic	Students will be able to: • Recognize God's role in the dynamic nature of Earth systems • Model and differentiate plate tectonics and fault types • Use fossil records to describe the history of earth • Illustrate the rock cycle • Classify minerals and rocks • Simulate interactions at plate boundaries • Represent sea floor spreading with a model • Examine cause and effect relationships related to earthquakes and volcanoes • Categorize renewable, nonrenewable, and inexhaustible resources • Describe the advantages and disadvantages of using Earth's resources • Explore alternative energy sources • Analyze the benefits of reducing, reusing, and

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	expressed visually (e.g., in a flowchart, diagram, model, graph, or table). **10. Read and comprehend complex literary and informational texts independently and proficiently.** RST.6-8.10. By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently. **Writing** **8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.** WHST.6-8.8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. **NGSS: Science Performance Expectations (2013)** **NGSS: MS Earth & Space Science** **MS.History of Earth** **Performance Expectations** MS-ESS1-4. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history. MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales**.** MS-ESS2-3. Analyze and interpret data on the distribution of fossils and rocks, contintental shapes, and seafloor structures to provide evidence of the past plate motions**.** **MS.Earth's Systems** **Performance Expectations** MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. **MS.Human Impacts** **Performance Expectations** MS-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.	• Igneous • Intrusive • Extrusive • Volcano • Earthquake • Tsunami • Typhoon • Plate boundaries • Rock • Hot spots • Convection currents • Sea floor spreading • Continental drift • Pangaea • Mountain building • Renewable resources • Nonrenewable resources • Inexhaustible resources • Fossil fuels • Ores • Nuclear energy • Geothermal energy	recycling Earth's resources

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	MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.* MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capital consumption of natural resources impact Earth's systems. **NGSS: Science and Engineering Practices** **NGSS: 6-8** **Practice 1. Asking questions (for science) and defining problems (for engineering)** Asking questions and defining problems in 6–8 builds on K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models. Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify and/or seek additional information. Ask questions to identify and/or clarify evidence and/or the premise(s) of an argument. Ask questions to clarify and/or refine a model, an explanation, or an engineering problem. **Practice 2. Developing and using models** **Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.** Develop or modify a model—based on evidence – to match what happens if a variable or component of a system is changed. Use and/or develop a model of simple systems with uncertain and less predictable factors. Develop and/or use a model to predict and/or describe phenomena. **Practice 4. Analyzing and interpreting data** **Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.** Distinguish between causal and correlational relationships in data. Analyze and interpret data to provide evidence for phenomena. Consider limitations of data analysis (e.g., measurement error), and/or seek to improve precision and accuracy of data with better technological tools and methods (e.g., multiple trials).		

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	Practice 6. Constructing explanations (for science) and designing solutions (for engineering) Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. Construct an explanation using models or representations. Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints. **Practice 8. Obtaining, evaluating, and communicating information** **Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.** **Integrate qualitative and/or quantitative scientific and/or technical information in written text with that contained in media and visual displays to clarify claims and findings.** **Communicate scientific and/or technical information (e.g. about a proposed object, tool, process, system) in writing and/or through oral presentations.** **Connections to the Nature of Science: Most Closely Associated with Practices** **Scientific Investigations Use a Variety of Methods** **Science investigations use a variety of methods and tools to make measurements and observations.** **Science investigations are guided by a set of values to ensure accuracy of measurements, observations, and objectivity of findings.** **Science depends on evaluating proposed explanations.** **Scientific Knowledge is Based on Empirical Evidence** **Science knowledge is based upon logical and conceptual connections between evidence and explanations.**		

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	Scientific Knowledge is Open to Revision in Light of New Evidence **Scientific explanations are subject to revision and improvement in light of new evidence.** **The certainty and durability of science findings varies.** **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** Theories are explanations for observable phenomena. Science theories are based on a body of evidence developed over time. 		
Weather Science	**CCSS: English Language Arts 6-12** **CCSS: Grade 6** **Capacities of the Literate Individual** **Students Who are College and Career Ready in Reading, Writing, Speaking, Listening, & Language** They demonstrate independence. They build strong content knowledge. They respond to the varying demands of audience, task, purpose, and discipline. They comprehend as well as critique. They value evidence. They use technology and digital media strategically and capably. They come to understand other perspectives and cultures. **Reading: Informational Text** **Key Ideas and Details** **1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.** RI.6.1. Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	Students will know and understand the following content: • Weather is a measurable condition of the atmosphere at a specific time and location • The atmosphere is a mixture of gases • Energy is transferred to matter and causes it to change states • Humans impact the environment, but there are ways to minimize these affects. • Humans continue to design and evaluate new solutions for the conservation of Earth. • As the human population increases, so does the	Students will be able to: • Believe in and identify the changing nature of God's creation • Differentiate between weather and climate • Discuss heat transfer • Consider factors of local and global wind patterns • Recognize that climate is related to solar energy transfer • Construct a model of the water cycle • Explore the density of fluids • Develop a particle model for air pressure • Identify where weather occurs in the atmosphere • Measure weather factors and variables

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	Integration of Knowledge and Ideas **7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.** RI.6.7. Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue. Writing **Text Types and Purposes1** **1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.** W.6.1. Write arguments to support claims with clear reasons and relevant evidence. W.6.1a. Introduce claim(s) and organize the reasons and evidence clearly. W.6.1b. Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text. W.6.1d. Establish and maintain a formal style. **CCSS: Literacy in History/Social Studies, Science, & Technical Subjects 6-12** **CCSS: Grades 6-8** **Capacities of the Literate Individual** **Students Who are College and Career Ready in Reading, Writing, Speaking, Listening, & Language** They demonstrate independence. They build strong content knowledge. They respond to the varying demands of audience, task, purpose, and discipline. They comprehend as well as critique. They value evidence. They use technology and digital media strategically and capably. They come to understand other perspectives and cultures**.** **Reading: Science & Technical Subjects** **10. Read and comprehend complex literary and informational texts independently and proficiently.** RST.6-8.10. By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.	impact on Earth's systems Scientific terminology: • climate • weather • temperature • water cycle • latitude • ocean currents • carbon dioxide • greenhouse gases • pressure • altitude • evaporation • transpiration • atmosphere • nitrogen • oxygen • air pressure • convection currents • air masses • sea breeze • land breeze • density • fluid • radiation • conduction • convection • heat transfer • compression • pollution • agriculture • fresh water • salt water • deforestation • endangered • aquifers • biosphere • wind energy	• Analyze varying conditions within the atmosphere • Describe the advantages and disadvantages of using Earth's resources • Evaluate human impact on the environment • Examine the value of Earth's resources and alternative energy sources • Critique the benefits of reducing, reusing, and recycling Earth's resources

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	NGSS: Science Performance Expectations (2013) **NGSS: MS Earth & Space Science** **MS.Earth's Systems** **Performance Expectations** MS-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. **MS.Weather and Climate** **Performance Expectations** MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. MS-ESS2-6. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. **NGSS: Science and Engineering Practices** **NGSS: 6-8** **Practice 3. Planning and carrying out investigations** **Planning and carrying out investigations in 6-8 builds on K-5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions.** Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. Conduct an investigation and/or evaluate and/or revise the experimental design to produce data to serve as the basis for evidence that meet the goals of the investigation. Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions.	• solar energy • hydroelectric energy	

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	Practice 4. Analyzing and interpreting data **Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.** **Analyze and interpret data to determine similarities and differences in findings.** **Practice 8. Obtaining, evaluating, and communicating information** Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods. Communicate scientific and/or technical information (e.g. about a proposed object, tool, process, system) in writing and/or through oral presentations. Connections to the Nature of Science: Most Closely Associated with Practices Scientific Knowledge is Based on Empirical Evidence Science disciplines share common rules of obtaining and evaluating empirical evidence. **NGSS: Disciplinary Core Ideas** **NGSS: 6-8** **ESS2: Earth's Systems** ESS2.C: The Roles of Water in Earth's Surface Processes Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. (MS-ESS2-4) The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. (MSESS2- 5) Global movements of water and its changes in form are propelled by sunlight and gravity. (MS-ESS2-4) Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. (MS-ESS2-6) **ESS2.D: Weather and Climate** Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local		

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	and regional geography, all of which can affect oceanic and atmospheric flow patterns. (MS-ESS2-6) Because these patterns are so complex, weather can only be predicted probabilistically. (MS-ESS2-5) The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. (MS-ESS2-6) **ESS3: Earth and Human Activity** **ESS3.B: Natural Hazards** Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. (MS-ESS3-2) **ESS3.D: Global Climate Change** **Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming).** Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities. (MS-ESS3-5) 		
Science Projects	**CCSS: English Language Arts 6-12** **CCSS: Grade 7** **Capacities of the Literate Individual** **Students Who are College and Career Ready in Reading, Writing, Speaking, Listening, & Language** They build strong content knowledge. They comprehend as well as critique. They use technology and digital media strategically and capably.	• The engineering design process • Inquiry based approach to the scientific method. • Scientific method • Hypothesis • Procedure • Background information • Procedures • Bibliography • Results • Graphs	The students will be able to: • Follow the scientific method to conduct an experiment. • Define the criteria and constraints of a scientific problem. • Research scientific principles. • Evaluate solutions to determine how well the objectives were met

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	Reading: Literature **Key Ideas and Details** **1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.** RL.7.1. Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. **Writing** **Text Types and Purposes** **1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.** W.7.1d. Establish and maintain a formal style. W.7.1e. Provide a concluding statement or section that follows from and supports the argument presented. **2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.** W.7.2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. W.7.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic. **Production and Distribution of Writing** **4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.** W.7.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.) **6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.**	• Dependent and independent variables • Purpose	during the scientific process. • Analyze and interpret data to determine similarities and differences in findings. • Develop and use models. • Ask and define questions to specify relationships between variables. • Manage a project and meet deadlines. • Communicate project findings through written results, creating a presentation board, and speeches.

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	W.7.6. Use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources. **Research to Build and Present Knowledge** **7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.** W.7.7. Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation. **9. Draw evidence from literary or informational texts to support analysis, reflection, and research.** W.7.9. Draw evidence from literary or informational texts to support analysis, reflection, and research. **Speaking & Listening** **Comprehension and Collaboration** **1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.** SL.7.1a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion. **Presentation of Knowledge and Ideas** **4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.** SL.7.4. Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation. **5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.**		

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	SL.7.5. Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. **Language** **Conventions of Standard English** **1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.** L.7.1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. **2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.** L.7.2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. L.7.2b. Spell correctly. **Knowledge of Language** **3. Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.** L.7.3. Use knowledge of language and its conventions when writing, speaking, reading, or listening. L.7.3a. Choose language that expresses ideas precisely and concisely, recognizing and eliminating wordiness and redundancy.* **CCSS: Mathematics** **CCSS: Grade 7** **The Number System** **7.NS.A. Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.** 7.NS.A.3. Solve real-world and mathematical problems involving the four operations with rational numbers.		

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	Statistics & Probability **7.SP.B. Draw informal comparative inferences about two populations.** 7.SP.B.4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. **7.SP.C. Investigate chance processes and develop, use, and evaluate probability models.** 7.SP.C.6. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. **Mathematical Practice** **MP.The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.** MP.6. Attend to precision. **NGSS: Science Performance Expectations (2013)** **NGSS: MS Engineering Design** **MS.Engineering Design** **Performance Expectations** MS-ETS1-1. 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-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the		

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	best characteristics of each that can be combined into a new solution to better meet the criteria for success. MS-ETS1-4. 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.. **NGSS: Crosscutting Concepts** **NGSS: 6-8** **Crosscutting Statements** **1. Patterns – Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.** Graphs, charts, and images can be used to identify patterns in data. **2. Cause and Effect: Mechanism and Prediction – Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.** Cause and effect relationships may be used to predict phenomena in natural or designed systems. Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability. **3. Scale, Proportion, and Quantity – In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change.** Scientific relationships can be represented through the use of algebraic expressions and equations. **7. Stability and Change – For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.**		

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	Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales, including the atomic scale. **Connections to the Nature of Science: Most Closely Associated with Crosscutting Concepts** **Science is a Way of Knowing** Science is both a body of knowledge and the processes and practices used to add to that body of knowledge. **Science Addresses Questions About the Natural and Material World.** Science limits its explanations to systems that lend themselves to observation and empirical evidence. **NGSS: Disciplinary Core Ideas** **NGSS: 6-8** **ETS1: Engineering Design** **ETS1.C: Optimizing the Design Solution** Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of the characteristics may be incorporated into the new design. (MS-ETS1-3 (secondary to MS-PS1-6) The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. (MSETS1-4) (secondary to MS-PS1-6) 		