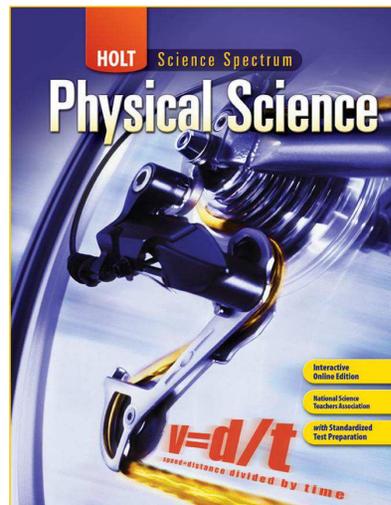


Holt Science Spectrum Physical Science



correlated to the

**Oklahoma Academic Standards for Science: Physical Science
Disciplinary Core Ideas**

Explanation of Correlation

The following document is a correlation of *Holt Science Spectrum: Physical Science* to the Oklahoma Academic Standards for Science: Disciplinary Core Ideas, Physical Science. The format for this correlation follows the same basic format established by the Oklahoma Academic Standards for Science, modified to accommodate the addition of page references. The correlation provides a cross-reference between the concepts and skills in the Oklahoma Academic Standards for Science and representative page numbers where those concepts and skills are taught or assessed. Those references marked with an asterisk represent pages which offer secondary support or where application of the required skill is implied

The references contained in this correlation reflect Houghton Mifflin Harcourt's interpretation of the concepts and skills outlined in Oklahoma Academic Standards for Science: Disciplinary Core Ideas, Physical Science.

Key to References

SE *Student Edition*
TE *Teacher's Edition*

Holt Science Spectrum: Physical Science

correlated to the

**Oklahoma Academic Standards: Disciplinary Core Ideas
Physical Science**

Oklahoma Academic Standards: Disciplinary Core Ideas Physical Science	Page Citations
HS-PS1-1: Matter and Its Interactions	
Structure and Properties of Matter: <ul style="list-style-type: none">Each atom has charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons.	SE/TE 115, 117-118, 119-124, 127, 128-131, 132, 134-135, 138-139, 140-141 TE Only 137
Structure and Properties of Matter: <ul style="list-style-type: none">The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states.	SE/TE 143, 145-150, 151-155, 156-164, 166-167, 170-171, 172-173 TE Only 169
HS-PS1-2: Matter and Its Interactions	
Structure and Properties of Matter: <ul style="list-style-type: none">The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states.	SE/TE 143, 145-150, 151-155, 156-164, 166-167, 170-171, 172-173 TE Only 169

Holt Science Spectrum: Physical Science correlated to the
 Oklahoma Academic Standards for Science: Disciplinary Core Ideas, Physical Science

Oklahoma Academic Standards: Disciplinary Core Ideas Physical Science	Page Citations
Chemical Reactions: <ul style="list-style-type: none"> The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. 	SE/TE 87-88, 217, 218, 225-229, 230-235, 237, 250, 252-253, 254
HS-PS1-5: Matter and Its Interactions	
Chemical Reactions: <ul style="list-style-type: none"> Chemical processes, their rates, and whether or not energy is stored or released can be understood in terms of the collisions of molecules and the rearrangements of atoms into new molecules, with consequent changes in the sum of all bond energies in the set of molecules that are matched by changes in kinetic energy. 	SE/TE 219-222, 223, 224, 238-241, 242-243, 247, 248-249, 252-253, 254-255
HS-PS1-7: Matter and Its Interactions	
Chemical Reactions: <ul style="list-style-type: none"> The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. 	SE/TE 87-88, 217, 218, 225-229, 230-235, 237, 250, 252-253, 254
HS-PS2-1: Motion and Stability: Forces and Interactions	
Forces and Motion: <ul style="list-style-type: none"> Newton’s second law accurately predicts changes in the motion of macroscopic objects 	SE/TE 400-402, 407, 420, 423 TE Only 421
HS-PS2-2: Motion and Stability: Forces and Interactions	
Forces and Motion: <ul style="list-style-type: none"> Momentum is defined for a particular frame of reference; it is the mass times the velocity of the object. If a system interacts with objects outside itself, the total momentum of the system can change; however, any such change is balanced by changes in the momentum of objects outside the system. 	SE/TE 414-417, 418-419, 423

Holt Science Spectrum: Physical Science correlated to the
 Oklahoma Academic Standards for Science: Disciplinary Core Ideas, Physical Science

Oklahoma Academic Standards: Disciplinary Core Ideas Physical Science	Page Citations
HS-PS2-3: Motion and Stability: Forces and Interactions	
Forces and Motion: <ul style="list-style-type: none"> If a system interacts with objects outside itself, the total momentum of the system can change; however, any such change is balanced by changes in the momentum of objects outside the system. 	SE/TE 414-417, 418-419, 423
Defining and Delimiting Engineering Problems (secondary to HS-PS2-3): <ul style="list-style-type: none"> Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. 	SE/TE 11, 427, 832-833 <u>Interactive Online Edition:</u> Chapter Resources: Chapter 7 Standardized Test Practice
HS-PS2-5: Motion and Stability: Forces and Interactions	
Types of Interactions: <ul style="list-style-type: none"> Forces at a distance are explained by fields (gravitational, electric, and magnetic) permeating space that can transfer energy through space. 	SE/TE 380-381, 405-410, 411, 422, 450, 452, 506, 590-592, 593-594, 617, 619-624, 625, 626-628, 629, 630-631, 632-634, 635, 636-637, 639, 640-641, 644-645, 647
Types of Interactions: <ul style="list-style-type: none"> Magnets or electric currents cause magnetic fields; electric charges or changing magnetic fields cause electric fields. 	SE/TE 381, 590-592, 593-594, 612-613, 617, 619-624, 625, 626-628, 629, 630-631, 632-634, 635, 639, 644-645, 647 TE Only 611
Definitions of Energy (secondary to HS-PS2-5): <ul style="list-style-type: none"> “Electrical energy” may mean energy stored in a battery or energy transmitted by electric currents. 	SE/TE 343, 349, 450, 458, 594-595, 634, 636-637

Holt Science Spectrum: Physical Science correlated to the
 Oklahoma Academic Standards for Science: Disciplinary Core Ideas, Physical Science

Oklahoma Academic Standards: Disciplinary Core Ideas Physical Science	Page Citations
HS-PS3-1: Energy	
<p>Definitions of Energy:</p> <ul style="list-style-type: none"> Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's total energy is conserved, even as, within the system, energy is continually transferred from one object to another and between its various possible forms. 	<p>SE/TE 87-88, 444-450, 451, 452, 466</p>
<p>Conservation of Energy and Energy Transfer:</p> <ul style="list-style-type: none"> Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system. 	<p>SE/TE 87-88, 456-457, 461, 467</p>
<p>Conservation of Energy and Energy Transfer:</p> <ul style="list-style-type: none"> Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. 	<p>SE/TE 87-88, 453-457, 458, 459-461, 462-463, 466-467, 469</p>
<p>Conservation of Energy and Energy Transfer:</p> <ul style="list-style-type: none"> Mathematical expressions, which quantify how the stored energy in a system depends on its configuration (e.g. relative positions of charged particles, compression of a spring) and how kinetic energy depends on mass and speed, allow the concept of conservation of energy to be used to predict and describe system behavior. 	<p>SE/TE 462-445-448, 452, 454, 455, 463</p>
<p>Conservation of Energy and Energy Transfer:</p> <ul style="list-style-type: none"> The availability of energy limits what can occur in any system. 	<p>SE/TE 456-457, 459, 460-461, 490-491, 493</p>

Holt Science Spectrum: Physical Science correlated to the
 Oklahoma Academic Standards for Science: Disciplinary Core Ideas, Physical Science

Oklahoma Academic Standards: Disciplinary Core Ideas Physical Science	Page Citations
HS-PS3-2: Energy	
<p>Definitions of Energy:</p> <ul style="list-style-type: none"> Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system’s total energy is conserved, even as, within the system, energy is continually transferred from one object to another and between its various possible forms. 	<p>SE/TE 87-88, 444-450, 451, 452, 466</p>
<p>Definitions of Energy:</p> <ul style="list-style-type: none"> At the macroscopic scale, energy manifests itself in multiple ways, such as in motion, sound, light, and thermal energy. These relationships are better understood at the microscopic scale, at which all of the different manifestations of energy can be modeled as a combination of energy associated with the motion of particles and energy associated with the configuration (relative position of the particles). In some cases the relative position energy can be thought of as stored in fields (which mediate interactions between particles). This last concept includes radiation, a phenomenon in which energy stored in fields moves across space. 	<p>SE/TE 80-81, 240, 444-450, 451, 452, 474, 480-482, 487, 498, 543-545, 551, 552-554, 558, 578, 593-595</p> <p>TE Only 577</p>
HS-PS3-3: Energy	
<p>Definitions of Energy:</p> <ul style="list-style-type: none"> At the macroscopic scale, energy manifests itself in multiple ways, such as in motion, sound, light, and thermal energy. 	<p>SE/TE 80-81, 240, 444-450, 451, 452, 474, 480-482, 487, 498, 543-545, 551, 552-554, 558, 578</p> <p>TE Only 577</p>

Holt Science Spectrum: Physical Science correlated to the
 Oklahoma Academic Standards for Science: Disciplinary Core Ideas, Physical Science

Oklahoma Academic Standards: Disciplinary Core Ideas Physical Science	Page Citations
<p>Defining and Delimiting Engineering Problems (secondary to HS-PS2-3):</p> <ul style="list-style-type: none"> Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. 	<p>SE/TE 11, 427, 832-833</p> <p><u>Interactive Online Edition:</u> Chapter Resources: Chapter 7 Standardized Test Practice</p>
<p><i>* Connections to Engineering, Technology, and Application of Science</i></p> <p>Interdependence of Science, Engineering, and Technology:</p> <ul style="list-style-type: none"> Modern civilization depends on major technological systems. Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. 	<p>SE/TE 8, 165, 343, 347, 399, 488-489, 550, 559, 604, 629</p>
HS-PS3-4: Energy	
<p>Conservation of Energy and Energy Transfer:</p> <ul style="list-style-type: none"> Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. 	<p>SE/TE 87-88, 453-457, 458, 459-461, 462-463, 466-467, 469</p>
<p>Conservation of Energy and Energy Transfer:</p> <ul style="list-style-type: none"> Uncontrolled systems always evolve toward more stable states— that is, toward more uniform energy distribution (e.g., water flows downhill, objects hotter than their surrounding environment cool down). 	<p>SE/TE 244-247, 330-331, 333-336, 338, 352-353, 456-457, 478-479, 491</p>

Holt Science Spectrum: Physical Science correlated to the
 Oklahoma Academic Standards for Science: Disciplinary Core Ideas, Physical Science

Oklahoma Academic Standards: Disciplinary Core Ideas Physical Science	Page Citations
HS-PS4-1: Waves and Their Applications in Technologies for Information Transfer	
Wave Properties: <ul style="list-style-type: none"> The wavelength and frequency of a wave are related to one another by the speed of travel of the wave, which depends on the type of wave and the medium through which it is passing. 	SE/TE 514-516, 518-521, 523, 530-531, 532, 534-535, 543-544, 551, 554-555, 558 TE Only 533
HS-PS4-2: Waves and Their Applications in Technologies for Information Transfer	
Wave Properties: <ul style="list-style-type: none"> Information can be digitized (e.g., a picture stored as the values of an array of pixels); in this form, it can be stored reliably in computer memory and sent over long distances as a series of wave pulses. 	SE/TE* 165, 559, 605
<p><i>* Connections to Engineering, Technology, and Application of Science</i></p> <p>Interdependence of Science, Engineering, and Technology:</p> <ul style="list-style-type: none"> Modern civilization depends on major technological systems. Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. 	SE/TE 8, 165, 343, 347, 399, 488-489, 550, 559, 604, 629
HS-PS4-4: Waves and Their Applications in Technologies for Information Transfer	
Electromagnetic Radiation: <ul style="list-style-type: none"> When light or longer wavelength electromagnetic radiation is absorbed in matter, it is generally converted into thermal energy (heat). 	SE/TE 482, 557

Holt Science Spectrum: Physical Science correlated to the
 Oklahoma Academic Standards for Science: Disciplinary Core Ideas, Physical Science

Oklahoma Academic Standards: Disciplinary Core Ideas Physical Science	Page Citations
<p>Electromagnetic Radiation:</p> <ul style="list-style-type: none"> Shorter wavelength electromagnetic radiation (ultraviolet, X-rays, gamma rays) can ionize atoms and cause damage to living cells. 	<p>SE/TE 123, 329, 558</p>
<p>Electromagnetic Radiation:</p> <ul style="list-style-type: none"> Photoelectric materials emit electrons when they absorb light of a high-enough frequency. 	<p>SE/TE* 461 TE Only* 556</p>