



**Physical Science Frameworks Curriculum Guide
Introduction**

Crosscutting Concepts: Energy & Matter; Patterns; Systems & System Models; Structure & Function; Scale, Proportion, & Quantity; Cause & Effect

Topics: Types of energy; Changes in energy types

1-week Instructional Segment

Anchoring Phenomenon	GSE	Sample Lessons	Disciplinary Core Ideas	Science and Engineering Practices	Instructional Notes
<p>Overall- Cars and rockets require chemicals in constructing and in running. They require physics principles to move, and they cause waves through their motion.</p>	<p>All SPS7a</p>	<p>Introductory Unit- Energy and the Cross-cutting Concepts How does a car or rocket work?</p>	<p><i>By the end of grade 12</i> Formative assessment unit- NA In this short introduction unit teachers will elicit questions from students that will recur throughout the year as the students add to their knowledge about physical science.</p> <p>National Research Council. (2012). A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas</p>	<p>Asking questions</p> <p>Obtaining, evaluating and communicating Information</p> <p>Planning and carrying out investigations</p> <p>Developing and using models</p>	<p>It is important for students to keep a journal to use as a reference throughout the course. The culminating instructional segment will use information gained throughout the year.</p> <p>Safety Use proper safety precautions if you plan to use model rockets or other materials in your classroom.</p> <p>By the end of this unit, students are using the following language in their speaking and writing during EXPLAIN or ELABORATE.</p> <ul style="list-style-type: none"> ● Patterns ● Energy ● Models

					<ul style="list-style-type: none"> ● Systems ● Proportion ● Quantity ● Cause ● Effect ● Structure ● Function
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This instructional segment will connect to all other instructional segments throughout the year. The guiding standard (SPS7a) on energy transformation is key to all other units as energy is transformed in atoms through nuclear reactions, in the creation and breaking of bonds, in electricity generation and use, during motion from potential to kinetic energy, and in waves. The purpose of this unit is to give students a true “anchor” for all of physical science.

In instructional segment 2- Structure and Function of Matter, discuss properties of the elements and compounds used to build cars and/or rockets. In instructional segment 3- Stability and Change in Reactions, point out the chemical reactions in rockets and cars (combustion and others). In instructional segment 3- Energy and Matter, discuss rockets powered by nuclear energy or ones used to deliver nuclear weapons or about the potential uses for nuclear energy to power cars (generally through electricity production delivered to electric cars). In instructional segment 4- Cause and Effect in Force and Motion, the movement of a car and/or rocket is used as a model to explore velocity, acceleration, and other concepts. In instructional segment 6- Patterns in Waves, the Doppler effect that occurs when a car passes by or the sonic boom a rocket makes is used to help students explain these concepts. Finally, in instructional segment 7- Energy Capstone, students can use all of the physical science concepts they learned throughout the year to create model rockets and cars that are powered by simple chemical reactions and explain how a car and/or a rocket works. When students can see the patterns and connections within these units, they will certainly have mastered the physical science standards.