APPROVED FACILITY SCHOOLS CURRICULUM GUIDE

SUBJECT: Science GRADE: 7

Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
TIMELINE: Quarter 1			
Physical Science: Matter and Its Interactions MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures. **I C M**	I can identify what an atom is composed of through drawings consisting of protons, neutrons, and electrons. I can identify a simple molecule by drawing and building a model of two like atoms combined. I can demonstrate the atomic composition of a compound structure by developing models such as drawings and 3-D figures.	Knowledge Comprehension Comprehension Application Synthesis	Atom Compound Electron Elements Gas Liquid Mass Matter Metric system Molecule Negative charge Neutron Particles Periodic table Positive charge Proton Solid Structure Thermal energy Volume Weight

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Physical Science: Matter and Its Interactions MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. **I C M**	I can classify substances by identifying the individual physical and chemical properties of the substance. I can analyze the properties of a substance by comparing and contrasting those properties before and after undergoing a physical and a chemical change.	Comprehension Analysis Synthesis Evaluation	Boiling point Chemical Chemical change Condensation Conductivity Density Evaporation Flammability Freezing Gas Liquid Melting Melting point Physical change Product Property Reactant Reaction Solid Solubility Substance
Engineering Design MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. **I C M**	I can define the criteria and constraints of a problem to ensure a successful solution by using scientific principles.	Knowledge Comprehension	Hypothesis Modify Observe Predict Scientific method Solution

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Physical Science: Matter and Its Interactions MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. **I C M**	I can gather and analyze information from various resources to determine that synthetic materials come from natural resources.	Knowledge Analysis Synthesis	Energy Family Group Impact Kinetic Natural resource Periodic table Potential Synthetic System Transfer
Physical Science: Matter and Its Interactions MS-PS1-4 Develop a model that predicts and describes changes in particle motion, temperature, and state of pure substance when thermal energy is added or removed. **I C M**	I can develop a model through role play and drawings that predict and describe changes in particle motion, temperature, and substance state when thermal energy is added or removed.	Comprehension Application	Boiling Condensation Evaporation Freezing Melting Particles Pure substance Temperature Thermal energy
Physical Science: Matter and Its Interactions 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. **I C M**	I can analyze various chemical equations and develop models to show how matter is conserved.	Application Analysis	Chemical change Chemical reaction Conservation of Mass Conserved Mass Physical change Product Reactant Reaction

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Physical Science: Matter and Its Interactions MS-PS1-6. Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. **I C M**	I can design a project to construct, test and modify a device that either releases or absorbs thermal energy.	Synthesis Evaluation	Absorb Hypothesis Modify Observe Predict Solution Thermal energy
Engineering Design MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. **I C M**	I can use a process to evaluate solutions to determine how well they meet the criteria and constraints of the problem.	Evaluation	Hypothesis Modify Observe Predict Solution Systematic
Engineering Design MS-ETS1-3. Analyze data from tests to determine similarities among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. **I C M**	I can analyze data from tests and determine similarities among solutions. I can identify the best parts from each test and combine them to make a new solution resulting in better success.	Analysis Application Synthesis	Hypothesis Modify Observe Predict Solution Systematic

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RESOURCES AND NOTES FOR QUARTER 1:

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Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
TIMELINE: Quarter 2			
Physical Science: Energy 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. **I C**	I can create and interpret a graph that shows the relationship of mass and speed to kinetic energy.	Application Synthesis	Dependent variable Force Friction Independent variable Kinetic energy Mass Mechanical energy Potential energy Speed
Physical Science: Energy MS-PS3-2. Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. **I C**	I can make a model to describe how potential energy is stored based on the arrangement of objects interacting at a distance.	Application Synthesis	Energy transfer Environment Force Friction Gravitational Potential energy Kinetic energy Mass Potential energy
Physical Science: Energy MS-PS3-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. **I C M**	I can design, construct, and test a device that will either minimize or maximize thermal energy transfer.	Application Synthesis Evaluation	Celsius Mass Temperature Thermal energy
Physical Science: Energy 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. **I C M**	I can determine how the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles are related by measuring the temperature of different samples.	Application Analysis	Energy transfer Kinetic energy Mass Particles Temperature Thermal energy

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Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Physical Science: Energy MS-PS3-5. Construct, use and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. **I C M**	I can construct, use, and present arguments to show that when the kinetic energy of an object changes, energy is transferred either to or from the object.	Application Synthesis	Energy transfer Force Friction Kinetic energy Law of conservation of energy Potential energy

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RESOURCES AND NOTES FOR QUARTER 2 :

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SUBJECT: Science GRADE: 7

Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
TIMELINE: Quarter 3			
Physical Science Motion and Stability: Forces and Interactions MS-PS2-1. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects. **I C M**	I can solve a problem involving the motion of two colliding objects using Newton's Third Law.	Application	Colliding Exert Force Interaction Motion Newton's law Reaction Stability
Energy 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. **M**	I can create and interpret a graph that shows the relationship of mass and speed to kinetic energy.	Application Evaluation	Dependent variable Force Friction Independent variable Kinetic energy Mass Mechanical energy Potential energy Speed
Motion and Stability: Forces and Interactions 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. **I C M**	I can prove that an object's motion depends on the sum of the forces on the object and the mass of that object.	Synthesis	Attract Electrical forces Friction Gravitational forces Inertia Magnetic field Magnetic forces Mass Repel Unbalanced force

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Energy MS-PS3-2. Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. **M**	I can make a model to describe how potential energy is stored based on the arrangement of objects interacting at a distance.	Application Synthesis	Energy transfer Environment Force Friction Gravitational Potential energy Kinetic energy Mass Potential energy
Motion and Stability: Forces and Interactions MS-PS2-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. **I C M**	I can determine the factors that affect the strength of electric and magnetic forces.	Evaluation	Attract Conduct Electrical current Electromagnetic friction Force Magnetic field Repel Resistance
Motion and Stability: Forces and Interactions MS-PS2-4. Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. **I C M**	I can prove that gravitational interactions are attractive and depend on the masses of interacting objects.	Evaluation	Attract Gravitational forces Interact Mass
Motion and Stability: Forces and Interactions 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. **I C M**	I can evaluate an investigation I performed to prove that fields exist between objects exerting forces on each other even though the objects are not in contact.	Analysis Evaluation	Energy Exert Fields Gravitational forces Magnetic forces

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RESOURCES AND NOTES FOR QUARTER 3 :

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Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
TIMELINE: Quarter 4			
Physical Science: Waves and Their Applications in Technologies for Information Transfer 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. **I C M**	I can use algebra formulas to describe how the amplitude of a wave is related to the energy in a wave.	Application Analysis	Amplitude Compression Crest Diffraction Electromagnetic waves Energy Frequency Light wave Longitudinal waves Mechanical waves Particle Rarefaction Reflection Refraction Sound wave Transverse waves Trough Vacuum Wave Wavelength
Physical Science: Waves and Their Applications in Technologies for Information Transfer MS-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. **I C M**	I can develop and use a model to describe that waves are reflected, absorbed, or transmitted through different materials.	Application	Absorb Light wave Opaque Reflect Sound wave Translucent Transmitted Transparent

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Physical Science: Waves and Their Applications in Technologies for Information Transfer MS-PS4-3. Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals. **I C M**	I can combine scientific and technical information to prove/show that digital signals are more reliable than analog signals.	Synthesis	Analog Digital Medium Signals Vacuum Wave pulse
Engineering Design MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.	I can develop a model to generate data for repetitive testing and modification so an optimal design of that model can be achieved.	Analysis Synthesis Evaluation	Data Generate Model Modification Optimal Refine

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RESOURCES AND NOTES FOR QUARTER 4 :