

HCPS Grade 8 Science Course

Unit & Title	MSDE/NGSS Science Standards	Lesson Topic	
Unit 1 – Energy in Your World <i>11 Days</i>	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.	Experience 1	Fan Parts and Model
		Experience 2	Energy Types
		Experience 3	Creating a Simple Battery – Day 1
		Experience 4	Creating a Simple Battery – Day 2
		Experience 5	Forms of Energy
		Experience 6	What is the Impact of Increasing PE on the KE of a System?
		Experience 7	Energy Conversions Gizmo
		Experience 8	Pendulum Gizmo or PhET
		Experience 9	Energy in Your World Project
		Experience 10	Traditional Energy Resources – Day 1
		Experience 11	Traditional Energy Resources – Day 2

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<p>Unit 2 – Motion and Stability 8 weeks</p>	<p>MS-PS2-1: Apply Newton’s Third Law to design a solution to a problem involving the motion of two colliding objects.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>	Experience 1	Motion Mini Book
		Experience 2	Need for Speed Lab
		Experience 3	Walk the Line
		Experience 4	Bike Helmet Activity
		Experience 5	Velocity and Acceleration Lab
		Experience 6	Balanced and Unbalanced Forces
		Experience 7	Force and Motion Basics
		Experience 8	Force and Fan Carts Gizmo
		Experience 9	Gravity
		Experience 10	Gravity Force PhET Lab
		Experience 11	Investigating Newton’s Laws of Motion
		Experience 12	Bumper Boats
		Experience 13	Bouncing Balls: Collisions and Momentum in Sports
		Experience 14	Elastic and Inelastic Collisions Investigation
		Experience 15	Car Project or Bat Project

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<p data-bbox="176 756 310 911">Unit 3 – Structure of Matter and Properties <i>6 weeks</i></p>	<p data-bbox="348 578 720 699">MS-PS1-1: Develop models to describe the atomic composition of simple molecules and extended structures.</p> <p data-bbox="348 740 720 894">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.</p> <p data-bbox="348 935 720 1122">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.</p>	Experience 1	Introduction to Elements, Atoms, Molecules, and Compounds
		Experience 2	Periodic Table Scavenger Hunt
		Experience 3	Build a Molecule PhET Simulation
		Experience 4	Structure of Table Salt Lab (Ionic Bonds)
		Experience 5	It's Getting Hot in Here (Covalent Bonds)
		Experience 6	Nuts and Bolts of Pure Substances
		Experience 7	Tic Tac Toe Mixtures and Pure Substances
		Experience 8	Wonders of Water
		Experience 9	Solving Solubility Lab
		Experience 10	Determining Density
		Experience 11	Liquid Rainbow
		Experience 12	Rise and Fall: Density at Work
		Experience 13	Dastardly Density
		Experience 14	The Boiling Point of Liquids
		Experience 15	Technicolor Atoms
		Experience 16	Who's Polluting the Chesapeake Bay?
		Experience 17	States of Matter Brochure
		Experience 18	Water Curve
		Experience 19	Phases of Water Gizmo
		Experience 20	States of Matter Basics PhET
		Experience 21	Phase Changes

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Unit 4 – Thermodynamics 3 weeks	<p>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.</p> <p>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.</p> <p>MS-PS3-3: Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.</p> <p>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.</p>	Experience 1	Temperature vs. Heat
		Experience 2	Which Type of Matter Transfers Thermal Energy the Fastest?
		Experience 3	Heat Transfer through Conduction
		Experience 4	Effect of Mass on Energy Transfer - First Law of Thermodynamics
		Experience 5	Heat Transfer through Convection
		Experience 6	Heat Transfer through Radiation Lab
		Experience 7	Thermos Project

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Unit 5 – Chemical Reactions <i>3 weeks</i>	<p>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.</p> <p>MS-PS1-3: Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.</p> <p>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.</p> <p>MS-PS1-6: Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.</p>	Experience 1	Law of Conservation of Mass
		Experience 2	Energy Changes in Chemical Reactions
		Experience 3	Reptile Incubator Lab
		Experience 4	Categorizing Physical and Chemical Properties & Mystery Powder Analysis Gizmo
		Experience 5	Physical vs. Chemical Changes
		Experience 6	Indicators of a Chemical Change
		Experience 7	Exploring Chemical Changes Lab
		Experience 8	Natural Resources and Synthetic Materials

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Unit 6 – Electromagnetic Forces <i>2 weeks</i>	<p>MS-PS2-3: Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.</p> <p>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.</p>	Experience 1	What are Magnetic Fields?
		Experience 2	Evaluating Experimental Design: Fields
		Experience 3	Planning and Carrying Out an Investigation-Fields
		Experience 4	Investigating Electromagnets
		Experience 5	Investigating Motors and Generators

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Unit 7 – Waves <i>4 weeks</i>	<p>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.</p> <p>MS-PS4-2: Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.</p> <p>MS-PS4-3: Integrate qualitative scientific and technical</p>	Experience 1	What are Waves?
		Experience 2	Wave Properties & Modeling
		Experience 3	Types of Waves
		Experience 4	Transverse/Light Waves
		Experience 5	RAT Material Temperature Activity

	information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.	Experience 6	Longitudinal/Compression/Sound Waves
		Experience 7	Analog vs Digital Signals
		Experience 8	Waves Project