

Chapter Title	Chapter Description	Lesson Title	Lesson Description	Activity Code	Activity Title
Physical and Chemical Changes	Students will distinguish matter from nonmatter, distinguish between physical and chemical properties, and distinguish between physical and chemical changes.				
		Matter	Students will be able to distinguish matter from things that are not matter.		
				MSSC035	Matter
				MSSC646	Authentic Task: STEM Careers: Particle Physicist
					Lesson Quiz: Matter
		Physical and Chemical Properties	Students will be able to distinguish between physical and chemical properties of matter.		
				MSSC036	Physical and Chemical Properties
				MSSC647	Authentic Task: STEM Careers: Materials Scientist
					Lesson Quiz: Physical and Chemical Properties

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		Physical and Chemical Changes	Students will be able to distinguish between physical and chemical changes.		
				MSSC037	Physical and Chemical Changes
				MSSC506	Odyssey Writer: Identifying Physical and Chemical Changes
					Lesson Quiz: Physical and Chemical Changes
Atoms, Elements, and Compounds	Students will investigate atoms, elements, and compounds. Additional topics include isotopes, ions, molecules, and ionic and covalent bonding.				
		Atoms	Students will be able to describe the structure of an atom, and explain how matter is made of atoms.		
				MSSC038	Atoms
				MSSC648	Authentic Task: History of Atomic Theory
					Lesson Quiz: Atoms

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		Elements	Students will be able to distinguish elements from other types of matter and describe the atoms of an element.		
				MSSC039	Elements
				MSSC524	Odyssey Writer: Report on an Element
				MSSC406	Odyssey Community: What's Your Favorite Element and Why?
					Lesson Quiz: Elements
		Isotopes	Students will be able to distinguish between the different isotopes of an element.		
				MSSC040	Isotopes
				MSSC649	Authentic Task: STEM Careers: Radiologist/Medical Imaging
				MSSC650	Authentic Task: Radioactive Decay/Dating
					Lesson Quiz: Isotopes
		Ions	Students will be able to describe how ions are formed from atoms.		
				MSSC041	Ions
				MSSC525	Odyssey Writer: Formation of an Ion
					Lesson Quiz: Ions

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		Compounds and Molecules	Students will be able to distinguish compounds, molecules, and elements from one another.		
				MSSC042	Compounds and Molecules
				MSSC651	Authentic Task: Engineering and Technology: Nanotechnology
				MSSC434	Odyssey Community: Atoms, Compounds, or Molecules?
					Lesson Quiz: Compounds and Molecules
		Ionic and Covalent Bonding	Students will be able to describe how atoms can form ionic and covalent bonds.		
				MSSC043	Ionic and Covalent Bonding
				MSSC652	Authentic Task: Electron Dot Diagrams
				MSSC653	Authentic Task: STEM Careers: Chemist
					Lesson Quiz: Ionic and Covalent Bonding
Mixtures and Solutions	Students will explore mixtures, solutions, and their properties.				

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		Mixtures and Solutions	Students will be able to identify the solvent and solute in a solution, and distinguish mixtures and solutions from pure substances.		
				MSSC044	Mixtures and Solutions
				MSSC407	Odyssey Community: Examples of Mixtures and Solutions
				MSSC606	Authentic Task: Solubility
				MSSC607	Authentic Task: PhET Simulation: Salts and Solubility
					Lesson Quiz: Mixtures and Solutions
		Separating Mixtures	Students will be able to describe methods for separating a mixture into its components.		
				MSSC045	Separating Mixtures
				MSSC526	Odyssey Writer: How to Separate a Mixture
					Lesson Quiz: Separating Mixtures
The Periodic Table	Students will explore how elements are arranged on the periodic table of the elements.				

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		Introduction to the Periodic Table	Students will be able to locate an element on the periodic table and identify its atomic number, mass, and number of protons, neutrons, and electrons.		
				MSSC046	The Periodic Table of the Elements
				MSSC654	Authentic Task: Dmitri Mendeleev
					Lesson Quiz: Introduction to the Periodic Table
		Regions of the Periodic Table	Students will be able to locate major categories of elements on the periodic table, including metals, metalloids, nonmetals, and noble gases, and describe the reactivity within a group/family and period/series.		
				MSSC047	Regions of the Periodic Table
				MSSC655	Authentic Task: The Explosive Alkali Metals
				MSSC527	Odyssey Writer: Researching a Region of the Periodic Table

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					Lesson Quiz: Regions of the Periodic Table
Chemical Formulas and Reactions	Students will investigate chemical formulas and chemical reactions. Topics include reaction rates, conservation of matter, balancing equations, and endothermic and exothermic reactions.				
		Chemical Formulas	Students will be able to determine the number of atoms of each element in a chemical formula containing subscripts and coefficients.		
				MSSC048	Chemical Formulas
				MSSC528	Odyssey Writer: What's the Difference Between Subscripts and Coefficients?
					Lesson Quiz: Chemical Formulas
		Chemical Reactions	Students will be able to identify a chemical reaction and distinguish the reactants from the products.		
				MSSC049	Chemical Reactions

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				MSSC656	Authentic Task: Explosions!
					Lesson Quiz: Chemical Reactions
		Reaction Rates	Students will be able to explain the effects of temperature, concentration, surface area, and catalysts on the rate of chemical reactions.		
				MSSC050	Reaction Rates
				MSSC657	Authentic Task: Examples of Catalysts
				MSSC529	Odyssey Writer: Analyzing Reaction Rates
					Lesson Quiz: Reaction Rates
		Conservation of Matter in Reactions	Students will be able to describe how matter is conserved in a closed system.		
				MSSC051	Conservation of Matter
					Lesson Quiz: Conservation of Matter in Reactions
		Balancing Chemical Equations	Students will be able to apply the law of conservation of matter to balance chemical equations.		



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				MSSC052	Balancing Chemical Equations
				MSSC608	Authentic Task: PhET Simulation: Reactants, Products, and Leftovers
				MSSC530	Odyssey Writer: What Went Wrong - Balancing Chemical Reactions
					Lesson Quiz: Balancing Chemical Equations
		Endothermic and Exothermic Reactions	Students will be able to distinguish between endothermic and exothermic reactions.		
				MSSC053	Chemical Reactions and Heat
					Lesson Quiz: Endothermic and Exothermic Reactions
States of Matter	Students will investigate the properties of solids, liquids, gases, and plasmas, and how matter can change from one state to another.				
		Atomic and Molecular Motion	Students will be able to describe movement of atoms and molecules in solids, liquids and gases.		

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				MSSC054	Atomic and Molecular Motion
					Lesson Quiz: Atomic and Molecular Motion
		States of Matter	Students will be able to differentiate between solids, liquids, gases, and plasmas.		
				MSSC055	States of Matter
				MSSC609	Authentic Task: PhET Simulation: States of Matter
					Lesson Quiz: States of Matter
		Changes of State	Students will be able to describe how matter can change from one state to another.		
				MSSC056	Changes of State
				MSSC408	Odyssey Community: Examples of Matter Changing State
					Lesson Quiz: Changes of State
Motion	Students will explore motion by investigating how speed, velocity, and acceleration can describe how an object moves.				

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		Position	Students will be able to describe the position of an object based on a reference point and a coordinate system.		
				MSSC435	Odyssey Community: Why Is It Important to Know Where Things Are?
				MSSC062	Position
					Lesson Quiz: Position
		Graphing Position	Students will be able to create a position-versus-time graph for a given situation, and interpret the results of a position-versus-time graph.		
				MSSC063	Graphing Position
				MSSC507	Odyssey Writer: Interpreting Position vs. Time Information
					Lesson Quiz: Graphing Position
		Speed	Students will be able to define speed and distinguish measurements of speed from other scientific measurements.		
				MSSC064	Speed
					Lesson Quiz: Speed

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		Calculating Speed	Students will be able to calculate the average speed of an object given distance and time measurements.		
				MSSC065	Calculating Speed
				MSSC436	Odyssey Community: Is This Problem Solved Correctly?
					Lesson Quiz: Calculating Speed
		Graphing Speed	Students will be able to describe the motion of an object given a graph of its speed versus time.		
				MSSC066	Graphing Speed
				MSSC610	Authentic Task: PhET Simulation: The Moving Man
				MSSC534	Odyssey Writer: Interpreting Speed vs. Time Information
					Lesson Quiz: Graphing Speed
		Velocity	Students will be able to distinguish between speed and velocity.		
				MSSC067	Velocity
				MSSC611	Authentic Task: PhET Simulation: Lunar Lander

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				MSSC535	Odyssey Writer: Why Use Velocity?
					Lesson Quiz: Velocity
		Acceleration	Students will be able to classify objects with changing speed or direction as accelerating, and recognize constant acceleration and deceleration on a graph of speed vs. time.		
				MSSC068	Acceleration
				MSSC612	Authentic Task: PhET Simulation: Maze Game
				MSSC437	Odyssey Community: Examples of Acceleration
					Lesson Quiz: Acceleration
Force	Students will investigate how forces affect the motion of objects. Topics include Newton's laws of motion and momentum.				

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		Introduction to Forces	Students will be able to identify, measure, and describe common forces acting on objects, including friction, gravity, compression, and tension.		
				MSSC069	Force
				MSSC664	Authentic Task: Forces Lab
					Lesson Quiz: Introduction to Forces
		Analyzing Forces	Students will be able to determine the net force on an object.		
				MSSC070	Net Force
				MSSC536	Odyssey Writer: Analyzing the Net Force
					Lesson Quiz: Analyzing Forces
		Balanced Forces	Students will be able to differentiate between objects on which balanced and unbalanced forces are acting.		
				MSSC071	Balanced Forces
				MSSC438	Odyssey Community: Are the Forces Balanced?

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				MSSC665	Authentic Task: STEM Careers: Mechanical Engineer
					Lesson Quiz: Balanced Forces
		Forces and Motion	Students will be able to predict the qualitative effect of an unbalanced force on the motion of an object.		
				MSSC072	Forces and Motion
				MSSC537	Odyssey Writer: Forces: What's Going to Happen?
					Lesson Quiz: Forces and Motion
		Mass and Inertia	Students will be able to predict how the same force will have different effects on different masses.		
				MSSC073	Mass and Inertia
				MSSC666	Authentic Task: The LHC and the Search for the Higgs Particle
					Lesson Quiz: Mass and Inertia
		Calculating Force, Mass, and Acceleration	Students will be able to calculate force, mass, or acceleration using the formula $F = ma$ .		

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				MSSC074	Force, Mass, and Acceleration
				MSSC439	Odyssey Community: Is This Force Problem Solved Correctly?
				MSSC538	Odyssey Writer: Word Problem: Calculating Force, Mass, and Acceleration
					Lesson Quiz: Calculating Force, Mass, and Acceleration
		Action and Reaction Forces	Students will be able to identify action-reaction force pairs.		
				MSSC075	Action and Reaction Forces
				MSSC667	Authentic Task: Robert Goddard and Rockets
				MSSC539	Odyssey Writer: How Are You Able to Walk?
					Lesson Quiz: Action and Reaction Forces
		Newton's Laws of Motion	Students will be able to identify examples of each of Newton's laws of motion.		



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				MSSC076	Newton's Laws of Motion
					Lesson Quiz: Newton's Laws of Motion
		Momentum	Students will be able to define momentum and relate forces applied to an object to the object's change in momentum.		
				MSSC077	Momentum
				MSSC668	Authentic Task: PhET Simulation: Air Hockey Collisions
					Lesson Quiz: Momentum
Gravity and Weight	Students will explore the relationship between weight and mass, and how gravity affects objects with mass, as well as how gravity creates air and water pressure.				
		Weight and Mass	Students will be able to distinguish between mass and weight using appropriate measuring instruments and units.		
				MSSC078	Weight and Mass

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				MSSC669	Authentic Task: Your Weight on Other Planets
					Lesson Quiz: Weight and Mass
		Gravity	Students will be able to predict how the gravitational attraction between two masses will increase or decrease when changes are made in the masses or in the distance between the objects.		
				MSSC079	Gravity
				MSSC613	Authentic Task: PhET Simulation: Gravity Force Lab
				MSSC614	Authentic Task: Air Pressure
					Lesson Quiz: Gravity
Density and Buoyancy	Students will explore volume, density, and buoyancy.				
		Volume	Students will be able to measure and describe the volume of a rectangular prism and an irregular solid.		
				MSSC080	Volume

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				MSSC508	Odyssey Writer: What Shape Should a Package Be?
					Lesson Quiz: Volume
		Introduction to Density	Students will be able to define density and distinguish materials by their different densities.		
				MSSC081	Density
				MSSC615	Authentic Task: PhET Simulation: Density
					Lesson Quiz: Introduction to Density
		Calculating Density	Students will be able to calculate the mass, volume, or density of a substance using the formula for density.		
				MSSC082	Calculating Density
				MSSC541	Odyssey Writer: Word Problem: Calculating Density
					Lesson Quiz: Calculating Density
		Buoyancy	Students will be able to predict whether a given object will sink or float when placed in a liquid.		
				MSSC083	Buoyancy
				MSSC616	Authentic Task: PhET Simulation: Buoyancy

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				MSSC509	Odyssey Writer: Monkeys in a Rowboat
					Lesson Quiz: Buoyancy
Energy	Students will investigate different forms of energy, how energy can change forms, conservation of energy, work, power, simple machines, mechanical advantage, and efficiency.				
		Types of Energy	Students will be able to compare and contrast the different forms of energy (heat, light, electricity, nuclear, mechanical motion, sound) and their characteristics.		
				MSSC084	What Is Energy?
				MSSC440	Odyssey Community: Energy at Home
					Lesson Quiz: Types of Energy
		Potential and Kinetic Energy	Students will be able to distinguish between potential and kinetic energy.		
				MSSC085	Potential and Kinetic Energy

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				MSSC617	Authentic Task: PhET Simulation: Energy Skate Park
					Lesson Quiz: Potential and Kinetic Energy
		Energy Transformations	Students will be able to explain how energy can be changed from one form to another as it moves through a system, or can be transferred from one system to another system.		
				MSSC086	Energy Transformations
					Lesson Quiz: Energy Flow
		Energy Loss	Students will be able to identify energy transformations in which some energy may be lost as heat.		
				MSSC087	Energy Loss
				MSSC441	Odyssey Community: Energy Loss Discussion
					Lesson Quiz: Energy Loss
		Conservation of Energy	Students will be able to apply the law of conservation of energy to analyze energy transformations.		

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				MSSC088	Conservation of Energy
				MSSC542	Odyssey Writer: Conservation of Energy
					Lesson Quiz: Conservation of Energy
		Work	Students will be able to distinguish situations where work is done from situations where work is not done.		
				MSSC089	Work and Energy
				MSSC409	Odyssey Community: Is Work Being Done?
				MSSC618	Authentic Task: Power
					Lesson Quiz: Work
		Simple Machines	Students will be able to differentiate between the six simple machines (lever, inclined plane, pulley, wedge, screw, and wheel and axle).		
				MSSC090	Simple Machines
				MSSC619	Authentic Task: PhET Simulation: The Ramp
				MSSC442	Odyssey Community: Complex Machines and Simple Machines
					Lesson Quiz: Simple Machines

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		Mechanical Advantage and Efficiency	Students will be able to analyze the mechanical advantage and efficiency of a machine.		
				MSSC091	Mechanical Advantage and Efficiency
				MSSC443	Odyssey Community: Perpetual Motion Machines
					Lesson Quiz: Mechanical Advantage and Efficiency
Heat	Students will explore heat and temperature, how heat flows from warm to cool objects, and heat transfer by conduction, convection, and radiation.				
		Heat and Temperature	Students will be able to relate the kinetic energy of the particles in a substance to its heat and temperature.		
				MSSC092	Heat and Temperature
					Lesson Quiz: Heat and Temperature

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		Heat Flow	Students will be able to predict how heat will flow between two objects.		
				MSSC093	Heat Flow
				MSSC543	Odyssey Writer: Where Will the Heat Go?
					Lesson Quiz: Heat Flow
		Conduction, Convection, and Radiation	Students will be able to distinguish between conduction, convection, and radiation.		
				MSSC094	Conduction, Convection, and Radiation
				MSSC620	Authentic Task: PhET Simulation: Microwaves
				MSSC410	Odyssey Community: Examples of Heat Flow
					Lesson Quiz: Conduction, Convection, and Radiation



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Waves	Students will investigate the properties of waves. Topics include the characteristics used to describe waves, types of waves, how waves are transmitted, how waves carry energy, and sound and light waves.				
		Introduction to Waves	Students will be able to give examples of electromagnetic and mechanical waves.		
				MSSC095	What Are Waves?
				MSSC544	Odyssey Writer: Everyday Waves
					Lesson Quiz: Introduction to Waves
		Characteristics of Waves	Students will be able to identify the crests, troughs, wavelength, frequency, and amplitude of a given wave.		
				MSSC096	Characteristics of Waves
				MSSC621	Authentic Task: PhET Simulation: Wave on a String

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					Lesson Quiz: Characteristics of Waves
		Types of Waves	Students will be able to distinguish between longitudinal and transverse waves.		
				MSSC097	Longitudinal and Transverse Waves
					Lesson Quiz: Types of Waves
		Wave Transmission	Students will be able to describe how waves are transmitted through different media.		
				MSSC098	Wave Transmission
				MSSC622	Authentic Task: PhET Simulation: Wave Interference
					Lesson Quiz: Wave Transmission
		Waves and Energy	Students will be able to relate the wavelength, frequency, and amplitude of a wave to its energy.		
				MSSC099	Waves and Energy
					Lesson Quiz: Waves and Energy

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		Sound Waves	Students will be able to apply the properties of waves to explain the loudness and pitch of sounds.		
				MSSC100	Sound
				MSSC623	Authentic Task: PhET Simulation: Sound
					Lesson Quiz: Sound Waves
Light	Students will explore the electromagnetic spectrum as well as investigate how light can interact with matter by being transmitted, absorbed, scattered, reflected, or refracted.				
		The Electromagnetic Spectrum	Students will be able to compare the characteristics of different groups of waves on the electromagnetic spectrum, including wavelength, frequency, uses, and hazards.		
				MSSC101	The Electromagnetic Spectrum

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				MSSC510	Odyssey Writer: Explaining the Electromagnetic Spectrum
					Lesson Quiz: The Electromagnetic Spectrum
		Transmission, Absorption, and Scattering of Light	Students will be able to distinguish whether light is transmitted, absorbed, or scattered as it interacts with matter.		
				MSSC102	Transmission, Absorption, and Scattering
					Lesson Quiz: Transmission, Absorption, and Scattering of Light
		Reflection of Light	Students will be able to predict the path of a light ray after it has been reflected.		
				MSSC103	Reflection
					Lesson Quiz: Reflection of Light
		Refraction of Light	Students will be able to predict the direction in which light will be refracted as it passes from one medium into another.		

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				MSSC104	Refraction
					Lesson Quiz: Refraction of Light
		Color	Students will be able to explain the relationship between an object's color and the wavelength of light reflected or transmitted to the viewer's eyes.		
				MSSC105	Color and Sight
				MSSC624	Authentic Task: PhET Simulation: Color Vision
				MSSC545	Odyssey Writer: Where Did the Color Come From?
					Lesson Quiz: Color
		Lenses	Students will be able to explain how simple lenses are used in a magnifying glass, an eye, a camera, a telescope, and a microscope.		
				MSSC106	Lenses
				MSSC625	Authentic Task: PhET Simulation: Geometric Optics
					Lesson Quiz: Lenses