Quarter 1

CURRICULUM *End Product of Learning, "What You Teach"*		**INSTRUCTION** *Means to the End Product of Learning, "What You Teach"*		**TECHNOLOGY** *Means to Engage Students and Provide Practice*	**INTERVENTION and ASSESSMENT**
CONTENT **What we want students to "KNOW"**	**SKILL** **What we want students to "DO"**	**LEARNING RESOURCES**	**TEACHING STRATEGIES**	**SOFTWARE and ONLINE Sites**	**Varied Classroom Assessment Strategies**
CORE IDEAS **PS21.A Structure and Properties of Matter** Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals) **SCIENCE and ENGINEERING PRACTICES** **Developing and Using Models** Develop a model to predict and/or describe phenomena. **CROSSCUTTING CONCEPTS** **Scale, Proportion, and Quantity** Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.	**PERFORMANCE EXPECTATION** **MS-PS1-1** Develop models to describe the atomic composition of simple molecules and extended structures.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Experimenting with Mixtures, Compounds, and Elements Unit** **Lessons 6; 8-9** **SUBCONCEPT 3–** A compound has properties different from its constituent elements and can be separated only by chemical means. **Lesson 6** **SUBCONCEPT 5 –** Elements can be combined chemically to form compounds. **Lessons 8-9** *-Inquiry Investigations* *-Science Notebooking* *-Student Guide* *-Hands-on Equipment* *-Creating Models* **TWIG** www.twigcarolina.com **Molecules, Atoms**	***Smithsonian Science and Technology Concepts™*** **Integrated FERA Cycle Instruction of** Crosscutting concepts and science and engineering practices with science core ideas **FOCUS Strategies include:** -pre-teaching activities such as brainstorming, KWL charts, anticipation guides, etc. -guiding/focus questions **EXPLORE Strategies include:** -inquiry-based discussions and investigations -classroom activities, inquiries and models to help students develop a further understanding of the concepts/core ideas being discussed **REFLECT Strategies include:** -Science Notebooking -Key Ideas -Academic Vocabulary **APPLY Strategies include:** -Venn diagrams, cause and effect charts, review games, engineering application lessons, etc. **COMMON CORE** **Reading Informational Text RI.1-9:** RI.1-3 Key Ideas and Details RI.4-6 Craft and Structure RI.7-9 Integration of Knowledge and Ideas **Writing W.1-9** W.1-3 Text Types and Purpose W.4-6 Production and Distribution of Writing W.7-9 Research to Build and Present Knowledge **GUIDING QUESTIONS** *-How do particles combine to form matter?* *-How can we use physical properties to identify pure substances?* *-How do new substances differ from their reactants?*	**RESOURCES:** www.carolinascienceonline.com • Interactive Whiteboard Activities www.tigtagcarolina.com • Video Sets related to molecules, atoms, synthetic www.mysi.edu Smithsonian information website **DEVICES:** • iPads • Tablets • Chromebooks • ELMO • SMARTboard **SOFTWARE:** • Microsoft Powerpoint • Microsoft Word • SMARTboard activities	**INTERVENTIONS:** ***Smithsonian Science and Technology Concepts™*** • Science Notebooks • Extensions **ASSESSMENTS:** ***Smithsonian Science and Technology Concepts™*** Exploring Mixtures, Compounds, and Elements Unit **Lesson 1 Pre-Assessment** *Students complete a circuit of eight inquiries that introduce concepts about pure substances and mixtures studied in the unit.* **Lesson 13 Assessment** *Students complete an inquiry analysis and a written assessment to evaluate how well they have learned the concepts.* *-FORMATIVE* *-SUMMATIVE* **Science Notebooks** **Inquiry Data Sheets** **Investigation Follow-up Questions**
CORE IDEAS **PS1.A Structure and Properties of Matter** Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it **PS1.B Chemical Reactions** Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original sutances are regrouped into different molecules, and these new substances have different properties from those of the reactants. **SCIENCE and ENGINEERING PRACTICES** **Obtaining, Evaluating, and Communicating Information** Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. **CROSSCUTTING CONCEPTS** **Structure and Function** Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.	**PERFORMANCE EXPECTATION** **MS-PS1-3** Gather and made sense of information to describe that synthetic materials come from natural resources and impact society.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Experimenting with Mixtures, Compounds, and Elements Unit** **Lessons 6; 8-9** **SUBCONCEPT 5 –** Elements can be combined chemically to form compounds. **Lessons 8-9** *-Inquiry Investigations* *-Science Notebooking* *-Student Guide* *-Hands-on Equipment* *-Creating Models* **TWIG** www.twigcarolina.com **Synthetic**			

Quarter 1 cont...	CURRICULUM *End Product of Learning, "What You Teach"*		INSTRUCTION *Means to the End Product of Learning, "What You Teach"*		TECHNOLOGY *Means to Engage Students and Provide Practice*	INTERVENTION and ASSESSMENT
	CONTENT **What we want students to "KNOW"**	**SKILL** **What we want students to "DO"**	**LEARNING RESOURCES**	**TEACHING STRATEGIES**	**SOFTWARE and ONLINE Sites**	**Varied Classroom Assessment Strategies**
	CORE IDEAS **PS21.A Structure and Properties of Matter** Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. In a liquid, the molecules are constantly in contact with others; in a gas the are widely spaced except when they happen to collide. In a collide, atoms are closely spaced and may vibrate in position but do not change relative locations **SCIENCE and ENGINEERING PRACTICES** **Developing and Using Models** Develop a model to predict and/or describe phenomena. **CROSSCUTTING CONCEPTS** **Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems.	**PERFORMANCE EXPECTATION** **MS-PS1-4** Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Experimenting with Mixtures, Compounds, and Elements Unit** **Lessons 5-7** **SUBCONCEPT 2–** Substances can be classified as pure substances or mixtures based on their composition and behavior **Lesson 5** **SUBCONCEPT 3–** A compound has properties different from its constituent elements and can be separated only by chemical means. **Lesson 6** **SUBCONCEPT 4 –** Elements can be identified by their pure physical appearance, chemical structure, and behavior **Lesson 7** *-Inquiry Investigations* *-Science Notebooking* *-Student Guide* *-Hands-on Equipment* *-Creating Models* **TWIG** www.twigcarolina.com **Molecules, Intermolecular Forces**	***Smithsonian Science and Technology Concepts™*** **Integrated FERA Cycle Instruction of** Crosscutting concepts and science and engineering practices with science core ideas **FOCUS Strategies include:** -pre-teaching activities such as brainstorming, KWL charts, anticipation guides, etc. -guiding/focus questions **EXPLORE Strategies include:** -inquiry-based discussions and investigations -classroom activities, inquiries and models to help students develop a further understanding of the concepts/core ideas being discussed **REFLECT Strategies include:** -Science Notebooking -Key Ideas -Academic Vocabulary **APPLY Strategies include:** -Venn diagrams, cause and effect charts, review games, engineering application lessons, etc.	**RESOURCES:** www.carolinascienceonline.com • Interactive Whiteboard Activities www.tigtagcarolina.com • Video Sets related to molecules, atoms, synthetic www.mysi.edu Smithsonian information website **DEVICES:** • iPads • Tablets • Chromebooks • ELMO • SMARTboard **SOFTWARE:** • Microsoft Powerpoint • Microsoft Word • SMARTboard activities	**INTERVENTIONS:** ***Smithsonian Science and Technology Concepts™*** • Science Notebooks • Extensions **ASSESSMENTS:** ***Smithsonian Science and Technology Concepts™*** Exploring Mixtures, Compounds, and Elements Unit **Lesson 1 Pre-Assessment** *Students complete a circuit of eight inquiries that introduce concepts about pure substances and mixtures studied in the unit.* **Lesson 13 Assessment** *Students complete an inquiry analysis and a written assessment to evaluate how well they have learned the concepts.* *-FORMATIVE* *-SUMMATIVE* **Science Notebooks** **Inquiry Data Sheets** **Investigation Follow-up Questions**
	CORE IDEAS **PS1.A Structure and Properties of Matter** Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it **PS1.B Chemical Reactions** Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. **SCIENCE and ENGINEERING PRACTICES** **Analyzing and Interpreting Data** Analyze and interpret data to determine similarities and differences in findings. **CROSSCUTTING CONCEPTS** **Patterns** Macroscopic patterns are related to the nature of microscopic and atomic –level structure.	**PERFORMANCE EXPECTATION** **MS-PS1-2** Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction occurred.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Experimenting with Mixtures, Compounds, and Elements Unit** **Lessons 1- 8-11** **SUBCONCEPT 1 –** Students have ideas, preconceptions, and misconceptions about pure substances and mixtures. **Lesson 1** **SUBCONCEPT 5 –** Elements can be combined chemically to form compounds. **Lessons 8-11** *-Inquiry Investigations* *-Science Notebooking* *-Student Guide* *-Hands-on Equipment* *-Creating Models* **TWIG** www.twigcarolina.com **Synthetic**	**COMMON CORE** **Reading Informational Text RI.1-9:** RI.1-3 Key Ideas and Details RI.4-6 Craft and Structure RI.7-9 Integration of Knowledge and Ideas **Writing W.1-9** W.1-3 Text Types and Purpose W.4-6 Production and Distribution of Writing W.7-9 Research to Build and Present Knowledge **GUIDING QUESTIONS** *-How can we compare and contrast the molecular motion of gases and liquids?* *-How can I use models to describe properties of matter?*		

	CURRICULUM *End Product of Learning, "What You Teach"*		INSTRUCTION *Means to the End Product of Learning, "What You Teach"*		TECHNOLOGY *Means to Engage Students and Provide Practice*	INTERVENTION and ASSESSMENT
	CONTENT **What we want students to "KNOW"**	**SKILL** **What we want students to "DO"**	**LEARNING RESOURCES**	**TEACHING STRATEGIES**	**SOFTWARE and ONLINE Sites**	**Varied Classroom Assessment Strategies**
Quarter 1 cont…	**CORE IDEAS** **PS1.B Chemical Reactions** Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants The total number of each type of atom is conserved, and thus the mass does not change. **SCIENCE and ENGINEERING PRACTICES** **Developing and Using Models** Develop a model to describe unobservable mechanisms. **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** Laws are regularities or mathematical descriptions of natural phenomena. **CROSSCUTTING CONCEPTS** **Energy and matter** Matter is conserved because atoms are conserved in physical and chemical processes.	**PERFORMANCE EXPECTATION** **MS-PS1-5** Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Experimenting with Mixtures, Compounds, and Elements Unit** **Lessons 12-13** **SUBCONCEPT 6–** Mass remains constant during chemical reactions. **Lessons 12-13** *-Inquiry Investigations* *-Science Notebooking* *-Student Guide* *-Hands-on Equipment* *-Creating Models* **TWIG** www.twigcarolina.com **Chemical Reactions**	***Smithsonian Science and Technology Concepts™*** **Integrated FERA Cycle Instruction of** Crosscutting concepts and science and engineering practices with science core ideas **FOCUS Strategies include:** -pre-teaching activities such as brainstorming, KWL charts, anticipation guides, etc. -guiding/focus questions **EXPLORE Strategies include:** -inquiry-based discussions and investigations -classroom activities, inquiries and models to help students develop a further understanding of the concepts/core ideas being discussed **REFLECT Strategies include:** -Science Notebooking -Key Ideas -Academic Vocabulary **APPLY Strategies include:** -Venn diagrams, cause and effect charts, review games, engineering application lessons, etc. **COMMON CORE** **Reading Informational Text RI.1-9:** RI.1-3 Key Ideas and Details RI.4-6 Craft and Structure RI.7-9 Integration of Knowledge and Ideas **Writing W.1-9** W.1-3 Text Types and Purpose W.4-6 Production and Distribution of Writing W.7-9 Research to Build and Present Knowledge **GUIDING QUESTIONS** *-How do particles combine to form matter?* *-How can we use models to explain how temperature and pressure affect the phase of matter?*	**RESOURCES:** www.carolinascienceonline.com • Interactive Whiteboard Activities www.tigtagcarolina.com • Video Sets related to molecules, atoms, synthetic www.mysi.edu Smithsonian information website **DEVICES:** • iPads • Tablets • Chromebooks • ELMO • SMARTboard **SOFTWARE:** • Microsoft Powerpoint • Microsoft Word • SMARTboard activities	**INTERVENTIONS:** ***Smithsonian Science and Technology Concepts™*** • Science Notebooks • Extensions **ASSESSMENTS:** ***Smithsonian Science and Technology Concepts™*** Exploring Mixtures, Compounds, and Elements Unit **Lesson 1 Pre-Assessment** *Students complete a circuit of eight inquiries that introduce concepts about pure substances and mixtures studied in the unit.* **Lesson 13 Assessment** *Students complete an inquiry analysis and a written assessment to evaluate how well they have learned the concepts.* *-FORMATIVE* *-SUMMATIVE* **Science Notebooks** **Inquiry Data Sheets** **Investigation Follow-up Questions**
	CORE IDEAS **PS1.B Chemical Reactions** Some chemical reactions release energy, others store energy. **ETS1.B Developing Possible Solutions** A solution needs to be tested, and then modified on the basis of the test results, in order to improve it **ETS1.C Optimizing the Design Solution** Some chemical reactions release energy, others store energy. **SCIENCE and ENGINEERING PRACTICES** **Constructing Explanations and Designing Solutions** Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints. **CROSSCUTTING CONCEPTS** **Energy and Matter** The transfer of energy can be tracked as energy flows through a designed or natural system.	**PERFORMANCE EXPECTATION** **MS-PS1-6** Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Experimenting with Mixtures, Compounds, and Elements Unit** **Lesson 6** **SUBCONCEPT 3–** A compound has properties different from its constituent elements and can be separated only by chemical means. **Lesson 6** *-Inquiry Investigations* *-Science Notebooking* *-Student Guide* *-Hands-on Equipment* *-Creating Models* **TWIG** www.twigcarolina.com **Thermal Energy; Chemical Reactions**			

	CURRICULUM *End Product of Learning, "What You Teach"*		INSTRUCTION *Means to the End Product of Learning, "What You Teach"*		TECHNOLOGY *Means to Engage Students and Provide Practice*	INTERVENTION and ASSESSMENT
	CONTENT **What we want students to "KNOW"**	**SKILL** **What we want students to "DO"**	**LEARNING RESOURCES**	**TEACHING STRATEGIES**	**SOFTWARE and ONLINE Sites**	**Varied Classroom Assessment Strategies**
Quarter 2	**CORE IDEAS** **PS2.A Forces and Motion** 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). **SCIENCE and ENGINEERING PRACTICES** **Constructing Explanations and Designing Solutions** Apply scientific ideas or principles to design an object, tool, process, or system. **CROSSCUTTING CONCEPTS** **Systems and System Models** Models can be used to represent systems and their interactions – such as inputs, processes and outputs – and energy and matter flows within systems. **Influence of Science, Engineering and Technology on Society and the Natural World** The uses of technologies and any limitation on their use are driven by individual or societal needs, desires, and values by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.	**PERFORMANCE EXPECTATION** **MS-PS2-1** Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Experimenting with Forces and Motion Unit** **Lessons 8-13** **SUBCONCEPT 4–** Unbalanced forces can change the motion of objects. **Lessons 8-9** **SUBCONCEPT 5–** Energy can be stored in systems. Unbalanced forces can transform kinetic energy and potential energy from one form to another.. **Lessons 10-13** *-Inquiry Investigations* *-Science Notebooking* *-Student Guide* *-Hands-on Equipment* *-Creating Models* **TWIG** www.twigcarolina.com **Newton**	***Smithsonian Science and Technology Concepts™*** **Integrated FERA Cycle Instruction of** Crosscutting concepts and science and engineering practices with science core ideas **FOCUS Strategies include:** -pre-teaching activities such as brainstorming, KWL charts, anticipation guides, etc. -guiding/focus questions **EXPLORE Strategies include:** -inquiry-based discussions and investigations -classroom activities, inquiries and models to help students develop a further understanding of the concepts/core ideas being discussed **REFLECT Strategies include:** -Science Notebooking -Key Ideas -Academic Vocabulary **APPLY Strategies include:** -Venn diagrams, cause and effect charts, review games, engineering application lessons, etc. **COMMON CORE** **Reading Informational Text RI.1-9:** RI.1-3 Key Ideas and Details RI.4-6 Craft and Structure RI.7-9 Integration of Knowledge and Ideas **Writing W.1-9** W.1-3 Text Types and Purpose W.4-6 Production and Distribution of Writing W.7-9 Research to Build and Present Knowledge **GUIDING QUESTIONS** *How can we use everyday phenomenon to explain the concept of equal and opposite reactions?*	**RESOURCES:** www.carolinascienceonline.com • Interactive Whiteboard Activities www.tigtagcarolina.com • Video Sets related to Newton, Motion www.mysi.edu Smithsonian information website **DEVICES:** • iPads • Tablets • Chromebooks • ELMO • SMARTboard **SOFTWARE:** • Microsoft Powerpoint • Microsoft Word • SMARTboard activities	**INTERVENTIONS:** ***Smithsonian Science and Technology Concepts™*** • Science Notebooks • Extensions **ASSESSMENTS:** ***Smithsonian Science and Technology Concepts™*** Experimenting with Forces and Motion Unit **Lesson 1 Pre-Assessment** *Students complete a circuit of six inquiries that introduce the concepts they will study during the unit.* **Lesson 13 Assessment** *Students demonstrate their understanding of the concepts developed in the unit.* *-FORMATIVE* *-SUMMATIVE* **Science Notebooks** **Inquiry Data Sheets** **Investigation Follow-up Questions**
	CORE IDEAS **PS2.B Types of Interactions** Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects. **SCIENCE and ENGINEERING PRACTICES** **Asking Questions and Defining Problems** 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. **CROSSCUTTING CONCEPTS** **Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems.	**PERFORMANCE EXPECTATION** **MS-PS2-3** Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Experimenting with Forces and Motion Unit** **Lessons 5-6; 11-12** **SUBCONCEPT 2–** Forces are pushes or pulls that act in specific ways on objects. **Lessons 5-6** **SUBCONCEPT 5–** Energy can be stored in systems. Unbalanced forces can transform kinetic energy and potential energy from one form to another.. **Lessons 11-12** *-Inquiry Investigations* *-Science Notebooking* *-Student Guide* *-Hands-on Equipment* *-Creating Models* **TWIG** www.twigcarolina.com **Forces, Magnet; Electric**			

Quarter 2 cont...

CURRICULUM *End Product of Learning, "What You Teach"*		**INSTRUCTION** *Means to the End Product of Learning, "What You Teach"*		**TECHNOLOGY** *Means to Engage Students and Provide Practice*	**INTERVENTION and ASSESSMENT**
CONTENT **What we want students to "KNOW"**	**SKILL** **What we want students to "DO"**	**LEARNING RESOURCES**	**TEACHING STRATEGIES**	**SOFTWARE and ONLINE Sites**	**Varied Classroom Assessment Strategies**
CORE IDEAS **PS2.A Forces and Motion** The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change. The greater the mass of the objects, the greater the force needed to achieve the same change in motion. For any given object, a larger force causes a larger change in motion. All positions of objects and the directions of forces and motions must be described in an arbitrarily chosen reference frame and arbitrarily chosen units of size. In order to share information with other people, these choices must also be shared. **SCIENCE and ENGINEERING PRACTICES** **Planning and Carrying Out Investigations** 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 the claim. **Scientific Knowledge is Based on Empirical Evidence** Science knowledge is based upon logical and conceptual connections between evidence and explanations. **CROSSCUTTING CONCEPTS** **Stability and Change** Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales.	**PERFORMANCE EXPECTATION** **MS-PS2-2** Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Experimenting with Forces and Motion Unit** **Lessons 1-4; 7; 9-10; 12** **SUBCONCEPT 1–** Students have ideas, preconceptions, and misconceptions about forces, motion and energy. **Lesson 1** **SUBCONCEPT 2–** Forces are pushes or pulls that act in specific ways on objects. **Lessons 2-4** **SUBCONCEPT 3–**The motion of an object can be measured by determining the speed and direction in which an object moves. Moving objects have kinetic energy. **Lesson 7** **SUBCONCEPT 4–** Unbalanced forces can change the motion of objects. **Lesson 9** **SUBCONCEPT 5–** Energy can be stored in systems. Unbalanced forces can transform kinetic energy and potential energy from one form to another.. **Lessons 10-12** *-Inquiry Investigations* *-Science Notebooking* *-Student Guide* *-Hands-on Equipment* *-Creating Models* **TWIG** www.twigcarolina.com **Motion**	***Smithsonian Science and Technology Concepts™*** **Integrated FERA Cycle Instruction of** Crosscutting concepts and science and engineering practices with science core ideas **FOCUS Strategies include:** -pre-teaching activities such as brainstorming, KWL charts, anticipation guides, etc. -guiding/focus questions **EXPLORE Strategies include:** -inquiry-based discussions and investigations -classroom activities, inquiries and models to help students develop a further understanding of the concepts/core ideas being discussed **REFLECT Strategies include:** -Science Notebooking -Key Ideas -Academic Vocabulary **APPLY Strategies include:** -Venn diagrams, cause and effect charts, review games, engineering application lessons, etc. **COMMON CORE** **Reading Informational Text RI.1-9:** RI.1-3 Key Ideas and Details RI.4-6 Craft and Structure RI.7-9 Integration of Knowledge and Ideas **Writing W.1-9** W.1-3 Text Types and Purpose W.4-6 Production and Distribution of Writing W.7-9 Research to Build and Present Knowledge **GUIDING QUESTIONS** *How can one predict an objects continued motion, changes in motion or stability?*	**RESOURCES:** www.carolinascienceonline.com • Interactive Whiteboard Activities www.tigtagcarolina.com • Video Sets related to Newton, Motion www.mysi.edu Smithsonian information website **DEVICES:** • iPads • Tablets • Chromebooks • ELMO • SMARTboard **SOFTWARE:** • Microsoft Powerpoint • Microsoft Word • SMARTboard activities	**INTERVENTIONS:** ***Smithsonian Science and Technology Concepts™*** • Science Notebooks • Extensions **ASSESSMENTS:** ***Smithsonian Science and Technology Concepts™*** Experimenting with Forces and Motion Unit **Lesson 1 Pre-Assessment** *Students complete a circuit of six inquiries that introduce the concepts they will study during the unit.* **Lesson 13 Assessment** *Students demonstrate their understanding of the concepts developed in the unit.* *-FORMATIVE* *-SUMMATIVE* **Science Notebooks** **Inquiry Data Sheets** **Investigation Follow-up Questions**
CORE IDEAS **PS2.B Types of Interactions** Gravitational forces are always attractive. There is a gravitation force between two masses, but it is very small except when one or both of the objects have large mass – e.g. Earth and the Sun **SCIENCE and ENGINEERING PRACTICES** **Engaging in Argument from Evidence** Construct and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomena or a solution to a problem. **CROSSCUTTING CONCEPTS** **Systems and System Models** Models can be used to represent systems and their interactions – such as inputs, processes and outputs – and energy and matter flows within systems.	**PERFORMANCE EXPECTATION** **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 object.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Experimenting with Forces and Motion Unit** **Lessons 11-12** **SUBCONCEPT 5–** Energy can be stored in systems. Unbalanced forces can transform kinetic energy and potential energy from one form to another.. **Lessons 11-12** **TWIG** www.twigcarolina.com **Newton**			

	CURRICULUM *End Product of Learning, "What You Teach"*		INSTRUCTION *Means to the End Product of Learning, "What You Teach"*		TECHNOLOGY *Means to Engage Students and Provide Practice*	INTERVENTION and ASSESSMENT
	CONTENT **What we want students to "KNOW"**	**SKILL** **What we want students to "DO"**	**LEARNING RESOURCES**	**TEACHING STRATEGIES**	**SOFTWARE and ONLINE Sites**	**Varied Classroom Assessment Strategies**
Quarter 2 cont...	**CORE IDEAS** **PS2.B Types of Interactions** Forces that act at a distance (electric and magnetic) can be explained by fields that extend through space and can be mapped by their effect on a test object (a ball, a charged object, or a magnet, respectively). **SCIENCE and ENGINEERING PRACTICES** **Planning and Carrying Out Investigations** Conduct an investigation an evaluate the experimental design to produce data to serve as the basis for evidence that can meet the goals of the investigation. **CROSSCUTTING CONCEPTS** **Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems.	**PERFORMANCE EXPECTATION** **MS-PS2-5** Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Experimenting with Forces and Motion Unit** **Lessons 5-6; 11-12** **SUBCONCEPT 2–** Forces are pushes or pulls that act in specific ways on objects. **Lessons 5-6** **SUBCONCEPT 5–** Energy can be stored in systems. Unbalanced forces can transform kinetic energy and potential energy from one form to another.. **Lessons 11-12** *-Inquiry Investigations* *-Science Notebooking* *-Student Guide* *-Hands-on Equipment* *-Creating Models* **TWIG** www.twigcarolina.com **Magnetic Fields**	***Smithsonian Science and Technology Concepts™*** **Integrated FERA Cycle Instruction of** Crosscutting concepts and science and engineering practices with science core ideas **FOCUS Strategies include:** -pre-teaching activities such as brainstorming, KWL charts, anticipation guides, etc. -guiding/focus questions **EXPLORE Strategies include:** -inquiry-based discussions and investigations -classroom activities, inquiries and models to help students develop a further understanding of the concepts/core ideas being discussed **REFLECT Strategies include:** -Science Notebooking -Key Ideas -Academic Vocabulary **APPLY Strategies include:** -Venn diagrams, cause and effect charts, review games, engineering application lessons, etc. **COMMON CORE** **Reading Informational Text RI.1-9:** RI.1-3 Key Ideas and Details RI.4-6 Craft and Structure RI.7-9 Integration of Knowledge and Ideas **Writing W.1-9** W.1-3 Text Types and Purpose W.4-6 Production and Distribution of Writing W.7-9 Research to Build and Present Knowledge **GUIDING QUESTIONS** *What distinguished electric and magnetic forces from gravity?* *What is the relationship between gravitational force and the mass of the objects?*	**RESOURCES:** www.carolinascienceonline.com • Interactive Whiteboard Activities www.tigtagcarolina.com • Video Sets related to Newton, Motion www.mysi.edu Smithsonian information website **DEVICES:** • iPads • Tablets • Chromebooks • ELMO • SMARTboard **SOFTWARE:** • Microsoft Powerpoint • Microsoft Word • SMARTboard activities	**INTERVENTIONS:** ***Smithsonian Science and Technology Concepts™*** • Science Notebooks • Extensions **ASSESSMENTS:** ***Smithsonian Science and Technology Concepts™*** Experimenting with Forces and Motion Unit **Lesson 1 Pre-Assessment** *Students complete a circuit of six inquiries that introduce the concepts they will study during the unit.* **Lesson 13 Assessment** *Students demonstrate their understanding of the concepts developed in the unit.* *-FORMATIVE* *-SUMMATIVE* **Science Notebooks** **Inquiry Data Sheets** **Investigation Follow-up Questions**
	CORE IDEAS **PS3.A Definitions of Energy** Motion energy is properly called kinetic energy; it is proportional to the mass of the moving object and grows with the square of its speed. **SCIENCE and ENGINEERING PRACTICES** **Analyzing and Interpreting Data** Construct and interpret graphical displays of data to identify linear and nonlinear relationships. **CROSSCUTTING CONCEPTS** **Scale, Proportion, and Quantity** Proportional relationships (e.g., speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and processes.	**PERFORMANCE EXPECTATION** **MS-PS3-1** Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Experimenting with Forces and Motion Unit** **Lesson 7** **SUBCONCEPT 3–**The motion of an object can be measured by determining the speed and direction in which an object moves. Moving objects have kinetic energy. **Lesson 7** **TWIG** www.twigcarolina.com **Kinetic Energy**			

Quarter 2 cont...

CURRICULUM *End Product of Learning, "What You Teach"*		INSTRUCTION *Means to the End Product of Learning, "What You Teach"*		TECHNOLOGY *Means to Engage Students and Provide Practice*	INTERVENTION and ASSESSMENT
CONTENT **What we want students to "KNOW"**	**SKILL** **What we want students to "DO"**	**LEARNING RESOURCES**	**TEACHING STRATEGIES**	**SOFTWARE and ONLINE Sites**	**Varied Classroom Assessment Strategies**
CORE IDEAS **PS3.A Definitions of Energy** Motion energy is properly called kinetic energy; it is proportional to the mass of the moving object and grows with the square of its speed. A system of objects may be also contain store (potential) energy, depending on their relative positions. **PS3.C Relationships Between Energy and Forces** When two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from the object. **SCIENCE and ENGINEERING PRACTICES** **Developing and Using Models** Develop a model to describe unobservable mechanisms. **CROSSCUTTING CONCEPTS** **Systems and System Models** Models can be used to represent systems and their interactions – such as inputs, processes, and outputs – and energy and matter flows within systems.	**PERFORMANCE EXPECTATION** **MS-PS3-2** Develop a model to describe that when the arrangement of objects interacting at a distance change, different amount of potential energy are stored in the system.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Experimenting with Forces and Motion Unit** **Lesson 9** **SUBCONCEPT 4–** Unbalanced forces can change the motion of objects. **Lesson 9** *-Inquiry Investigations* *-Science Notebooking* *-Student Guide* *-Hands-on Equipment* *-Creating Models* **TWIG** www.twigcarolina.com **Potential Energy**	***Smithsonian Science and Technology Concepts™*** **Integrated FERA Cycle Instruction of** Crosscutting concepts and science and engineering practices with science core ideas **FOCUS Strategies include:** -pre-teaching activities such as brainstorming, KWL charts, anticipation guides, etc. -guiding/focus questions **EXPLORE Strategies include:** -inquiry-based discussions and investigations -classroom activities, inquiries and models to help students develop a further understanding of the concepts/core ideas being discussed **REFLECT Strategies include:** -Science Notebooking -Key Ideas -Academic Vocabulary **APPLY Strategies include:** -Venn diagrams, cause and effect charts, review games, engineering application lessons, etc. **COMMON CORE** **Reading Informational Text RI.1-9:** RI.1-3 Key Ideas and Details RI.4-6 Craft and Structure RI.7-9 Integration of Knowledge and Ideas **Writing W.1-9** W.1-3 Text Types and Purpose W.4-6 Production and Distribution of Writing W.7-9 Research to Build and Present Knowledge **GUIDING QUESTIONS** *How can one predict an objects continued motion, changes in motion or stability?*	**RESOURCES:** www.carolinascienceonline.com • Interactive Whiteboard Activities www.tigtagcarolina.com • Video Sets related to Newton, Motion www.mysi.edu Smithsonian information website **DEVICES:** • iPads • Tablets • Chromebooks • ELMO • SMARTboard **SOFTWARE:** • Microsoft Powerpoint • Microsoft Word • SMARTboard activities	**INTERVENTIONS:** ***Smithsonian Science and Technology Concepts™*** • Science Notebooks • Extensions **ASSESSMENTS:** ***Smithsonian Science and Technology Concepts™*** Experimenting with Forces and Motion Unit **Lesson 1 Pre-Assessment** *Students complete a circuit of six inquiries that introduce the concepts they will study during the unit.* **Lesson 13 Assessment** *Students demonstrate their understanding of the concepts developed in the unit.* *-FORMATIVE* *-SUMMATIVE* **Science Notebooks** **Inquiry Data Sheets** **Investigation Follow-up Questions**
CORE IDEAS **PS3.A Definitions of Energy** When the motion energy of an object changes, there is inevitably some other changes in energy at the same time. **SCIENCE and ENGINEERING PRACTICES** **Engaging in Argument from Evidence** 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 **CROSSCUTTING CONCEPTS** **Energy and Matter** Energy may take different forms (e.g. energy in fields, thermal energy, energy of motion).	**PERFORMANCE EXPECTATION** **MS-PS3-5** Construct, use, and present arguments to support the claim that when the motion energy of an object changes, energy is transferred to or from the object.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Experimenting with Forces and Motion Unit** **Lesson 1** **SUBCONCEPT 1–** Students have ideas, preconceptions, and misconceptions about forces, motion and energy. **Lesson 1** **TWIG** www.twigcarolina.com **Kinetic Energy; Thermal Energy**			

Quarter 2 cont...

CURRICULUM *End Product of Learning, "What You Teach"*		INSTRUCTION *Means to the End Product of Learning, "What You Teach"*		TECHNOLOGY *Means to Engage Students and Provide Practice*	INTERVENTION and ASSESSMENT
CONTENT **What we want students to "KNOW"**	**SKILL** **What we want students to "DO"**	**LEARNING RESOURCES**	**TEACHING STRATEGIES**	**SOFTWARE and ONLINE Sites**	**Varied Classroom Assessment Strategies**
CORE IDEAS **PS3.A Definitions of Energy** Temperature is a measure of the average kinetic energy of particles of matter. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present. **SCIENCE and ENGINEERING PRACTICES** **Planning and Carrying Out Investigations** 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 recoded, and how many data are need to support a claim. **CROSSCUTTING CONCEPTS** **Scale, Proportion, and Quantity** Proportional relationships (e.g., speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude and processes.	**PERFORMANCE EXPECTATION** **MS-PS3-4** Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Experimenting with Forces and Motion Unit** **Lesson 10** **SUBCONCEPT 5–** Energy can be stored in systems. Unbalanced forces can transform kinetic energy and potential energy from one form to another.. **Lesson 10** *-Inquiry Investigations* *-Science Notebooking* *-Student Guide* *-Hands-on Equipment* *-Creating Models* **TWIG** www.twigcarolina.com **Kinetic Energy; Thermal Energy**	***Smithsonian Science and Technology Concepts™*** **Integrated FERA Cycle Instruction of** Crosscutting concepts and science and engineering practices with science core ideas **FOCUS Strategies include:** -pre-teaching activities such as brainstorming, KWL charts, anticipation guides, etc. -guiding/focus questions **EXPLORE Strategies include:** -inquiry-based discussions and investigations -classroom activities, inquiries and models to help students develop a further understanding of the concepts/core ideas being discussed **REFLECT Strategies include:** -Science Notebooking -Key Ideas -Academic Vocabulary **APPLY Strategies include:** -Venn diagrams, cause and effect charts, review games, engineering application lessons, etc. **COMMON CORE** **Reading Informational Text RI.1-9:** RI.1-3 Key Ideas and Details RI.4-6 Craft and Structure RI.7-9 Integration of Knowledge and Ideas **Writing W.1-9** W.1-3 Text Types and Purpose W.4-6 Production and Distribution of Writing W.7-9 Research to Build and Present Knowledge **GUIDING QUESTIONS** *What factors determine the energy required to change the temperature of a matter sample by a given amount?*	**RESOURCES:** www.carolinascienceonline.com • Interactive Whiteboard Activities www.tigtagcarolina.com • Video Sets related to Newton, Motion www.mysi.edu Smithsonian information website **DEVICES:** • iPads • Tablets • Chromebooks • ELMO • SMARTboard **SOFTWARE:** • Microsoft Powerpoint • Microsoft Word • SMARTboard activities	**INTERVENTIONS:** ***Smithsonian Science and Technology Concepts™*** • Science Notebooks • Extensions **ASSESSMENTS:** ***Smithsonian Science and Technology Concepts™*** Experimenting with Forces and Motion Unit **Lesson 1 Pre-Assessment** *Students complete a circuit of six inquiries that introduce the concepts they will study during the unit.* **Lesson 13 Assessment** *Students demonstrate their understanding of the concepts developed in the unit.* *-FORMATIVE* *-SUMMATIVE* **Science Notebooks** **Inquiry Data Sheets** **Investigation Follow-up Questions**
CORE IDEAS **PS3.A Definitions of Energy** Temperature is a measure of the average kinetic energy of particles of matter. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present. **PS3.B Conservation of Energy and Energy Transfer** Energy is spontaneously transferred out of hotter regions or objects and into colder ones. **ETS1.A Defining and Delimiting an Engineering Design** **ETS1.B Developing Possible Solutions** **SCIENCE and ENGINEERING PRACTICES** **Constructing Explanations and Designing Solutions** Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process, or system. **CROSSCUTTING CONCEPTS** **Energy and Matter** The transfer of energy can be tracked as energy flows through a designed or natural system.	**PERFORMANCE EXPECTATION** **MS-PS3-3** Apply scientific principles to design, construct and test a device that either minimizes or maximizes thermal energy transfer.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Experimenting with Forces and Motion Unit** **Lesson 1** **SUBCONCEPT 5–** Energy can be stored in systems. Unbalanced forces can transform kinetic energy and potential energy from one form to another.. **Lesson 13** **TWIG** www.twigcarolina.com **Thermal Energy**			

	CURRICULUM *End Product of Learning, "What You Teach"*		INSTRUCTION *Means to the End Product of Learning, "What You Teach"*		TECHNOLOGY *Means to Engage Students and Provide Practice*	INTERVENTION and ASSESSMENT
	CONTENT **What we want students to "KNOW"**	**SKILL** **What we want students to "DO"**	**LEARNING RESOURCES**	**TEACHING STRATEGIES**	**SOFTWARE and ONLINE Sites**	**Varied Classroom Assessment Strategies**
Quarter 3	**CORE IDEAS** **ESS2.C The Roles of Water in Earth's Surface Processes** 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. **ESS2.D Weather and Climate** Because the patterns are so complex, weather can only be predicted probabilistically. **SCIENCE and ENGINEERING PRACTICES** **Planning and Carrying Out Investigations** 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. **CROSSCUTTING CONCEPTS** **Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems.	**PERFORMANCE EXPECTATION** **MS-ESS2-5** Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Understanding Weather and Climate Unit** **Lessons 1-9** **SUBCONCEPT 1–** Students have ideas, preconceptions, and misconceptions about weather and climate. **Lesson 1** **SUBCONCEPT 2–** A vortex is the movement of a fluid around a central axis. A vortex formed in the atmosphere results in winds, breezes, storms, tornadoes, and hurricanes. **Lessons 2-7** **SUBCONCEPT 3–** The dominant feature of Earth , its ocean, plays a major role in the planet's weather and climate, and in the lives of its living organisms. **Lesson 8** **SUBCONCEPT 4–** Vortices in the ocean set up convection currents. **Lesson 9** *-Inquiry Investigations* *-Science Notebooking* *-Student Guide* *-Hands-on Equipment* *-Creating Models* **TWIG** www.twigcarolina.com **Weather; Weather Patterns**	***Smithsonian Science and Technology Concepts™*** **Integrated FERA Cycle Instruction of** Crosscutting concepts and science and engineering practices with science core ideas **FOCUS Strategies include:** -pre-teaching activities such as brainstorming, KWL charts, anticipation guides, etc. -guiding/focus questions **EXPLORE Strategies include:** -inquiry-based discussions and investigations -classroom activities, inquiries and models to help students develop a further understanding of the concepts/core ideas being discussed **REFLECT Strategies include:** -Science Notebooking -Key Ideas -Academic Vocabulary **APPLY Strategies include:** -Venn diagrams, cause and effect charts, review games, engineering application lessons, etc. **COMMON CORE** **Reading Informational Text RI.1-9:** RI.1-3 Key Ideas and Details RI.4-6 Craft and Structure RI.7-9 Integration of Knowledge and Ideas **Writing W.1-9** W.1-3 Text Types and Purpose W.4-6 Production and Distribution of Writing W.7-9 Research to Build and Present Knowledge **GUIDING QUESTIONS** *What regulates weather and climate?*	**RESOURCES:** www.carolinascienceonline.com • Interactive Whiteboard Activities www.tigtagcarolina.com • Video Sets related to Weather Patterns; Oceans www.mysi.edu Smithsonian information website **DEVICES:** • iPads • Tablets • Chromebooks • ELMO • SMARTboard **SOFTWARE:** • Microsoft Powerpoint • Microsoft Word • SMARTboard activities	**INTERVENTIONS:** ***Smithsonian Science and Technology Concepts™*** • Science Notebooks • Extensions **ASSESSMENTS:** ***Smithsonian Science and Technology Concepts™*** Understanding Weather and Climate Unit **Lesson 1 Pre-Assessment** *Students create a concept map on weather events and locate atmospheric and oceanic processes on a world map.* **Lesson 13 Assessment** *Students complete an inquiry analysis and a written assessment to evaluate how well they have learned the concepts.* *-FORMATIVE* *-SUMMATIVE* **Science Notebooks** **Inquiry Data Sheets** **Investigation Follow-up Questions**
	CORE IDEAS **ESS3.B Natural Hazards** Mapping the history of natural hazards in a region, combined with an understanding of related geological forces can help forecast the locations and likelihoods of future events. **SCIENCE and ENGINEERING PRACTICES** **Analyzing and Interpreting Data** Analyze and interpret data to determine similarities and differences in findings. **CROSSCUTTING CONCEPTS** **Patterns** Graphs, charts, and images can be used to identify patterns in data..	**PERFORMANCE EXPECTATION** **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.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Understanding Weather and Climate Unit** **Lessons 2-7** **SUBCONCEPT 2–** A vortex is the movement of a fluid around a central axis. A vortex formed in the atmosphere results in winds, breezes, storms, tornadoes, and hurricanes. **Lessons 2-7** **TWIG** www.twigcarolina.com **Oceans**			

	CURRICULUM *End Product of Learning, "What You Teach"*		INSTRUCTION *Means to the End Product of Learning, "What You Teach"*		TECHNOLOGY *Means to Engage Students and Provide Practice*	INTERVENTION and ASSESSMENT
	CONTENT **What we want students to "KNOW"**	**SKILL** **What we want students to "DO"**	**LEARNING RESOURCES**	**TEACHING STRATEGIES**	**SOFTWARE and ONLINE Sites**	**Varied Classroom Assessment Strategies**
Quarter 3 cont…	**CORE IDEAS** **ESS2.C The Roles of Water in Earth's Surface Processes** Variations in density due to variations in temperature and alinity drive a global patter of interconnected ocean currents.. **ESS2.D Weather and Climate** Weather and climate are influence by interactions involving sunlight, the ocean the atmosphere, ice, and landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. 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. **SCIENCE and ENGINEERING PRACTICES** **Developing and Using Models** Develop and use a model to describe phenomena **CROSSCUTTING CONCEPTS** **Systems and System Models** Models can be used to represent systems and their interactions- such as inputs, processes and outputs – and energy, matter, and information flows within systems.	**PERFORMANCE EXPECTATION** **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.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Understanding Weather and Climate Unit** **Lessons 8-9** **SUBCONCEPT 3–** The dominant feature of Earth , its ocean, plays a major role in the planet's weather and climate, and in the lives of its living organisms. **Lesson 8** **SUBCONCEPT 4–** Vortices in the ocean set up convection currents. **Lesson 9** **TWIG** www.twigcarolina.com **Oceans**	***Smithsonian Science and Technology Concepts™*** **Integrated FERA Cycle Instruction of** Crosscutting concepts and science and engineering practices with science core ideas **FOCUS Strategies include:** -pre-teaching activities such as brainstorming, KWL charts, anticipation guides, etc. -guiding/focus questions **EXPLORE Strategies include:** -inquiry-based discussions and investigations -classroom activities, inquiries and models to help students develop a further understanding of the concepts/core ideas being discussed **REFLECT Strategies include:** -Science Notebooking -Key Ideas -Academic Vocabulary **APPLY Strategies include:** -Venn diagrams, cause and effect charts, review games, engineering application lessons, etc. **COMMON CORE** **Reading Informational Text RI.1-9:** RI.1-3 Key Ideas and Details RI.4-6 Craft and Structure RI.7-9 Integration of Knowledge and Ideas **Writing W.1-9** W.1-3 Text Types and Purpose W.4-6 Production and Distribution of Writing W.7-9 Research to Build and Present Knowledge **GUIDING QUESTIONS** *How do variations in temperature and salinity influence global patterns of ocean currents?* *What regulates weather and climate?*	**RESOURCES:** www.carolinascienceonline.com • Interactive Whiteboard Activities www.tigtagcarolina.com • Video Sets related to Natural Resources; Oceans www.mysi.edu Smithsonian information website **DEVICES:** • iPads • Tablets • Chromebooks • ELMO • SMARTboard **SOFTWARE:** • Microsoft Powerpoint • Microsoft Word • SMARTboard activities	**INTERVENTIONS:** ***Smithsonian Science and Technology Concepts™*** • Science Notebooks • Extensions **ASSESSMENTS:** ***Smithsonian Science and Technology Concepts™*** Understanding Weather and Climate Unit **Lesson 1 Pre-Assessment** *Students create a concept map on weather events and locate atmospheric and oceanic processes on a world map.* **Lesson 13 Assessment** *Students complete an inquiry analysis and a written assessment to evaluate how well they have learned the concepts.* *-FORMATIVE* *-SUMMATIVE* **Science Notebooks** **Inquiry Data Sheets** **Investigation Follow-up Questions**
	CORE IDEAS **ESS3.C Human Impacts on Earth's Systems** Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. **SCIENCE and ENGINEERING PRACTICES** **Engaging in Argument from Evidence** Construct an oral and written argument 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. **CROSSCUTTING CONCEPTS** **Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems.	**PERFORMANCE EXPECTATION** **MS-ESS3-4** Construct an argument supported by evidence for how increased in human population and per-capita consumption of natural resources impact Earth's systems.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Understanding Weather and Climate Unit** **Lessons 10-13** **SUBCONCEPT 5–** Climates, or weather conditions over long periods of time, are associated with specific geographic, atmospheric, and topographical conditions, Climates can change over time. **Lessons 10-13** **TWIG** www.twigcarolina.com **Natural Resources**			

	CURRICULUM *End Product of Learning, "What You Teach"*		INSTRUCTION *Means to the End Product of Learning, "What You Teach"*		TECHNOLOGY *Means to Engage Students and Provide Practice*	INTERVENTION and ASSESSMENT
	CONTENT **What we want students to "KNOW"**	**SKILL** **What we want students to "DO"**	**LEARNING RESOURCES**	**TEACHING STRATEGIES**	**SOFTWARE and ONLINE Sites**	**Varied Classroom Assessment Strategies**
Quarter 3 cont...	**CORE IDEAS** **ESS3.C Human Impacts on Earth's Systems** Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative or positive) for different living things. Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. **SCIENCE and ENGINEERING PRACTICES** **Constructing Explanations and Designing Solutions** Apply scientific principles to design an object, tool, process, or system. **CROSSCUTTING CONCEPTS** **Cause and Effect** Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation	**PERFORMANCE EXPECTATION** **MS-ESS3-3** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Understanding Weather and Climate Unit** **Lessons 1-9** **SUBCONCEPT 5–** Climates, or weather conditions over long periods of time, are associated with specific geographic, atmospheric, and topographical conditions, Climates can change over time. **Lessons 10-13** *-Inquiry Investigations* *-Science Notebooking* *-Student Guide* *-Hands-on Equipment* *-Creating Models* **TWIG** www.twigcarolina.com **Pollution**	***Smithsonian Science and Technology Concepts™*** **Integrated FERA Cycle Instruction of** Crosscutting concepts and science and engineering practices with science core ideas **FOCUS Strategies include:** -pre-teaching activities such as brainstorming, KWL charts, anticipation guides, etc. -guiding/focus questions **EXPLORE Strategies include:** -inquiry-based discussions and investigations -classroom activities, inquiries and models to help students develop a further understanding of the concepts/core ideas being discussed **REFLECT Strategies include:** -Science Notebooking -Key Ideas -Academic Vocabulary **APPLY Strategies include:** -Venn diagrams, cause and effect charts, review games, engineering application lessons, etc. **COMMON CORE** **Reading Informational Text RI.1-9:** RI.1-3 Key Ideas and Details RI.4-6 Craft and Structure RI.7-9 Integration of Knowledge and Ideas **Writing W.1-9** W.1-3 Text Types and Purpose W.4-6 Production and Distribution of Writing W.7-9 Research to Build and Present Knowledge **GUIDING QUESTIONS** *How do people model and predict the effects of human activities on Earth's climate?*	**RESOURCES:** www.carolinascienceonline.com • Interactive Whiteboard Activities www.tigtagcarolina.com • Video Sets related to Pollution; Catastrophic www.mysi.edu Smithsonian information website **DEVICES:** • iPads • Tablets • Chromebooks • ELMO • SMARTboard **SOFTWARE:** • Microsoft Powerpoint • Microsoft Word • SMARTboard activities	**INTERVENTIONS:** ***Smithsonian Science and Technology Concepts™*** • Science Notebooks • Extensions **ASSESSMENTS:** ***Smithsonian Science and Technology Concepts™*** Understanding Weather and Climate Unit **Lesson 1 Pre-Assessment** *Students create a concept map on weather events and locate atmospheric and oceanic processes on a world map.* **Lesson 13 Assessment** *Students complete an inquiry analysis and a written assessment to evaluate how well they have learned the concepts.* *-FORMATIVE* *-SUMMATIVE* **Science Notebooks** **Inquiry Data Sheets** **Investigation Follow-up Questions**
	CORE IDEAS **ESS3.B Natural Hazards** Mapping the history of natural hazards in a region, combined with an understanding of related geological forces can help forecast the locations and likelihoods of future events. **SCIENCE and ENGINEERING PRACTICES** **Analyzing and Interpreting Data** Analyze and interpret data to determine similarities and differences in findings. **CROSSCUTTING CONCEPTS** **Patterns** Graphs, charts, and images can be used to identify patterns in data..	**PERFORMANCE EXPECTATION** **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.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Understanding Weather and Climate Unit** **Lessons 2-7** **SUBCONCEPT 2–** A vortex is the movement of a fluid around a central axis. A vortex formed in the atmosphere results in winds, breezes, storms, tornadoes, and hurricanes. **Lessons 2-7** **TWIG** www.twigcarolina.com **Catastrophic**			

Quarter 3 cont...

CURRICULUM *End Product of Learning, "What You Teach"*		**INSTRUCTION** *Means to the End Product of Learning, "What You Teach"*		**TECHNOLOGY** *Means to Engage Students and Provide Practice*	**INTERVENTION and ASSESSMENT**
CONTENT **What we want students to "KNOW"**	**SKILL** **What we want students to "DO"**	**LEARNING RESOURCES**	**TEACHING STRATEGIES**	**SOFTWARE and ONLINE Sites**	**Varied Classroom Assessment Strategies**
CORE IDEAS **ESS3.D Global Climate Change** Human activities such as the release of greenhouse gases from the burning of 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. **SCIENCE and ENGINEERING PRACTICES** **Asking Questions and Defining Problems** Ask questions to identify and clarify evidence of an argument. **CROSSCUTTING CONCEPTS** **Stability and Change** Stability might be disturbed either by sudden events or gradual changes that accumulate over time.	**PERFORMANCE EXPECTATION** **MS-ESS3-5** Ask questions to clarify evidence of the factors that have cause the rise in global temperatures over the past century.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Understanding Weather and Climate Unit** **Lessons 11-13** **SUBCONCEPT 5–** Climates, or weather conditions over long periods of time, are associated with specific geographic, atmospheric, and topographical conditions, Climates can change over time. **Lessons 11-13** *-Inquiry Investigations* *-Science Notebooking* *-Student Guide* *-Hands-on Equipment* *-Creating Models* **TWIG** www.twigcarolina.com **Climate**	***Smithsonian Science and Technology Concepts™*** **Integrated FERA Cycle Instruction of** Crosscutting concepts and science and engineering practices with science core ideas **FOCUS Strategies include:** -pre-teaching activities such as brainstorming, KWL charts, anticipation guides, etc. -guiding/focus questions **EXPLORE Strategies include:** -inquiry-based discussions and investigations -classroom activities, inquiries and models to help students develop a further understanding of the concepts/core ideas being discussed **REFLECT Strategies include:** -Science Notebooking -Key Ideas -Academic Vocabulary **APPLY Strategies include:** -Venn diagrams, cause and effect charts, review games, engineering application lessons, etc. **COMMON CORE** **Reading Informational Text RI.1-9:** RI.1-3 Key Ideas and Details RI.4-6 Craft and Structure RI.7-9 Integration of Knowledge and Ideas **Writing W.1-9** W.1-3 Text Types and Purpose W.4-6 Production and Distribution of Writing W.7-9 Research to Build and Present Knowledge **GUIDING QUESTIONS** *How do people model and predict the effects of human activities on Earth's climate?*	**RESOURCES:** www.carolinascienceonline.com • Interactive Whiteboard Activities www.tigtagcarolina.com • Video Sets related to Climate www.mysi.edu Smithsonian information website **DEVICES:** • iPads • Tablets • Chromebooks • ELMO • SMARTboard **SOFTWARE:** • Microsoft Powerpoint • Microsoft Word • SMARTboard activities	**INTERVENTIONS:** ***Smithsonian Science and Technology Concepts™*** • Science Notebooks • Extensions **ASSESSMENTS:** ***Smithsonian Science and Technology Concepts™*** Understanding Weather and Climate Unit **Lesson 1 Pre-Assessment** *Students create a concept map on weather events and locate atmospheric and oceanic processes on a world map.* **Lesson 13 Assessment** *Students complete an inquiry analysis and a written assessment to evaluate how well they have learned the concepts.* *-FORMATIVE* *-SUMMATIVE* **Science Notebooks** **Inquiry Data Sheets** **Investigation Follow-up Questions**

Quarter 4

CURRICULUM *End Product of Learning, "What You Teach"*		**INSTRUCTION** *Means to the End Product of Learning, "What You Teach"*		**TECHNOLOGY** *Means to Engage Students and Provide Practice*	**INTERVENTION and ASSESSMENT**
CONTENT **What we want students to "KNOW"**	**SKILL** **What we want students to "DO"**	**LEARNING RESOURCES**	**TEACHING STRATEGIES**	**SOFTWARE and ONLINE Sites**	**Varied Classroom Assessment Strategies**
CORE IDEAS **PS4.A Wave Properties** A simple wave ha a repeating pattern with a specific wavelength, frequency, and amplitude. **SCIENCE and ENGINEERING PRACTICES** **Use Mathematics and Computational Thinking** Use mathematical representations to describe and/or support scientific conclusions and design solutions. **CROSSCUTTING CONCEPTS** **Patterns** Graphs and charts can be used to identify patterns in data.	**PERFORMANCE EXPECTATION** **MS-PS4-1** Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Exploring the Nature of Light Unit** **Lessons 6; 12** **SUBCONCEPT 3–** Visible light is one small part of the electromagnetic spectrum, which ranges from very long radio waves to short gamma rays. **Lesson 6** **SUBCONCEPT 7–** Light has characteristics of both particles and waves. **Lesson 12** *-Inquiry Investigations* *-Science Notebooking* *-Student Guide* *-Hands-on Equipment* *-Creating Models* **TWIG** www.twigcarolina.com **Waves**	***Smithsonian Science and Technology Concepts™*** **Integrated FERA Cycle Instruction of** Crosscutting concepts and science and engineering practices with science core ideas **FOCUS Strategies include:** -pre-teaching activities such as brainstorming, KWL charts, anticipation guides, etc. -guiding/focus questions **EXPLORE Strategies include:** -inquiry-based discussions and investigations -classroom activities, inquiries and models to help students develop a further understanding of the concepts/core ideas being discussed **REFLECT Strategies include:** -Science Notebooking -Key Ideas -Academic Vocabulary **APPLY Strategies include:** -Venn diagrams, cause and effect charts, review games, engineering application lessons, etc. **COMMON CORE** **Reading Informational Text RI.1-9:** RI.1-3 Key Ideas and Details RI.4-6 Craft and Structure RI.7-9 Integration of Knowledge and Ideas **Writing W.1-9** W.1-3 Text Types and Purpose W.4-6 Production and Distribution of Writing W.7-9 Research to Build and Present Knowledge **GUIDING QUESTIONS** *What evidence do we have that there are repeating patterns in a wave? What factors affect the pattern?*	**RESOURCES:** www.carolinascienceonline.com • Interactive Whiteboard Activities www.tigtagcarolina.com • Video Sets related to Waves www.mysi.edu Smithsonian information website **DEVICES:** • iPads • Tablets • Chromebooks • ELMO • SMARTboard **SOFTWARE:** • Microsoft Powerpoint • Microsoft Word • SMARTboard activities	**INTERVENTIONS:** ***Smithsonian Science and Technology Concepts™*** • Science Notebooks • Extensions **ASSESSMENTS:** ***Smithsonian Science and Technology Concepts™*** Exploring the Nature of Light Unit **Lesson 1 Pre-Assessment** *Students complete a circuit of four short inquiries that introduce the concepts of the unit* **Lesson 13 Assessment** *Students complete a performance assessment and written assessment to demonstrate their understanding of concepts developed in the unit.* *-FORMATIVE* *-SUMMATIVE* **Science Notebooks** **Inquiry Data Sheets** **Investigation Follow-up Questions**

Quarter 4 cont…

CURRICULUM *End Product of Learning, "What You Teach"*		**INSTRUCTION** *Means to the End Product of Learning, "What You Teach"*		**TECHNOLOGY** *Means to Engage Students and Provide Practice*	**INTERVENTION and ASSESSMENT**
CONTENT **What we want students to "KNOW"**	**SKILL** **What we want students to "DO"**	**LEARNING RESOURCES**	**TEACHING STRATEGIES**	**SOFTWARE and ONLINE Sites**	**Varied Classroom Assessment Strategies**
CORE IDEAS **PS4.A Wave Properties** A sound wave needs a medium through which it is transmitted. **PS4.B Electromagnetic Radiation** When light shines on an object, it is reflected , absorbed, or transmitted through an object, depending on the objects material and frequency (color) of the light. The pat that light travels can be traced as straight lines, except at surfaces between different transparent materials (e.g. air and water, air and glass) where the light path bends. A wave model of light is useful for explaining brightness, color and the frequency-dependent bending of light at a surface between media. However, because light can travel through space, it cannot be a matter wave, like sound or water. **SCIENCE and ENGINEERING PRACTICES** **Developing and Using Models** Develop and use a model to describe phenomena. **CROSSCUTTING CONCEPTS** **Structure and Function** Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.	**PERFORMANCE EXPECTATION** **MS-PS4-2** Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.	**RESOURCES:** ***Smithsonian Science and Technology Concepts™* Exploring the Nature of Light Unit** **Lessons 2-4; 5-7; 8-11** **SUBCONCEPT 2–** Light is a form of energy that travels outward in straight lines from its source. **Lessons 2-4** **SUBCONCEPT 3–** Visible light is one small part of the electromagnetic spectrum, which ranges from very long radio waves, to very short gamma rays. **Lesson 5-7** **SUBCONCEPT 4–** Objects have different colors because of the way the transmit, absorb, and reflect light **Lesson 8-9** **SUBCONCEPT 5 –** When light is reflected from a surface, the angle of the incidence equals the angle of reflection. **Lesson 10** **SUBCONCEPT 6 –** Light is refracted when it passes from one medium into another medium. **Lesson 11** *-Inquiry Investigations* *-Science Notebooking* *-Student Guide* *-Hands-on Equipment* *-Creating Models* **TWIG** www.twigcarolina.com **Waves**	***Smithsonian Science and Technology Concepts™*** **Integrated FERA Cycle Instruction of** Crosscutting concepts and science and engineering practices with science core ideas **FOCUS Strategies include:** -pre-teaching activities such as brainstorming, KWL charts, anticipation guides, etc. -guiding/focus questions **EXPLORE Strategies include:** -inquiry-based discussions and investigations -classroom activities, inquiries and models to help students develop a further understanding of the concepts/core ideas being discussed **REFLECT Strategies include:** -Science Notebooking -Key Ideas -Academic Vocabulary **APPLY Strategies include:** -Venn diagrams, cause and effect charts, review games, engineering application lessons, etc. **COMMON CORE** **Reading Informational Text RI.1-9:** RI.1-3 Key Ideas and Details RI.4-6 Craft and Structure RI.7-9 Integration of Knowledge and Ideas **Writing W.1-9** W.1-3 Text Types and Purpose W.4-6 Production and Distribution of Writing W.7-9 Research to Build and Present Knowledge **GUIDING QUESTIONS** *What evidence can we find that light is reflected, absorbed or transmitted?* *What are the effects of an object's surface material or color on what we see?* *How does light travel through a medium and from one medium to another?*	**RESOURCES:** www.carolinascienceonline.com • Interactive Whiteboard Activities www.tigtagcarolina.com • Video Sets related to Waves www.mysi.edu Smithsonian information website **DEVICES:** • iPads • Tablets • Chromebooks • ELMO • SMARTboard **SOFTWARE:** • Microsoft Powerpoint • Microsoft Word • SMARTboard activities	**INTERVENTIONS:** ***Smithsonian Science and Technology Concepts™*** • Science Notebooks • Extensions **ASSESSMENTS:** ***Smithsonian Science and Technology Concepts™*** Exploring the Nature of Light Unit **Lesson 1 Pre-Assessment** *Students complete a circuit of four short inquiries that introduce the concepts of the unit* **Lesson 13 Assessment** *Students complete a performance assessment and written assessment to demonstrate their understanding of concepts developed in the unit.* *-FORMATIVE* *-SUMMATIVE* **Science Notebooks** **Inquiry Data Sheets** **Investigation Follow-up Questions**