

PRESTON PUBLIC SCHOOLS
Science Curriculum Revision to Align with NGSS
Grade Level Unit Plan Organizer
8th Grade

Grade Level	Unit Name	Unit Theme/Description	NGS Standards Included
8	Catapulting the Scientific Method to the Next Level	Students build a catapult to test how the length of a catapult arm affects the distance it can throw a marshmallow. Through this experience students holistically determine the importance of details in procedures and review the scientific method in preparation for experiments throughout the 8th grade year.	Science and Engineering Practices: 1. Asking Questions and Defining Problems 3. Planning and Carrying Out Investigations 4. Analyzing and Interpreting Data 6. Constructing Explanations and Designing Solutions 7. Engaging in Argument From Evidence 8. Obtaining, Evaluating and Communicating Information
8	Forces of Flight	Students explore how planes are able to fly and develop a model to explain how forces in our world produce our ability to fly and how changes to those forces affect flight patterns. In part two of this unit, students further their knowledge of Newton's laws by applying them beyond flight to multiple other aspects of life.	MS-PS2-1. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects; 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; 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.

8	Rollercoaster Physics	<p>By studying the forms of energy and their transformations, students will develop a model that demonstrates how rollercoaster engineers use science and engineering to create thrilling amusement park rides.</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; 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; 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.</p>
8	DeepWater Horizon - The Benefits and Drawbacks of a Petroleum Based World	<p>Students will develop an understanding of the DeepWater Horizon Oil Spill and the effects of our use of oil in our daily lives on the environment by studying the chemistry of hydrocarbons and the interactions of elements.</p> <p>Students will develop a model of why a teapot whistles including the role of phase changes, thermal energy, molecular motion, and chemical versus physical changes of molecules.</p> <p>All topics come together in understanding how we obtain energy from natural resources to create electricity.</p>	<p>MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures; 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; MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society; 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; 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; MS-PS1-6. Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes; MS-PS3-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer; MS-PS3-4. Plan an investigation to determine</p>

			<p>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> <p>MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing human impact on the environment;</p> <p>MS-ESS3-4: Construct an argument supported by evidence of how increases in human population and per capita consumption of natural resources impact Earth's systems.</p>
8	Hyperspeed Innovations: Will the Hyperloop Train Revolutionize How We Travel?	Students will be able to describe how the hyperloop train is possible through the use of electromagnetic forces	<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> <p>MS-PS2-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.</p>
8	Waves and Their Applications in Technologies for Information Transfer	Students will investigate waves and how they have been and are used in technology.	<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 information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.</p>