

## Content Expectations by Grade Span

**Discipline:** Physical Science (P)

**Standard:** Force and Motion (FM)

**Grade Span:** Middle School (5-7)

Content Statement Code	Content Statement
<i>P.FM.M.2</i>	<b><i>Force Interactions-</i></b> <i>Some forces between objects act when the objects are in direct contact (touching), such as friction and air resistance, or when they are not in direct contact (not touching), such as magnetic force, electric force, and gravitational force.</i>
Content Expectation Code	Content Expectation
<b>P.FM.05.21</b>	Distinguish between contact forces and non-contact forces.
<b>P.FM.05.22</b>	Demonstrate contact and non-contact forces to change the motion of an object.

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Content Statement Code	Content Statement
<i>P.FM.M.3</i>	<b>Force-</b> <i>Forces have a magnitude and direction. Forces can be added. The net force on an object is the sum of all of the forces acting on the object. The speed and/or direction of motion of an object changes when a non-zero net force is applied to it. A balanced force on an object does not change the motion of the object (the object either remains at rest or continues to move at a constant speed in a straight line).</i>
Content Expectation Code	Content Expectation
<b>P.FM.05.31</b>	Describe what happens when two forces act on an object in the same or opposing directions.
<b>P.FM.05.32</b>	Describe how constant motion is the result of balanced (zero net) forces.
<b>P.FM.05.33</b>	Describe how changes in the motion of objects are caused by a non-zero net (unbalance) force.
<b>P.FM.05.34</b>	Relate the size of change in motion to the strength of unbalanced forces and the mass of the object.

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Content Statement Code	Content Statement
<i>P.FM.M.4</i>	<i><b>Speed-</b> Motion can be described by a change in position relative to a point of reference. The motion of an object can be described by its speed and the direction it is moving. The position and speed of an object can be measured and graphed as functions of time.</i>
Content Expectation Code	Content Expectation
<b>P.FM.05.41</b>	Explain the motion of an object relative to its point of reference.
<b>P.FM.05.42</b>	Describe the motion of an object in terms of distance, time and direction, as the object moves, and in relationship to other objects.
<b>P.FM.05.43</b>	Illustrate how motion can be measured and represented on a graph.

## Content Expectations by Grade Span

**Discipline:** Physical Science (P)

**Standard:** Energy (EN)

**Grade Span:** Middle School (5-7)

Content Statement Code	Content Statement
<i>P.EN.M.1</i>	<b><i>Kinetic and Potential Energy-</i></b> <i>Objects and substances in motion have kinetic energy. Objects and substances may have potential energy due to their relative positions in a system. Gravitational, elastic, and chemical energy are all forms of potential energy.</i>
Content Expectation Code	Content Expectation
<b>P.EN.06.11</b>	Identify kinetic or potential energy in everyday situations (for example: stretched rubber band, objects in motion, ball on a hill, food energy).
<b>P.EN.06.12</b>	Demonstrate the transformation between potential and kinetic energy in simple mechanical systems (for example: roller coasters, pendulums).

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**Discipline:** Physical Science (P)

**Standard:** Energy (EN)

**Grade Span:** Middle School (5-7)

Content Statement Code	Content Statement
<i>P.EN.M.3</i>	<b><i>Waves and Energy-</i></b> <i>Waves have energy and transfer energy when they interact with matter. Examples of waves include sound waves, seismic waves, waves on water, and light waves.</i>
Content Expectation Code	Content Expectation
<b>P.EN.07.31</b>	Identify examples of waves, including sound waves, seismic waves, and waves on water.
<b>P.EN.07.32</b>	Describe how waves are produced by vibrations in matter.
<b>P.EN.07.33</b>	Demonstrate how waves transfer energy when they interact with matter (for example: tuning fork in water, waves hitting a beach, earthquake knocking over buildings).

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**Discipline:** Physical Science (P)

**Standard:** Energy (EN)

**Grade Span:** Middle School (5-7)

Content Statement Code	Content Statement
<i>P.EN.M.4</i>	<i><b>Energy Transfer-</b> Energy is transferred from a source to a receiver by radiation, conduction, and convection. When energy is transferred from a source to a receiver, the quantity of energy before the transfer is equal to the quantity of energy after the transfer.</i>
Content Expectation Code	Content Expectation
<b>P.EN.06.41</b>	Explain how different forms of energy can be transferred from one place to another by radiation, conduction, or convection.
<b>P.EN.06.42</b>	Illustrate how energy can be transferred while no energy is lost or gained in the transfer.
<b>P.EN.07.43</b>	Explain how light energy is transferred to chemical energy through the process of photosynthesis.

## Content Expectations by Grade Span

**Discipline:** Physical Science (P)

**Standard:** Energy (EN)

**Grade Span:** Middle School (5-7)

Content Statement Code	Content Statement
<i>P.EN.M.6</i>	<b><i>Solar Energy Effects-</i></b> Nuclear reactions take place in the sun producing heat and light. Only a tiny fraction of the light energy from the Sun reaches Earth, providing energy to heat the Earth.
Content Expectation Code	Content Expectation
<b>P.EN.07.61</b>	Identify that nuclear reactions take place in the sun, producing heat and light.
<b>P.EN.07.62</b>	Explain how only a tiny fraction of light energy from the sun is transformed to heat energy on earth.

## Content Expectations by Grade Span

**Discipline:** Physical Science (P)

**Standard:** Properties of Matter (PM)

**Grade Span:** Middle School (5-7)

Content Statement Code	Content Statement
<i>P.PM.M.1</i>	<b><i>Chemical Properties-</i></b> Matter has chemical properties. The understanding of chemical properties helps to explain how new substances are formed.
Content Expectation Code	Content Expectation
<b>P.PM.07.11</b>	Classify substances by their chemical properties (flammability, pH, acid-base indicators, reactivity).

## Content Expectations by Grade Span

**Discipline:** Physical Science (P)

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Content Statement Code	Content Statement
<i>P.PM.M.2</i>	<b><i>Elements and Compounds-</i></b> Elements are composed of a single kind of atom that are grouped into families with similar properties on the periodic table. Compounds are composed of two or more different elements. Each element and compound has a unique set of physical and chemical properties such as boiling point, density, color, conductivity, and reactivity.
Content Expectation Code	Content Expectation
<b>P.PM.07.21</b>	Identify the smallest component that makes up an element.
<b>P.PM.07.22</b>	Describe how the elements within the Periodic Table are organized by similar properties into families (highly reactive metals, less reactive metals, highly reactive nonmetals, and some almost completely non-reactive gases).
<b>P.PM.07.23</b>	Illustrate the structure of molecules using models or drawings (water, carbon dioxide, salt).
<b>P.PM.07.24</b>	List examples of physical and chemical properties of elements and compounds. (boiling point, density, color, conductivity, reactivity).

## Content Expectations by Grade Span

**Discipline:** Physical Science (P)

**Standard:** Changes in Matter (CM)

**Grade Span:** Middle School (5-7)

Content Statement Code	Content Statement
<i>P.CM.M.1</i>	<b><i>Changes in State-</i></b> Matter changing from state to state can be explained by using models which show that matter is composed of tiny particles in motion. When changes of state occur, the atoms and/or molecules are not changed in structure. When the changes in state occur, mass is conserved because matter is not created or destroyed.
Content Expectation Code	Content Expectation
<b>P.CM.06.11</b>	Describe and illustrate changes in state, in terms of the arrangement and relative motion of the atoms or molecules.
<b>P.CM.06.12</b>	Explain how mass is conserved as it changes from state to state in a closed system.

## Content Expectations by Grade Span

**Discipline:** Physical Science (P)

**Standard:** Changes in Matter (CM)

**Grade Span:** Middle School (5-7)

Content Statement Code	Content Statement
<i>P.CM.M.2</i>	<b><i>Chemical Changes-</i></b> <i>Chemical changes occur when two elements and/or compounds react and produce new substances. These new substances have different physical and chemical properties than the original elements and/or compounds. During the chemical change, the number and kind of atoms in the reactants are the same as the number and kind of atoms in the products. Mass is conserved during chemical changes. The mass of the reactants is the same as the mass of the products.</i>
Content Expectation Code	Content Expectation
<b>P.CM.07.21</b>	Identify evidence of chemical change through color, gas formation, solid formation, and temperature change.
<b>P.CM.07.22</b>	Compare and contrast the chemical properties of a new substance with the original after a chemical change.
<b>P.CM.07.23</b>	Describe the physical properties and chemical properties of the products and reactants in a chemical change.