Unit	State Standards	Outcomes	Essential Questions	Essential Skills	Assessments	Faith Integration
Unit 1Chemical Building Blocks						
Introduction to Physical Science *(updated 6/10/20)*	SCI.SEP1.A.6-8(A) Students ask questions to specify relationships between variables and clarify arguments and models. This includes the following: •Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify or seek additional information. •Ask questions to identify and clarify evidence and the premise(s) of an argument. •Ask questions to determine relationships between independent and dependent variables and relationships in models. •Ask questions to clarify or refine a model, an explanation, or an engineering problem. •Ask questions that require sufficient and appropriate empirical evidence to answer. •Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles. •Ask questions that challenge the premise(s) of an argument or the interpretation of a data set. SCI.SEP1.B.6-8(A) Students define a design problem that can be solved through the development of an object, tool, process, or system, and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. SCI.SEP3.A.6-8(A) Students plan and carry out investigations that use multiple variables and provide evidence to support explanations or solutions. This includes the following: •Individually and collaboratively plan an investigation, identifying: independent and dependent variables and controls, tools needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. •Conduct an investigation. Evaluate and revise the experimental design to produce data that serve as the basis for evidence to meet the goals of the investigation. •Evaluate the accuracy of various methods for collecting data. •Collect data under a range of conditions that serve as the basis for evidence to answer scientific questions or test design solutions. •Collect data about the performance of a proposed object, tool, process, or system under a range of conditions. SCI.SEP4.A.6-8(A) Students extend quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. This includes the following: •Construct, analyze, or interpret graphical displays of data and large data sets to identify linear and nonlinear relationships. •Use graphical displays (e.g., maps, charts, graphs, and tables) of large data sets to identify		How do scientists investigate the natural world? What is Physical Science?	Explain what phsical science involves. Identify skills that scientists use to learn about the natural world. Describe how scientists investigate the natural world. Explain the roles of models, laws, and theories in science. Explain why preparation is important when carrying out scientific investigations. Describe what you should do if a lab accident occurs. Identify the steps in the technology design process, and describe what is involved in each step. Describe the parts of a technological system. Explain how society and technology affect each other.	Create a poster that differentiates between the two different kinds of observations. Quiz Review/revise answer to Big Question/beginning of Chapter. Chapter Project: Design a cardboard chair following requirements in book on page 5) Chapter 1 test--differentiated to the needs of each student	Creation story, Genesis 1. Research information about scientists that are Christian.

temporal and spatial relationships.
•Distinguish between causal and correlational relationships in data.
•Analyze and interpret data to provide evidence for explanations of phenomena.
•Apply concepts of statistics and probability (including mean, median, mode, and variability) to analyze and characterize data, using digital tools when feasible.
•Consider limitations of data analysis (e.g., measurement error), and seek to improve precision and accuracy of data with better technological tools and methods (e.g., multiple trials).
•Analyze and interpret data to determine similarities and differences in findings.
•Analyze data to define an optimal operational range for a proposed object, tool, process, or system that best meets criteria for success.

SCI.SEP7.A.6-8(A)

Students construct a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world. This includes the following.
•Compare and critique two arguments on the same topic. Analyze whether they emphasize similar or different evidence and interpretations of facts.
•Respectfully provide and receive critiques about one’s explanations, procedures, models, and questions by citing relevant evidence and posing and responding to questions that elicit pertinent elaboration and detail.
•Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.
•Make an oral or written argument that supports or refutes the advertised performance of a device, process, or system. Based the argument on empirical evidence concerning whether or not the technology meets relevant criteria and constraints.
•Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.

SCI.ESS3.C.8(A)

Human activities have altered the hydrosphere, atmosphere, and lithosphere which in turn has altered the biosphere. Changes to the biosphere can have different impacts for different living things. Activities and technologies can be engineered to reduce people’s impacts on Earth.

SCI.ETS1.B.7(A)

There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.

SCI.ETS1.B.9(A)

Models of all kinds are important for testing solutions.

SCI.ETS2.A.6(A)

Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems

SCI.ETS2.A.7(A)

Science and technology drive each other forward

SCI.ETS2.B.7(A)

The uses of technologies are driven by people’s

	needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions SCI.ETS2.B.8(A) Technology use varies over time and from region to region.					
Introduction to Matter *(updated 6/10/20)*	SCI.CC5.6-8(A) Students understand matter is conserved because atoms are conserved in physical and chemical processes. They also understand that within a natural or designed system the transfer of energy drives the motion and cycling of matter. Energy may take different forms (e.g. energy in fields, thermal energy, and energy of motion). The transfer of energy can be tracked as energy flows through a designed or natural system. SCI.CC6.6-8(A) Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used. SCI.SEP1.A.6-8(A) Students ask questions to specify relationships between variables and clarify arguments and models. This includes the following: •Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify or seek additional information. •Ask questions to identify and clarify evidence and the premise(s) of an argument. •Ask questions to determine relationships between independent and dependent variables and relationships in models. •Ask questions to clarify or refine a model, an explanation, or an engineering problem. •Ask questions that require sufficient and appropriate empirical evidence to answer. •Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles. •Ask questions that challenge the premise(s) of an argument or the interpretation of a data set. SCI.SEP2.A.6-8(A) Students develop, use, and revise models to describe, test, and predict more abstract phenomena and design systems. This includes the following: •Evaluate limitations of a model for a proposed object or tool. •Develop or modify a model—based on evidence – to match what happens if a variable or component of a system is changed. •Use and develop a model of simple systems with uncertain and less predictable factors. •Develop and/or revise a model to show the relationships among variables, including those that are not observable but predict observable phenomena.		What is Chemistry? -Describing matter -Measuring Matter -Changes in Matter -Energy and Matter	KNOWLEDGE: Identify the properties used to describe matter. Define elements and explain how they relate to compounds. Describe the properties of a mixture. Differentiate between weight and mass. Identify the units used to express the amount of space occupied by matter. Describe how the density of a material is determined. Describe what a physical change is. Describe what a chemical change is. Explain how changes in matter are related to changes in energy. Identify forms of energy that are related to changes in matter. Describe how chemical energy is related to chemical change. SKILLS: -Applying concepts, calculating, communicating, forming operational definitions, interpreting data, drawing conclusions, measuring, controlling variables, inferring, observing, and making models.	Students will Design and build a Density-Calculating System (page 33) Students will show the correct steps of the Scientific Method when completing experiments. Students will show the correct way to measure and weigh objects with the metric system. Written Chapter Test Concept Mapping Students will communicate information about variables.	Matter is anything that has mass and takes up space. Everything in creation is matter, formed by a true loving God.

•Develop and use a model to predict and describe phenomena.
•Develop a model to describe unobservable mechanisms.
•Develop and use a model to generate data to test ideas about phenomena in natural or designed systems, including those representing inputs and outputs, and those at unobservable scales.

SCI.SEP6.A.6-8(A)
Students construct explanations supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. This includes the following:
•Construct an explanation that includes qualitative or quantitative relationships between variables that predict and describe phenomena.
•Construct an explanation using models or representations.
•Construct a scientific explanation based on valid and reliable evidence obtained from sources, including the students' own experiments. Solutions should build on the following assumption: theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.
•Apply scientific ideas, principles, and evidence to construct, revise, or use an explanation for real world phenomena, examples, or events.
•Apply scientific reasoning to show why the data or evidence is adequate for the explanation.

SCI.SEP8.A.6-8(A)
Students evaluate the merit and validity of ideas and methods. This includes the following:
•Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s).
•Clarify claims and findings by integrating text-based qualitative and quantitative scientific information with information contained in media and visual displays.
•Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication. Describe how they are supported or not supported by evidence and evaluate methods used.
•Evaluate data, hypotheses, and conclusions in scientific and technical texts in light of competing information or accounts.
•Communicate scientific and technical information (e.g. about a proposed object, tool, process, or system) in writing and through oral presentations.

SCI.PS1.A.8(A)
The fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter, phase changes, and conservation of matter.

SCI.ETS1.B.6(A)
A solution needs to be tested and then modified on the basis of the test results in order to improve it.

SCI.ETS1.B.9(A)
Models of all kinds are important for testing solutions.

Solids, Liquids, and Gases *(updated 6/10/20)*	SCI.CC2.6-8(A) Students classify relationships as causal or correlational, and recognize correlation does not necessarily imply causation. They use cause and effect relationships to predict phenomena in natural or designed systems. They also understand that phenomena may have more than one cause, and some cause and effect relationships in systems can only be explained using probability. SCI.CC4.6-8(A) Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study. SCI.CC5.6-8(A) Students understand matter is conserved because atoms are conserved in physical and chemical processes. They also understand that within a natural or designed system the transfer of energy drives the motion and cycling of matter. Energy may take different forms (e.g. energy in fields, thermal energy, and energy of motion). The transfer of energy can be tracked as energy flows through a designed or natural system. SCI.CC6.6-8(A) Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used. SCI.SEP2.A.6-8(A) Students develop, use, and revise models to describe, test, and predict more abstract phenomena and design systems. This includes the following: •Evaluate limitations of a model for a proposed object or tool. •Develop or modify a model—based on evidence – to match what happens if a variable or component of a system is changed. •Use and develop a model of simple systems with uncertain and less predictable factors. •Develop and/or revise a model to show the relationships among variables, including those that are not observable but predict observable phenomena. •Develop and use a model to predict and describe phenomena. •Develop a model to describe unobservable mechanisms. •Develop and use a model to generate data to test ideas about phenomena in natural or designed systems, including those representing inputs and outputs, and those at unobservable scales. SCI.SEP4.A.6-8(A) Students extend quantitative analysis to investigations, distinguishing between correlation		How do solids, liquids, and gases differ? -States of Matter -Changes of State -Gas Behavior -Graphing Gas Behavior	KNOWLEDGE: -Describe the characteristics of a solid. -Describe the characteristics of a liquid. -Describe the characteristics of a gas. -Explain what happens to a substance during changes between solid and liquid, between liquid and gas, and between solid and gas. -List the types of measurements used when working with gases. Explain how the volume, temperature, and pressure of a gas are related. Identify the type of relationships shown on a graph for Charles's law and Boyle's law. SKILLS: -posing questions, forming operational definitions, communication, drawing conclusions, applying concepts, developing hypotheses, interpreting data, predicting, interpreting data, inferring, graphing,	Chapter Project (following bullit items) -How well they described what happens to particles of matter during changes of state -How well they organized the story outline in storyboard format -How thoroughly their cartoons or skits illustrate chapter concepts. Correct steps in the Scientific Method Written Chapter Test Differentiated Assessments as needed	Look at the items in the Bible that are solids, liquids, and gases. Compare and Contrast the Holy Spirit to a gas.

and causation, and basic statistical techniques of data and error analysis. This includes the following:
•Construct, analyze, or interpret graphical displays of data and large data sets to identify linear and nonlinear relationships.
•Use graphical displays (e.g., maps, charts, graphs, and tables) of large data sets to identify temporal and spatial relationships.
•Distinguish between causal and correlational relationships in data.
•Analyze and interpret data to provide evidence for explanations of phenomena.
•Apply concepts of statistics and probability (including mean, median, mode, and variability) to analyze and characterize data, using digital tools when feasible.
•Consider limitations of data analysis (e.g., measurement error), and seek to improve precision and accuracy of data with better technological tools and methods (e.g., multiple trials).
•Analyze and interpret data to determine similarities and differences in findings.
•Analyze data to define an optimal operational range for a proposed object, tool, process, or system that best meets criteria for success.

SCI.SEP8.A.6-8(A)
Students evaluate the merit and validity of ideas and methods. This includes the following:
•Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s).
•Clarify claims and findings by integrating text-based qualitative and quantitative scientific information with information contained in media and visual displays.
•Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication. Describe how they are supported or not supported by evidence and evaluate methods used.
•Evaluate data, hypotheses, and conclusions in scientific and technical texts in light of competing information or accounts.
•Communicate scientific and technical information (e.g. about a proposed object, tool, process, or system) in writing and through oral presentations.

SCI.PS1.A.8(A)
The fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter, phase changes, and conservation of matter.

SCI.ETS2.B.7(A)
The uses of technologies are driven by people’s needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions

SCI.ETS2.B.8(A)
Technology use varies over time and from region to region.

SCI.ETS3.B.6(A)
Science asks questions to understand the natural world and assumes that objects and events in natural systems occur in consistent patterns that

	are understandable through measurement and observation. Science carefully considers and evaluates anomalies in data and evidence. SCI.ETS3.C.6(A) A theory is an explanation of some aspect of the natural world. Scientists develop theories by using multiple approaches. Validity of these theories and explanations is increased through a peer review process that tests and evaluates the evidence supporting scientific claims. SCI.ETS3.C.7(A) Theories are explanations for observable phenomena based on a body of evidence developed over time. A hypothesis is a statement that can be tested to evaluate a theory. Scientific laws describe cause and effect relationships among observable phenomena. SCI.ETS3.C.8(A) Engineers develop solutions using multiple approaches and evaluate their solutions against criteria such as cost, safety, time and performance. This evaluation often involves trade-offs between constraints to find the optimal solution.					
Elements and the Periodic Table *(updated 6/10/20)*	SCI.CC1.6-8(A) Students recognize macroscopic patterns are related to the nature of microscopic and atomic-level structure. They identify patterns in rates of change and other numerical relationships that provide information about natural and human-designed systems. They use patterns to identify cause and effect relationships and use graphs and charts to identify patterns in data. SCI.CC2.6-8(A) Students classify relationships as causal or correlational, and recognize correlation does not necessarily imply causation. They use cause and effect relationships to predict phenomena in natural or designed systems. They also understand that phenomena may have more than one cause, and some cause and effect relationships in systems can only be explained using probability. SCI.CC4.6-8(A) Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study. SCI.CC5.6-8(A) Students understand matter is conserved because atoms are conserved in physical and chemical processes. They also understand that within a natural or designed system the transfer of energy drives the motion and cycling of matter. Energy may take different forms (e.g. energy in fields, thermal energy, and energy of motion). The transfer of energy can be tracked as energy flows through a designed or natural system. SCI.CC6.6-8(A) Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures		What is the periodic table of elements? -Introduction to Atoms -Organizing the Elements -Metals -Nonmetals and Metalloids -Radioactive Elements	KNOWLEDGE: -Describe how atomic theory developed and changed. -Describe the modern model of the atom. -Explain how Mendeleev discovered the pattern that led to the periodic table. -Tell what information about elements is found in the periodic table. -Explain how elements are created in starts. -List the physical properties of metals. -Explain how the reactivity of metals changes across the periodic table. -Explain how the elements that follow uranium are produced. -Describe the properties of nonmetals. -Tell how metalloids are useful. -Describe how radioactivity was discovere. -Identify the types of particles and energy that radioactive decay can produce. -Describe how radioactive isotopes are useful. SKILLS: Observing, designing experiments, comparing and contrasting, communicating, inferring, calculating, modeling, classifying, applying concepts, controlling variables, drawing conclusions, interpreting data, predicting.	Chapter Project page 101 Written Assessments Quizes Scientific Method Correctly used Differentiated Assessments	Metals in the Bible (jewelry) Uses of metals listed in Biblical history. Nonmetals used in Biblical history. The ground on which our faith stands-solid.

and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.

SCI.SEP1.A.6-8(A)

Students ask questions to specify relationships between variables and clarify arguments and models. This includes the following:
•Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify or seek additional information.
•Ask questions to identify and clarify evidence and the premise(s) of an argument.
•Ask questions to determine relationships between independent and dependent variables and relationships in models.
•Ask questions to clarify or refine a model, an explanation, or an engineering problem.
•Ask questions that require sufficient and appropriate empirical evidence to answer.
•Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles.
•Ask questions that challenge the premise(s) of an argument or the interpretation of a data set.

SCI.SEP1.B.6-8(A)

Students define a design problem that can be solved through the development of an object, tool, process, or system, and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions.

SCI.SEP4.A.6-8(A)

Students extend quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. This includes the following:
•Construct, analyze, or interpret graphical displays of data and large data sets to identify linear and nonlinear relationships.
•Use graphical displays (e.g., maps, charts, graphs, and tables) of large data sets to identify temporal and spatial relationships.
•Distinguish between causal and correlational relationships in data.
•Analyze and interpret data to provide evidence for explanations of phenomena.
•Apply concepts of statistics and probability (including mean, median, mode, and variability) to analyze and characterize data, using digital tools when feasible.
•Consider limitations of data analysis (e.g., measurement error), and seek to improve precision and accuracy of data with better technological tools and methods (e.g., multiple trials).
•Analyze and interpret data to determine similarities and differences in findings.
•Analyze data to define an optimal operational range for a proposed object, tool, process, or system that best meets criteria for success.

SCI.SEP7.A.6-8(A)

Students construct a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world. This includes the following.

	•Compare and critique two arguments on the same topic. Analyze whether they emphasize similar or different evidence and interpretations of facts. •Respectfully provide and receive critiques about one's explanations, procedures, models, and questions by citing relevant evidence and posing and responding to questions that elicit pertinent elaboration and detail. •Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. •Make an oral or written argument that supports or refutes the advertised performance of a device, process, or system. Based the argument on empirical evidence concerning whether or not the technology meets relevant criteria and constraints. •Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. SCI.PS1.A.8(A) The fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter, phase changes, and conservation of matter. SCI.ETS1.B.9(A) Models of all kinds are important for testing solutions. SCI.ETS3.A.6(A) Individuals and teams from many nations, cultures and backgrounds have contributed to advances in science and engineering. SCI.ETS3.A.7(A) Scientists and engineers are persistent, use creativity, reasoning, and skepticism, and remain open to new ideas. SCI.ETS3.B.6(A) Science asks questions to understand the natural world and assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. Science carefully considers and evaluates anomalies in data and evidence.					
Atoms and Bonding *(updated 6/10/20)*	SCI.CC1.6-8(A) Students recognize macroscopic patterns are related to the nature of microscopic and atomic-level structure. They identify patterns in rates of change and other numerical relationships that provide information about natural and human-designed systems. They use patterns to identify cause and effect relationships and use graphs and charts to identify patterns in data. SCI.CC4.6-8(A) Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study. SCI.CC5.6-8(A) Students understand matter is conserved because atoms are conserved in physical and chemical processes. They also understand that		How do compounds form? -Atoms, Bonding, and the Periodic Table -Ionic Bonds -Covalent Bonds -Bonding in Metals	KNOWLEDGE: -Explain how the reactivity of elements is related to valence electrons in atoms. -State what the periodic table tells you about atoms and the properties of elements. -Describe ions, and explain how they form bonds. -Explain how the formulas and names of ionic compounds are written. -Identify the properties of ionic compounds. -State what holds covalently bonded atoms together. -Identify the properties of molecular compounds. -Explain how unequal sharing of electrons occurs and how it affects molecules.	Chapter Project page 149 Written tests quizzes Differentiated Assessments Group Work	God's Design of the world, organized

	within a natural or designed system the transfer of energy drives the motion and cycling of matter. Energy may take different forms (e.g. energy in fields, thermal energy, and energy of motion). The transfer of energy can be tracked as energy flows through a designed or natural system. SCI.SEP1.A.6-8(A) Students ask questions to specify relationships between variables and clarify arguments and models. This includes the following: •Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify or seek additional information. •Ask questions to identify and clarify evidence and the premise(s) of an argument. •Ask questions to determine relationships between independent and dependent variables and relationships in models. •Ask questions to clarify or refine a model, an explanation, or an engineering problem. •Ask questions that require sufficient and appropriate empirical evidence to answer. •Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles. •Ask questions that challenge the premise(s) of an argument or the interpretation of a data set. SCI.SEP2.A.6-8(A) Students develop, use, and revise models to describe, test, and predict more abstract phenomena and design systems. This includes the following: •Evaluate limitations of a model for a proposed object or tool. •Develop or modify a model—based on evidence – to match what happens if a variable or component of a system is changed. •Use and develop a model of simple systems with uncertain and less predictable factors. •Develop and/or revise a model to show the relationships among variables, including those that are not observable but predict observable phenomena. •Develop and use a model to predict and describe phenomena. •Develop a model to describe unobservable mechanisms. •Develop and use a model to generate data to test ideas about phenomena in natural or designed systems, including those representing inputs and outputs, and those at unobservable scales. SCI.SEP3.A.6-8(A) Students plan and carry out investigations that use multiple variables and provide evidence to support explanations or solutions. This includes the following: •Individually and collaboratively plan an investigation, identifying: independent and dependent variables and controls, tools needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. •Conduct an investigation. Evaluate and revise the experimental design to produce data that serve as the basis for evidence to meet the goals			-Explain how the properties of metals and alloys compare. -Describe how metal atoms are bonded in solid metal. -Explain how metallic bonding results in useful properties of metals. SKILLS: -making models, comparing and contrasting, commuication, interpreting data, applying concepts, graphing, inferring, observing, controlling varables, forming operational definitions, developing hypotheses		

of the investigation.
•Evaluate the accuracy of various methods for collecting data.
•Collect data under a range of conditions that serve as the basis for evidence to answer scientific questions or test design solutions.
•Collect data about the performance of a proposed object, tool, process, or system under a range of conditions.

SCI.SEP4.A.6-8(A)

Students extend quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. This includes the following:
•Construct, analyze, or interpret graphical displays of data and large data sets to identify linear and nonlinear relationships.
•Use graphical displays (e.g., maps, charts, graphs, and tables) of large data sets to identify temporal and spatial relationships.
•Distinguish between causal and correlational relationships in data.
•Analyze and interpret data to provide evidence for explanations of phenomena.
•Apply concepts of statistics and probability (including mean, median, mode, and variability) to analyze and characterize data, using digital tools when feasible.
•Consider limitations of data analysis (e.g., measurement error), and seek to improve precision and accuracy of data with better technological tools and methods (e.g., multiple trials).
•Analyze and interpret data to determine similarities and differences in findings.
•Analyze data to define an optimal operational range for a proposed object, tool, process, or system that best meets criteria for success.

SCI.SEP5.A.6-8(A)

Students identify patterns in large data sets and use mathematical concepts to support explanations and arguments. This includes the following:
•Decide when to use qualitative vs. quantitative data.
•Use digital tools (e.g., computers) to analyze very large data sets for patterns and trends.
•Use mathematical representations to describe and support scientific conclusions and design solutions.
•Create algorithms (a series of ordered steps) to solve a problem.
•Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems.
•Use digital tools and mathematical concepts and arguments to test and compare proposed solutions to an engineering design problem.

SCI.SEP8.A.6-8(A)

Students evaluate the merit and validity of ideas and methods. This includes the following:
•Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s).
•Clarify claims and findings by integrating text-based qualitative and quantitative scientific information with information contained in media

	and visual displays. •Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication. Describe how they are supported or not supported by evidence and evaluate methods used. •Evaluate data, hypotheses, and conclusions in scientific and technical texts in light of competing information or accounts. •Communicate scientific and technical information (e.g. about a proposed object, tool, process, or system) in writing and through oral presentations. SCI.PS1.A.8(A) The fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter, phase changes, and conservation of matter. SCI.ETS1.B.8(A) Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. SCI.ETS1.B.9(A) Models of all kinds are important for testing solutions. SCI.ETS2.A.6(A) Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems SCI.ETS2.A.7(A) Science and technology drive each other forward SCI.ETS2.B.7(A) The uses of technologies are driven by people’s needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions SCI.ETS3.C.6(A) A theory is an explanation of some aspect of the natural world. Scientists develop theories by using multiple approaches. Validity of these theories and explanations is increased through a peer review process that tests and evaluates the evidence supporting scientific claims. SCI.ETS3.C.7(A) Theories are explanations for observable phenomena based on a body of evidence developed over time. A hypothesis is a statement that can be tested to evaluate a theory. Scientific laws describe cause and effect relationships among observable phenomena.					
Chemical Reactions *(updated 6/10/20)*	SCI.CC1.6-8(A) Students recognize macroscopic patterns are related to the nature of microscopic and atomic-level structure. They identify patterns in rates of change and other numerical relationships that provide information about natural and human-designed systems. They use patterns to identify cause and effect relationships and use graphs and charts to identify patterns in data. SCI.CC5.6-8(A) Students understand matter is conserved because atoms are conserved in physical and chemical processes. They also understand that within a natural or designed system the transfer of energy drives the motion and cycling of		What happens during a chemical reaction? -observing chemical change -describing chemical reactions -controlling chemical reactions -fire and fire safety	KNOWLEDGE: - State how matter and changes in matter can be described. -Explain how you can tell when a chemical reaction occurs. -Identify what information a chemical equation contains. -State the principle of conservation of mass -Explain what a balanced chemical equation must show. -Name three categories of chemical reactions.	Chapter Project page 183 Written tests Quizzes Differentiated assessments Group Work NEO K12 assessments Jeopardy game	Use of fire in Bible times. -cooking -heat

matter. Energy may take different forms (e.g. energy in fields, thermal energy, and energy of motion). The transfer of energy can be tracked as energy flows through a designed or natural system.

SCI.SEP1.A.6-8(A)

Students ask questions to specify relationships between variables and clarify arguments and models. This includes the following:
•Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify or seek additional information.
•Ask questions to identify and clarify evidence and the premise(s) of an argument.
•Ask questions to determine relationships between independent and dependent variables and relationships in models.
•Ask questions to clarify or refine a model, an explanation, or an engineering problem.
•Ask questions that require sufficient and appropriate empirical evidence to answer.
•Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles.
•Ask questions that challenge the premise(s) of an argument or the interpretation of a data set.

SCI.SEP2.A.6-8(A)

Students develop, use, and revise models to describe, test, and predict more abstract phenomena and design systems. This includes the following:
•Evaluate limitations of a model for a proposed object or tool.
•Develop or modify a model—based on evidence – to match what happens if a variable or component of a system is changed.
•Use and develop a model of simple systems with uncertain and less predictable factors.
•Develop and/or revise a model to show the relationships among variables, including those that are not observable but predict observable phenomena.
•Develop and use a model to predict and describe phenomena.
•Develop a model to describe unobservable mechanisms.
•Develop and use a model to generate data to test ideas about phenomena in natural and designed systems, including those representing inputs and outputs, and those at unobservable scales.

SCI.SEP4.A.6-8(A)

Students extend quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. This includes the following:
•Construct, analyze, or interpret graphical displays of data and large data sets to identify linear and nonlinear relationships.
•Use graphical displays (e.g., maps, charts, graphs, and tables) of large data sets to identify temporal and spatial relationships.
•Distinguish between causal and correlational relationships in data.
•Analyze and interpret data to provide evidence for explanations of phenomena.

-Explain how activation energy is related to chemical reactions.
-Identify factors that affect the rate of a chemical reaction.
-List the three things necessary to maintain a fire.
-Explain why you should know about the causes of fire and how to prevent a fire.
SKILLS:
Designing a solution, buildig a prototype, evaluating the design, interpreting data, communicating, observing, classifying, drawing conclusions, predicting, making models, inferring, applying concepts, calculating, developing hypotheses

•Apply concepts of statistics and probability (including mean, median, mode, and variability) to analyze and characterize data, using digital tools when feasible.
•Consider limitations of data analysis (e.g., measurement error), and seek to improve precision and accuracy of data with better technological tools and methods (e.g., multiple trials).
•Analyze and interpret data to determine similarities and differences in findings.
•Analyze data to define an optimal operational range for a proposed object, tool, process, or system that best meets criteria for success.

SCI.SEP6.B.6-8(A)

Students design solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. This includes the following:
•Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process, or system.
•Undertake a design project, engaging in the design cycle, to construct and implement a solution that meets specific design criteria and constraints.
•Optimize performance of a design by prioritizing criteria, making trade-offs, testing, revising, and retesting.

SCI.SEP7.A.6-8(A)

Students construct a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world. This includes the following.
•Compare and critique two arguments on the same topic. Analyze whether they emphasize similar or different evidence and interpretations of facts.
•Respectfully provide and receive critiques about one's explanations, procedures, models, and questions by citing relevant evidence and posing and responding to questions that elicit pertinent elaboration and detail.
•Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.
•Make an oral or written argument that supports or refutes the advertised performance of a device, process, or system. Based the argument on empirical evidence concerning whether or not the technology meets relevant criteria and constraints.
•Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.

SCI.SEP8.A.6-8(A)

Students evaluate the merit and validity of ideas and methods. This includes the following:
•Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s).
•Clarify claims and findings by integrating text-based qualitative and quantitative scientific information with information contained in media and visual displays.
•Gather, read, and synthesize information from multiple appropriate sources and assess the

	credibility, accuracy, and possible bias of each publication. Describe how they are supported or not supported by evidence and evaluate methods used. •Evaluate data, hypotheses, and conclusions in scientific and technical texts in light of competing information or accounts. •Communicate scientific and technical information (e.g. about a proposed object, tool, process, or system) in writing and through oral presentations. SCI.PS1.A.8(A) The fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter, phase changes, and conservation of matter. SCI.PS1.B.8(A) Reacting substances rearrange to form different molecules, but the number of atoms is conserved. Some reactions release energy and others absorb energy.					
Acids, Bases, and Solutions *(updated 6/10/20)*	SCI.CC2.6-8(A) Students classify relationships as causal or correlational, and recognize correlation does not necessarily imply causation. They use cause and effect relationships to predict phenomena in natural or designed systems. They also understand that phenomena may have more than one cause, and some cause and effect relationships in systems can only be explained using probability. SCI.SEP2.A.6-8(A) Students develop, use, and revise models to describe, test, and predict more abstract phenomena and design systems. This includes the following: •Evaluate limitations of a model for a proposed object or tool. •Develop or modify a model—based on evidence – to match what happens if a variable or component of a system is changed. •Use and develop a model of simple systems with uncertain and less predictable factors. •Develop and/or revise a model to show the relationships among variables, including those that are not observable but predict observable phenomena. •Develop and use a model to predict and describe phenomena. •Develop a model to describe unobservable mechanisms. •Develop and use a model to generate data to test ideas about phenomena in natural or designed systems, including those representing inputs and outputs, and those at unobservable scales. SCI.SEP3.A.6-8(A) Students plan and carry out investigations that use multiple variables and provide evidence to support explanations or solutions. This includes the following: •Individually and collaboratively plan an investigation, identifying: independent and dependent variables and controls, tools needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. •Conduct an investigation. Evaluate and revise the experimental design to produce data that		How may properties of acids and base be determined? -Understanding Sollutions -Concetration and Solubility -Describing Acids and Bases -Acids and Bases in Solution -Digestion and pH	KNOWLEDGE: -State the characteristics of solutions, colloids, and suspensions. -Describe what happens to the particles of a solute when a solution forms. -Explain how solutes affect the freezing point and boiling point of a solvent. -Describe how concentration is measured. -Explain why solubility is useful in identifying substances. -Identify factors that affect the solubility of a substance. -Name the properties of acids and bases. -Identify where acids and bases are commonly used. -State what kinds of ions acids and bases form in water. -Explain what pH tells you about a solution. -Describe what happens in a neutralizaion reaction. -Explain why the body must digest food. -Describe how pH affects digestion. SKILLS: - designing experiments, controlling variables, comparing and contrasting, communicating, observing, iinferring, applying concepts, drawing conclusions, redicting, forming operational definitions, intrepreting data, measuring	Chapter Project page 221 Written Tests Quizzes Experiments (correct process) NEO K12 work Differentiated Assessments	God's design for our digestive system. God's plan to have food with different pH levels.

	serve as the basis for evidence to meet the goals of the investigation. •Evaluate the accuracy of various methods for collecting data. •Collect data under a range of conditions that serve as the basis for evidence to answer scientific questions or test design solutions. •Collect data about the performance of a proposed object, tool, process, or system under a range of conditions. SCI.SEP4.A.6-8(A) Students extend quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. This includes the following: •Construct, analyze, or interpret graphical displays of data and large data sets to identify linear and nonlinear relationships. •Use graphical displays (e.g., maps, charts, graphs, and tables) of large data sets to identify temporal and spatial relationships. •Distinguish between causal and correlational relationships in data. •Analyze and interpret data to provide evidence for explanations of phenomena. •Apply concepts of statistics and probability (including mean, median, mode, and variability) to analyze and characterize data, using digital tools when feasible. •Consider limitations of data analysis (e.g., measurement error), and seek to improve precision and accuracy of data with better technological tools and methods (e.g., multiple trials). •Analyze and interpret data to determine similarities and differences in findings. •Analyze data to define an optimal operational range for a proposed object, tool, process, or system that best meets criteria for success. SCI.PS1.A.8(A) The fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter, phase changes, and conservation of matter. SCI.PS1.B.8(A) Reacting substances rearrange to form different molecules, but the number of atoms is conserved. Some reactions release energy and others absorb energy.					
Carbon Chemistry *(updated 6/10/20)*	SCI.CC1.6-8(A) Students recognize macroscopic patterns are related to the nature of microscopic and atomic-level structure. They identify patterns in rates of change and other numerical relationships that provide information about natural and human-designed systems. They use patterns to identify cause and effect relationships and use graphs and charts to identify patterns in data. SCI.CC4.6-8(A) Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study.		Why does carbon have a central role in the chemistry of living things? -Properties of Carbon -Carbon Compounds -Polymers and Composites -Life with Carbon	KNOWLEDGE: -Describe how carbon is able to form a huge variety of compounds. -identiry four forms of pure carbon. -List properties of organic compounds. -Identify properties of hydrocarbons. -Describe the kind of structures and bonding that hydrocarbons have. -Identify characteristics of substituted hydrocarbons, esters, and polymers. -Explain how polymers form. -Tell what composites are made of. -Identify benefits and problems that relate to the use of synthetic polymers.	Chapter Project page 259 Written Tests Quizzes Experiments (correct steps) Differentiated Assessments Group Work	God's Design of the Universe

	SCI.SEP6.A.6-8(A) Students construct explanations supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. This includes the following: •Construct an explanation that includes qualitative or quantitative relationships between variables that predict and describe phenomena. •Construct an explanation using models or representations. •Construct a scientific explanation based on valid and reliable evidence obtained from sources, including the students' own experiments. Solutions should build on the following assumption: theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. •Apply scientific ideas, principles, and evidence to construct, revise, or use an explanation for real world phenomena, examples, or events. •Apply scientific reasoning to show why the data or evidence is adequate for the explanation. SCI.SEP8.A.6-8(A) Students evaluate the merit and validity of ideas and methods. This includes the following: •Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s). •Clarify claims and findings by integrating text-based qualitative and quantitative scientific information with information contained in media and visual displays. •Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication. Describe how they are supported or not supported by evidence and evaluate methods used. •Evaluate data, hypotheses, and conclusions in scientific and technical texts in light of competing information or accounts. •Communicate scientific and technical information (e.g. about a proposed object, tool, process, or system) in writing and through oral presentations. SCI.PS1.B.8(A) Reacting substances rearrange to form different molecules, but the number of atoms is conserved. Some reactions release energy and others absorb energy. SCI.ETS3.B.6(A) Science asks questions to understand the natural world and assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. Science carefully considers and evaluates anomalies in data and evidence. SCI.ETS3.B.7(A) Engineering seeks solutions to human problems, including issues that arise due to human interaction with the environment. It uses some of the same practices as science and often applies scientific principles to solutions. SCI.ETS3.B.8(A) Science and engineering have direct impacts on the quality of life for all people. Therefore, scientists and engineers need to pursue their work in an ethical manner that requires honesty, fairness and dedication to public health, safety			-List the four main clases of organic compounds in living things. -Explain how the organic compounds in living things differ from one another.			

	and welfare.					
Unit	**State Standards**	**Outcomes**	**Essential Questions**	**Essential Skills**	**Assessments**	**Faith Integration**
Unit 2 Motion, Forces, and Energy						
Motion *(updated 6/10/20)*	SCI.CC4.6-8(A) Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study. SCI.CC5.6-8(A) Students understand matter is conserved because atoms are conserved in physical and chemical processes. They also understand that within a natural or designed system the transfer of energy drives the motion and cycling of matter. Energy may take different forms (e.g. energy in fields, thermal energy, and energy of motion). The transfer of energy can be tracked as energy flows through a designed or natural system. SCI.CC6.6-8(A) Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used. SCI.SEP4.A.6-8(A) Students extend quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. This includes the following: •Construct, analyze, or interpret graphical displays of data and large data sets to identify linear and nonlinear relationships. •Use graphical displays (e.g., maps, charts, graphs, and tables) of large data sets to identify temporal and spatial relationships. •Distinguish between causal and correlational relationships in data. •Analyze and interpret data to provide evidence for explanations of phenomena. •Apply concepts of statistics and probability (including mean, median, mode, and variability) to analyze and characterize data, using digital tools when feasible. •Consider limitations of data analysis (e.g., measurement error), and seek to improve precision and accuracy of data with better technological tools and methods (e.g., multiple trials). •Analyze and interpret data to determine similarities and differences in findings. •Analyze data to define an optimal operational range for a proposed object, tool, process, or system that best meets criteria for success. SCI.SEP5.A.6-8(A) Students identify patterns in large data sets and		What is motion? 1. Describing and measuring motion. 2. Speed and velocity. 3. Acceleration.	Knowledge: Detemine when an object is in motion. Describe how scientists measure distance. Calculate an object's speed and velocity. Demonstrate how to graph motion. Describe the motion of an object as it accelerates. Calculate acceleration. Skills: Measuring, calculating, communicating	Big 40+2 Vocabulary Quizzes Listing the Steps of the Scientific Method Exit Tickets Chapter Exams Tri-weekly Homework Assignments Explorations Inclined to Roll Lab Stopping on a Dime Lab Speed Lab	Calculate the speed differences between a donkey which Jesus rode, the whale that captured Jonah, the lion in the den, and Jesus on His journeys.

	use mathematical concepts to support explanations and arguments. This includes the following: •Decide when to use qualitative vs. quantitative data. •Use digital tools (e.g., computers) to analyze very large data sets for patterns and trends. •Use mathematical representations to describe and support scientific conclusions and design solutions. •Create algorithms (a series of ordered steps) to solve a problem. •Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. •Use digital tools and mathematical concepts and arguments to test and compare proposed solutions to an engineering design problem. SCI.PS2.A.6(A) Motion and changes in motion can be qualitatively described using concepts of speed, velocity, and acceleration (including speeding up, slowing down, and/or changing direction). SCI.PS2.A.7(A) The role of the mass of an object must be qualitatively accounted for in any change of motion due to the application of a force (Newton's first and second law). SCI.PS2.A.8(A) For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton's third law). SCI.PS2.B.8(A) Forces that act at a distance involve fields that can be mapped by their relative strength and effect on an object SCI.PS3.C.8(A) When two objects interact, each one exerts a force on the other, and these forces can transfer energy between the interacting objects.					
Forces *(updated 6/10/20)*	SCI.CC3.6-8(A) Students observe time, space, and energy phenomena at various scales using models to study systems that are too large or too small. They understand phenomena observed at one scale may not be observable at another scale, and the function of natural and designed systems may change with scale. They use proportional relationships (e.g., speed as the ratio of distance traveled to time taken) to gather information about the magnitude of properties and processes. They represent scientific relationships through the use of algebraic expressions and equations. SCI.CC7.6-8(A) Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time. SCI.SEP4.A.6-8(A) Students extend quantitative analysis to investigations, distinguishing between correlation		What is a force? 1. The nature of force. 2. Friction and gravity. 3. Newton's 1st and 2nd Law. 4. Newton's 3rd Law. 5. Rockets and Satellites.	Knowledge: Describe what a force is. Explain how balanced and unbalanced forces are related. Describe friction. Identify factors that affects gravitational force between objects. State Newtons 1st, 2nd, and 3rd Laws. State the Law of Conservation of Momentum. Explain how a rocket lifts off. Describe the forces that keep a satellite in orbit. Skills: Controlling variables, making models, predicting, and communicating	Big 40+2 Vocabulary Quizzes Listing the Steps of the Scientific Method Exit Tickets Chapter Exams Tri-weekly Homework Assignments Explorations Sticky Sneakers Lab Friction Lab Newton's Laws Comparison Balloon Shot Lab	Calculate the force needed by the children of Israel to lift the stones to build Pharoah's Temple.

	and causation, and basic statistical techniques of data and error analysis. This includes the following: •Construct, analyze, or interpret graphical displays of data and large data sets to identify linear and nonlinear relationships. •Use graphical displays (e.g., maps, charts, graphs, and tables) of large data sets to identify temporal and spatial relationships. •Distinguish between causal and correlational relationships in data. •Analyze and interpret data to provide evidence for explanations of phenomena. •Apply concepts of statistics and probability (including mean, median, mode, and variability) to analyze and characterize data, using digital tools when feasible. •Consider limitations of data analysis (e.g., measurement error), and seek to improve precision and accuracy of data with better technological tools and methods (e.g., multiple trials). •Analyze and interpret data to determine similarities and differences in findings. •Analyze data to define an optimal operational range for a proposed object, tool, process, or system that best meets criteria for success. SCI.SEP5.A.6-8(A) Students identify patterns in large data sets and use mathematical concepts to support explanations and arguments. This includes the following: •Decide when to use qualitative vs. quantitative data. •Use digital tools (e.g., computers) to analyze very large data sets for patterns and trends. •Use mathematical representations to describe and support scientific conclusions and design solutions. •Create algorithms (a series of ordered steps) to solve a problem. •Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. •Use digital tools and mathematical concepts and arguments to test and compare proposed solutions to an engineering design problem. SCI.PS2.A.7(A) The role of the mass of an object must be qualitatively accounted for in any change of motion due to the application of a force (Newton's first and second law). SCI.PS2.B.8(A) Forces that act at a distance involve fields that can be mapped by their relative strength and effect on an object SCI.ETS3.A.8(A) Science and engineering are influenced by what is valued in society. SCI.ETS3.B.8(A) Science and engineering have direct impacts on the quality of life for all people. Therefore, scientists and engineers need to pursue their work in an ethical manner that requires honesty, fairness and dedication to public health, safety and welfare.						

Forces in Fluids *(updated 6/10/20)*	SCI.SEP1.A.6-8(A) Students ask questions to specify relationships between variables and clarify arguments and models. This includes the following: •Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify or seek additional information. •Ask questions to identify and clarify evidence and the premise(s) of an argument. •Ask questions to determine relationships between independent and dependent variables and relationships in models. •Ask questions to clarify or refine a model, an explanation, or an engineering problem. •Ask questions that require sufficient and appropriate empirical evidence to answer. •Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles. •Ask questions that challenge the premise(s) of an argument or the interpretation of a data set. SCI.SEP3.A.6-8(A) Students plan and carry out investigations that use multiple variables and provide evidence to support explanations or solutions. This includes the following: •Individually and collaboratively plan an investigation, identifying: independent and dependent variables and controls, tools needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. •Conduct an investigation. Evaluate and revise the experimental design to produce data that serve as the basis for evidence to meet the goals of the investigation. •Evaluate the accuracy of various methods for collecting data. •Collect data under a range of conditions that serve as the basis for evidence to answer scientific questions or test design solutions. •Collect data about the performance of a proposed object, tool, process, or system under a range of conditions. SCI.SEP4.A.6-8(A) Students extend quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. This includes the following: •Construct, analyze, or interpret graphical displays of data and large data sets to identify linear and nonlinear relationships. •Use graphical displays (e.g., maps, charts, graphs, and tables) of large data sets to identify temporal and spatial relationships. •Distinguish between causal and correlational relationships in data. •Analyze and interpret data to provide evidence for explanations of phenomena. •Apply concepts of statistics and probability (including mean, median, mode, and variability) to analyze and characterize data, using digital tools when feasible. •Consider limitations of data analysis (e.g., measurement error), and seek to improve precision and accuracy of data with better		How does fluid produce a force? 1. Pressure. 2. Floating and sinking. 3. Pascal's Principle. 4. Bernoulli's Principle.	Knowledge: Explain what pressure depends on. Explain how fluids exert pressure. Describe the effect of buoyant force. Determine whether something will sink or float based on density. State Pascal and Bernoulli's Principles. List some applications of these two principles. Skills: Applying concepts, making models, evaluating design,redesigning, communicating	Big 40+2 Vocabulary Quizzes Listing the Steps of the Scientific Method Exit Tickets Chapter Exams Tri-weekly Homework Assignments Explorations Density Column Lab Sink and Spill Lab Aviation Activity	How did God use people like Pascal and Bernoulli to improve the lives of us today?

	technological tools and methods (e.g., multiple trials). •Analyze and interpret data to determine similarities and differences in findings. •Analyze data to define an optimal operational range for a proposed object, tool, process, or system that best meets criteria for success. SCI.SEP7.A.6-8(A) Students construct a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world. This includes the following. •Compare and critique two arguments on the same topic. Analyze whether they emphasize similar or different evidence and interpretations of facts. •Respectfully provide and receive critiques about one's explanations, procedures, models, and questions by citing relevant evidence and posing and responding to questions that elicit pertinent elaboration and detail. •Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. •Make an oral or written argument that supports or refutes the advertised performance of a device, process, or system. Based the argument on empirical evidence concerning whether or not the technology meets relevant criteria and constraints. •Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. SCI.SEP8.A.6-8(A) Students evaluate the merit and validity of ideas and methods. This includes the following: •Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s). •Clarify claims and findings by integrating text-based qualitative and quantitative scientific information with information contained in media and visual displays. •Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication. Describe how they are supported or not supported by evidence and evaluate methods used. •Evaluate data, hypotheses, and conclusions in scientific and technical texts in light of competing information or accounts. •Communicate scientific and technical information (e.g. about a proposed object, tool, process, or system) in writing and through oral presentations. SCI.PS2.B.8(A) Forces that act at a distance involve fields that can be mapped by their relative strength and effect on an object						

Work and Machines *(updated 6/10/20)*	SCI.SEP2.A.6-8(A) Students develop, use, and revise models to describe, test, and predict more abstract phenomena and design systems. This includes the following: •Evaluate limitations of a model for a proposed object or tool. •Develop or modify a model—based on evidence – to match what happens if a variable or component of a system is changed. •Use and develop a model of simple systems with uncertain and less predictable factors. •Develop and/or revise a model to show the relationships among variables, including those that are not observable but predict observable phenomena. •Develop and use a model to predict and describe phenomena. •Develop a model to describe unobservable mechanisms. •Develop and use a model to generate data to test ideas about phenomena in natural or designed systems, including those representing inputs and outputs, and those at unobservable scales. SCI.SEP5.A.6-8(A) Students identify patterns in large data sets and use mathematical concepts to support explanations and arguments. This includes the following: •Decide when to use qualitative vs. quantitative data. •Use digital tools (e.g., computers) to analyze very large data sets for patterns and trends. •Use mathematical representations to describe and support scientific conclusions and design solutions. •Create algorithms (a series of ordered steps) to solve a problem. •Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. •Use digital tools and mathematical concepts and arguments to test and compare proposed solutions to an engineering design problem. SCI.SEP6.B.6-8(A) Students design solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. This includes the following: •Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process, or system. •Undertake a design project, engaging in the design cycle, to construct and implement a solution that meets specific design criteria and constraints. •Optimize performance of a design by prioritizing criteria, making trade-offs, testing, revising, and retesting. SCI.PS3.C.8(A) When two objects interact, each one exerts a force on the other, and these forces can transfer energy between the interacting objects. SCI.ETS2.A.6(A) Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems		How do machines help us with work? 1. What is work? 2. How machines do work. 3. Simple machines.	Knowledge: Identify when work is done on an object. Calculate work. Define and calculate power. Explain how machines make work easier. Calculate mechanical advantage of a machine. Describe the different simple machines. Describe a compound machine. Skills: Designing, building, calculating, and communicating	Big 40+2 Vocabulary Quizzes Listing the Steps of the Scientific Method Exit Tickets Chapter Exams Tri-weekly Homework Assignments Explorations Seesaw Science Lab Simple Machine Investigation Angling for Access Lab	What are examples of simple and compound machines found in the Bible?

	SCI.ETS2.A.7(A) Science and technology drive each other forward					
Energy *(updated 6/10/20)*	SCI.CC3.6-8(A) Students observe time, space, and energy phenomena at various scales using models to study systems that are too large or too small. They understand phenomena observed at one scale may not be observable at another scale, and the function of natural and designed systems may change with scale. They use proportional relationships (e.g., speed as the ratio of distance traveled to time taken) to gather information about the magnitude of properties and processes. They represent scientific relationships through the use of algebraic expressions and equations. SCI.SEP1.A.6-8(A) Students ask questions to specify relationships between variables and clarify arguments and models. This includes the following: •Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify or seek additional information. •Ask questions to identify and clarify evidence and the premise(s) of an argument. •Ask questions to determine relationships between independent and dependent variables and relationships in models. •Ask questions to clarify or refine a model, an explanation, or an engineering problem. •Ask questions that require sufficient and appropriate empirical evidence to answer. •Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles. •Ask questions that challenge the premise(s) of an argument or the interpretation of a data set. SCI.SEP4.A.6-8(A) Students extend quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. This includes the following: •Construct, analyze, or interpret graphical displays of data and large data sets to identify linear and nonlinear relationships. •Use graphical displays (e.g., maps, charts, graphs, and tables) of large data sets to identify temporal and spatial relationships. •Distinguish between causal and correlational relationships in data. •Analyze and interpret data to provide evidence for explanations of phenomena. •Apply concepts of statistics and probability (including mean, median, mode, and variability) to analyze and characterize data, using digital tools when feasible. •Consider limitations of data analysis (e.g., measurement error), and seek to improve precision and accuracy of data with better technological tools and methods (e.g., multiple trials). •Analyze and interpret data to determine similarities and differences in findings. •Analyze data to define an optimal operational range for a proposed object, tool, process, or system that best meets criteria for success.		How is energy used? 1. What is energy? 2. Forms of energy. 3. Energy transformations and conservation. 4. Energy and fossil fuels.	Knowledge: Describe how energy, work, and power are related. Name and describe two basic kinds of energy. Describe how different forms of energy are related. Name common energy transformations. State the Law of Conservation of Energy. Identify the sources of the energy stored in fossil fuels. Describe how energy is transformed when fossil fuels are used. Skills: Making models, controlling variables	Big 40+2 Vocabulary Quizzes Listing the Steps of the Scientific Method Exit Tickets Chapter Exams Tri-weekly Homework Assignments Explorations Can You Feel the Power Lab Soaring Straws Lab	If our world is 6000-8000 years old, how can we claim some fossil fuels are 100's of thousands years old?

	SCI.SEP5.A.6-8(A) Students identify patterns in large data sets and use mathematical concepts to support explanations and arguments. This includes the following: •Decide when to use qualitative vs. quantitative data. •Use digital tools (e.g., computers) to analyze very large data sets for patterns and trends. •Use mathematical representations to describe and support scientific conclusions and design solutions. •Create algorithms (a series of ordered steps) to solve a problem. •Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. •Use digital tools and mathematical concepts and arguments to test and compare proposed solutions to an engineering design problem. SCI.SEP8.A.6-8(A) Students evaluate the merit and validity of ideas and methods. This includes the following: •Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s). •Clarify claims and findings by integrating text-based qualitative and quantitative scientific information with information contained in media and visual displays. •Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication. Describe how they are supported or not supported by evidence and evaluate methods used. •Evaluate data, hypotheses, and conclusions in scientific and technical texts in light of competing information or accounts. •Communicate scientific and technical information (e.g. about a proposed object, tool, process, or system) in writing and through oral presentations. SCI.PS3.A.8(A) Kinetic energy can be distinguished from the various forms of potential energy. SCI.PS3.B.8(A) Energy changes to and from each type can be tracked through physical or chemical interactions. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter. SCI.PS3.C.8(A) When two objects interact, each one exerts a force on the other, and these forces can transfer energy between the interacting objects. SCI.PS3.D.8(A) Sunlight is captured by plants and used in a chemical reaction to produce sugar molecules for storing this energy. This stored energy can be released by respiration or combustion, which can be reversed by burning those molecules to release energy. SCI.ETS2.A.7(A) Science and technology drive each other forward					

Thermal Energy and Heat *(updated 6/10/20)*	SCI.CC3.6-8(A) Students observe time, space, and energy phenomena at various scales using models to study systems that are too large or too small. They understand phenomena observed at one scale may not be observable at another scale, and the function of natural and designed systems may change with scale. They use proportional relationships (e.g., speed as the ratio of distance traveled to time taken) to gather information about the magnitude of properties and processes. They represent scientific relationships through the use of algebraic expressions and equations. SCI.SEP5.A.6-8(A) Students identify patterns in large data sets and use mathematical concepts to support explanations and arguments. This includes the following: •Decide when to use qualitative vs. quantitative data. •Use digital tools (e.g., computers) to analyze very large data sets for patterns and trends. •Use mathematical representations to describe and support scientific conclusions and design solutions. •Create algorithms (a series of ordered steps) to solve a problem. •Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. •Use digital tools and mathematical concepts and arguments to test and compare proposed solutions to an engineering design problem. SCI.SEP6.B.6-8(A) Students design solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. This includes the following: •Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process, or system. •Undertake a design project, engaging in the design cycle, to construct and implement a solution that meets specific design criteria and constraints. •Optimize performance of a design by prioritizing criteria, making trade-offs, testing, revising, and retesting. SCI.SEP7.A.6-8(A) Students construct a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world. This includes the following. •Compare and critique two arguments on the same topic. Analyze whether they emphasize similar or different evidence and interpretations of facts. •Respectfully provide and receive critiques about one's explanations, procedures, models, and questions by citing relevant evidence and posing and responding to questions that elicit pertinent elaboration and detail. •Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. •Make an oral or written argument that supports or refutes the advertised performance of a device, process, or system. Based the argument		How does thermal energy relate to heat? 1. Temperature, Thermal energy, and heat. 2. The transfer of heat. 3. Thermal energy and states of matter. 4. Uses of heat.	Knowledge: Name the three common temperature scales. How is thermal energy related to temperature and heat. Describe three forms of heat transfer. Identify the direction in which heat moves. Describe the difference between conductors and insulators. Name the three states of matter. Identify the causes of a change of state. Describe how engines use thermal energy. Describe how refrigerators keep things cold. Skills: Designing experiments and communicating.	Big 40+2 Vocabulary Quizzes Listing the Steps of the Scientific Method Exit Tickets Chapter Exams Tri-weekly Homework Assignments Explorations Build Your Own Thermometer Lab Just Add Water Lab	They had coins at various mentions in the Bible, how was heat used to develop and mold these coins that have now lasted thousands of years.

	on empirical evidence concerning whether or not the technology meets relevant criteria and constraints. •Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. SCI.SEP8.A.6-8(A) Students evaluate the merit and validity of ideas and methods. This includes the following: •Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s). •Clarify claims and findings by integrating text-based qualitative and quantitative scientific information with information contained in media and visual displays. •Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication. Describe how they are supported or not supported by evidence and evaluate methods used. •Evaluate data, hypotheses, and conclusions in scientific and technical texts in light of competing information or accounts. •Communicate scientific and technical information (e.g. about a proposed object, tool, process, or system) in writing and through oral presentations. SCI.PS3.A.8(A) Kinetic energy can be distinguished from the various forms of potential energy. SCI.PS3.B.8(A) Energy changes to and from each type can be tracked through physical or chemical interactions. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter. SCI.PS3.C.8(A) When two objects interact, each one exerts a force on the other, and these forces can transfer energy between the interacting objects. SCI.PS3.D.8(A) Sunlight is captured by plants and used in a chemical reaction to produce sugar molecules for storing this energy. This stored energy can be released by respiration or combustion, which can be reversed by burning those molecules to release energy.						