Science 8 Course Overview

Unit	Major Concepts	Skills	Summative Assessments
Chemical Interactions	All common matter on Earth is made of elements. Each element is represented by a unique, defining particle called an atom. Elements are arranged in the periodic table by both mass and chemical characteristics. A kinetic particulate model can be used to explain observations of the macroscopic properties and behaviors of solids, liquids, and gasses. All matter consists of individual particles in constant motion. Energy transfers to, from, and through matter when particles collide (conduction), and always from higher-energy particles to lower-energy particles. Phase of matter is determined by the relationship between the particles of a mass. Substances react chemically in characteristic ways with other substances to form new substances with different characteristic properties. In chemical reactions, mass and energy are conserved. Products of a chemical reaction are limited by the quantities of the reactants present.	Choose appropriate measurement instruments and units for specific tasks. Measure mass, volume, and temperature of substances accurately. Apply a kinetic particulate model to explain the behavior of solids, liquids, and gasses at the macroscopic and particle levels, including expansion, compression, contraction, and phase change. Calculate energy transfer in calories. Calculate heat of fusion from data. Use atom models and chemical formulas to demonstrate how reactants rearrange during chemical reactions to form new substances. Work collaboratively with peers to analyze science investigations. Apply scientific thinking processes to conduct investigations and build explanations. Apply the engineering design process to evaluate and optimize design options applying knowledge of conduction, convection, and radiation.	Lab reports and/or presentations summarizing controlled experiments Presenting results of independent research Mid-summative and Final Assessments Thermal Design Engineering Challenge

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Force and Motion	The motion of an object can be described by its position, direction of motion, and speed. Motion can be measured, calculated, and represented on a graph. An object that is not being subjected to a (net) force will continue to move at a constant speed. If more than one force acts on an object then the forces will reinforce or cancel one another, depending on their direction and magnitude. Unbalanced forces will change the speed or direction of an object's motion. Acceleration is the change in velocity of an object over time.	Describe an object's motion in terms of change of position. Apply equations to calculate linear motion and various aspects of change of position - distance, displacement, speed, velocity, and acceleration. Transform narrative accounts of motion events into graphic representations. Analyze illustrations of forces in motion. Gather, graph, and analyze data. Apply math skills in the context of science. Work collaboratively with peers to succeed and optimize design choices in NASA engineering challenges.	Lab reports and/or presentations summarizing controlled experiments Presenting results of independent research Quizzes Mid-summative and Final Exams Engineering Design Challenges

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Planetary Science	All perceptions of motion are relative to the observer's frame of reference. Scale is the size relationship between a representation of an object and the object. The Moon shines as a result of reflected light from the Sun. Half of the Moon is always illuminated (except during a lunar eclipse). Craters can be categorized by size and physical characteristics. The solar system formed during a sequence of events that started with a nebula. The distance between solar system objects is enormous. Liquid water is essential to life as we know it. Scientific missions provide data about the composition and environmental conditions on the planets, moons, and other bodies in the solar system. Planetary-system objects move in measurable and predictable patterns.	Compare and contrast apparent and real motion using examples and explain the role of the observer's frame of reference. Construct scale models of the Earth/Moon system and the solar system. Identify and classify major moon surface features. Use models of the Sun, Moon, and Earth to explain the mechanics of Moon phases. Describe the conditions required to produce solar and lunar eclipses, and explain why they do not occur every month. Determine the effect of meteoroid size and speed on crater characteristics. Use a spectroscope to analyze light coming from different light sources. Work collaboratively with peers to analyze science investigations. Apply scientific thinking processes to conduct investigations and build explanations.	Lab reports and/or presentations summarizing controlled experiments Presenting results of independent research Mid-summative and Final Assessments Engineering Design Challenges