

# SCIENCE FUSION



Houghton Mifflin Harcourt™

**ScienceFusion**

correlated to the

**Oklahoma Academic Standards for Science:  
Disciplinary Core Ideas**      **Grade 8**

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<p>Oklahoma Academic Standards: Disciplinary Core Ideas Grade 8</p>	<p><b>Citations</b></p> <p>In the <i>ScienceFusion</i> digital curriculum, students encounter the same science concepts, vocabulary, and inquiry as they see in the Student Edition, but written with new examples or scenarios to provide an alternative digital experience for every write-in textbook lesson.</p>	
<p><b>MS-PS1-3: Matter and Its Interactions</b></p>		
<p><b>Structure and Properties of Matter:</b></p> <ul style="list-style-type: none"> <li>Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it.</li> </ul>	<p><b>SE/Digital Curriculum</b></p>	<p>Print: Mod H U1 L4: Pure Substances and Mixtures pp. 50-63; Mod H U3 L2: The Periodic Table pp. 168-179</p>
<p><b>Chemical Reactions:</b></p> <ul style="list-style-type: none"> <li>Substances react chemically in characteristic ways.</li> <li>In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants.</li> </ul>	<p><b>TE/Digital Curriculum</b></p>	<p>Mod H U1 L4: Pure Substances and Mixtures pp. 68-82; Mod H U3 L2: The Periodic Table pp. 214-227</p> <p>Mod H U4 L1: Chemical Reactions pp. 212-223</p> <p>Mod H U4 L1: Chemical Reactions pp. 272-285</p>

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<p><i>Connections to Engineering, Technology, and Application of Science</i></p> <p><b>Interdependence of Science, Engineering, and Technology:</b></p> <ul style="list-style-type: none"> <li>Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems.</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod K U3 L1: The Engineering Design Process, pp. 114-125; Mod K U3 L5: Engineering and Life Science, pp.168-179; Mod K U3 L6: Engineering and Life Science, pp.180-191</p> <p><b>TE/Digital Curriculum</b> Mod K U3 L1: The Engineering Design Process, pp. 150-163; Mod K U3 L5: Engineering and Life Science, pp.214-227; Mod K U3 L6: Engineering and Our World, pp.228-241</p>
<p><b>Interdependence of Science, Engineering, and Technology on Society and the Natural World:</b></p> <ul style="list-style-type: none"> <li>The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod K U3 L6: Engineering and Our World pp. 180-191</p> <p><b>TE/Digital Curriculum</b> Mod K U3 L6: Engineering and Our Word pp. 236-241</p>

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<p><b>MS-PS1-5: Matter and Its Interactions</b></p>	
<p><b>Chemical Reactions:</b></p> <ul style="list-style-type: none"> <li>Substances react chemically in characteristic ways.</li> <li>In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants.</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod H U4 L1: Chemical Reactions pp. 212-223</p> <p><b>TE/Digital Curriculum</b> Mod H U4 L1: Chemical Reactions pp. 272-285</p>
<p><b>Chemical Reactions:</b></p> <ul style="list-style-type: none"> <li>The total number of each type of atom is conserved, and thus the mass does not change.</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod H U4 L1: Chemical Reactions pp. 212-223</p> <p><b>TE/Digital Curriculum</b> Mod H U4 L1: Chemical Reactions pp. 272-285</p>
<p><i>Connections to Engineering, Technology, and Application of Science</i></p> <p><b>Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena:</b></p> <ul style="list-style-type: none"> <li>Laws are regularities or mathematical descriptions of natural phenomena.</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod K U1 L3: Scientific Knowledge pp. 30-41</p> <p><b>TE/Digital Curriculum</b> Mod K U1 L3: Scientific Knowledge pp. 42-55</p>

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<p><b>MS-PS1-6: Matter and Its Interactions</b></p>		
<p><b>Chemical Reactions:</b></p> <ul style="list-style-type: none"> <li>Some chemical reactions release energy, others store energy.</li> </ul>	<p><b>SE/Digital Curriculum</b></p> <p><b>TE/Digital Curriculum</b></p>	<p>Mod H U4 L1: Chemical Reactions pp. 212-223</p> <p>Mod H U4 L1: Chemical Reactions pp. 272-285</p>
<p><b>Developing Possible Solutions:</b> (secondary to MS-PS1-6)</p> <ul style="list-style-type: none"> <li>A solution needs to be tested, and then modified on the basis of the test results, in order to improve it.</li> </ul>	<p><b>SE/Digital Curriculum</b></p> <p><b>TE/Digital Curriculum</b></p>	<p>Mod K U3 L1: The Engineering Design Process pp. 114-125</p> <p>Mod K U3 L1: The Engineering Design Process pp. 150-163</p>
<p><b>Optimizing the Design Solution:</b> (secondary to MS-PS1-6)</p> <ul style="list-style-type: none"> <li>Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of the characteristics may be incorporated into the new design.</li> <li>The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution.</li> </ul>	<p><b>SE/Digital Curriculum</b></p> <p><b>TE/Digital Curriculum</b></p>	<p>Mod K U3 L1: The Engineering Design Process pp. 114-125</p> <p>Mod K U3 L1: The Engineering Design Process pp. 150-163</p>

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<p><b>MS-PS2-1: Motion and Stability: Forces and Interactions</b></p>	
<p><b>Forces and Motion:</b></p> <ul style="list-style-type: none"> <li>For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton’s third law).</li> </ul>	<p><b>SE/Digital Curriculum</b> Print: Mod I U1 L3: Forces pp. 28-41</p> <p><b>TE/Digital Curriculum</b> Mod I U1 L3: Forces pp. 44-58</p>
<p><i>Connections to Engineering, Technology, and Application of Science</i></p> <p><b>Interdependence of Science, Engineering, and Technology on Society and the Natural World:</b></p> <ul style="list-style-type: none"> <li>The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod K U3 L6: Engineering and Our World pp. 180-191</p> <p><b>TE/Digital Curriculum</b> Mod K U3 L6: Engineering and Our Word pp. 236-241</p>

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<p><b>MS-PS2-2: Motion and Stability: Forces and Interactions</b></p>	
<p><b>Forces and Motion:</b></p> <ul style="list-style-type: none"> <li>• The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change.</li> <li>• The greater the mass of the object, the greater the force needed to achieve the same change in motion</li> <li>• For any given object, a larger force causes a larger change in motion</li> </ul>	<p><b>SE/Digital Curriculum</b> Print: Mod I U1 L3: Forces pp. 28-41</p> <p><b>TE/Digital Curriculum</b> Mod I U1 L3: Forces pp. 44-58</p>
<p><b>MS-PS4-1: Waves and Their Applications in Technologies for Informational Transfer</b></p>	
<p><b>Waves Properties:</b></p> <ul style="list-style-type: none"> <li>• A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude.</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod J U1 L2: Properties of Waves pp. 16-25</p> <p><b>TE/Digital Curriculum</b> Mod J U1 L2: Properties of Waves pp. 26-38</p>
<p><b>MS-PS4-2: Waves and Their Applications in Technologies for Informational Transfer</b></p>	
<p><b>Waves Properties:</b></p> <ul style="list-style-type: none"> <li>• A sound wave needs a medium through which it is transmitted.</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod J U2 L2: Interactions of Sound Waves pp. 48-59</p> <p><b>TE/Digital Curriculum</b> Mod J U2 L2: Interactions of Sound Waves pp. 68-81</p>

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<p><b>Electromagnetic Radiation:</b></p> <ul style="list-style-type: none"> <li>When light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object’s material and the frequency (color) of the light.</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod J U3 L2: Interactions of Light pp. 94-103</p> <p><b>TE/Digital Curriculum</b> Mod J U3 L2: Interactions of Light pp. 128-140</p>
<p><b>Electromagnetic Radiation:</b></p> <ul style="list-style-type: none"> <li>The path that light travels can be traced as straight lines, except at surfaces between different transparent materials (e.g., air and water, air and glass) where the light path bends.</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod J U3 L2: Interactions of Light pp. 94-103</p> <p><b>TE/Digital Curriculum</b> Mod J U3 L2: Interactions of Light pp. 128-140</p>
<p><b>Electromagnetic Radiation:</b></p> <ul style="list-style-type: none"> <li>A wave model of light is useful for explaining brightness, color, and the frequency-dependent bending of light at a surface between media. However, because light can travel through space, it cannot be a matter wave, like sound or water waves</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod J U1 L1: Waves pp. 4-13; Mod J U3 L1: The Electromagnetic Spectrum pp. 82-93</p> <p><b>TE/Digital Curriculum</b> Mod J U1 L1: Waves pp. 10-22; Mod J U3 L1: The Electromagnetic Spectrum pp. 114-127</p>



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<p><b>MS-PS4-3: Waves and Their Applications in Technologies for Informational Transfer</b></p>		
<p><b>Information Technologies and Instrumentation:</b></p> <ul style="list-style-type: none"> <li>Digitized signals (sent as wave pulses) are a more reliable way to encode and transmit information.</li> </ul>	<p><b>SE/Digital Curriculum</b></p> <p><b>TE/Digital Curriculum</b></p>	<p>Mod J U2 L3: Sound Technology pp. 62-71</p> <p>Mod J U2 L3: Sound Technology pp. 84-96</p>
<p><b>MS-LS1-7: From Molecules to Organisms: Structure and Processes</b></p>		
<p><b>Organization for Matter and Energy Flow in Organisms:</b></p> <ul style="list-style-type: none"> <li>Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy.</li> </ul>	<p><b>SE/Digital Curriculum</b></p> <p><b>TE/Digital Curriculum</b></p>	<p>Mod A U1 L6: Photosynthesis and Cellular Respiration pp. 66-77</p> <p>Mod A U1 L6: Photosynthesis and Cellular Respiration pp. 92-105</p>
<p><b>Energy in Chemical Processes and Everyday Life:</b> (secondary to MS-LS1-7)</p> <ul style="list-style-type: none"> <li>Cellular respiration in plants and animals involve chemical reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials.</li> </ul>	<p><b>SE/Digital Curriculum</b></p> <p><b>TE/Digital Curriculum</b></p>	<p>Mod A U1 L6: Photosynthesis and Cellular Respiration pp. 66-77</p> <p>Mod A U1 L6: Photosynthesis and Cellular Respiration pp. 92-105</p>

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<p><b>MS-LS4-1: Biological Unity and Diversity</b></p>	
<p><b>Evidence of Common Ancestry and Diversity:</b></p> <ul style="list-style-type: none"> <li>The collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers in which they are found) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth.</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod B U1 L4: The History of Life on Earth pp. 38-49</p> <p><b>TE/Digital Curriculum</b> Mod B U1 L4: The History of Life on Earth pp. 58-71</p>
<p><b>MS-LS4-2: Biological Unity and Diversity</b></p>	
<p><b>Evidence of Common Ancestry and Diversity:</b></p> <ul style="list-style-type: none"> <li>The collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers in which they are found) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth.</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod B U1 L4: The History of Life on Earth pp. 38-49</p> <p><b>TE/Digital Curriculum</b> Mod B U1 L4: The History of Life on Earth pp. 58-71</p>

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<p><b>MS-ESS1-4: Earth’s Place in the Universe</b></p>	
<p><b>The History of Planet Earth:</b></p> <ul style="list-style-type: none"> <li>• The geologic time scale interpreted from rock strata provides a way to organize Earth’s history.</li> <li>• Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale.</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod E U2 L4: The Geologic Time Scale pp. 118-129</p> <p><b>TE/Digital Curriculum</b> Mod E U2 L4: The Geologic Time Scale pp. 150-163</p>
<p><b>MS-ESS2-1: Earth’s Systems</b></p>	
<p><b>Earth’s Materials and Systems:</b></p> <ul style="list-style-type: none"> <li>• All Earth processes are the result of energy flowing and matter cycling within and among the planet’s systems. This energy is derived from the sun and Earth’s hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth’s materials and living organisms.</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod E U1 L1: Earth’s Spheres pp. 4-16</p> <p><b>TE/Digital Curriculum</b> Mod E U1 L1: Earth’s Spheres pp. 14-28</p>
<p><b>MS-ESS2-2: Earth’s Systems</b></p>	
<p><b>Earth’s Materials and Systems:</b></p> <ul style="list-style-type: none"> <li>• The planet’s systems interact over scales that range from microscopic to global in size. These interactions have shaped Earth’s history and will determine its future.</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod E U2 L1: Geologic Change over Time pp. 78-91</p> <p><b>TE/Digital Curriculum</b> Mod E U2 L1: Geologic Change over Time pp. 104-118</p>

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<p><b>The Roles of Water in Earth’s Surface Processes:</b></p> <ul style="list-style-type: none"> <li>Water’s movements—both on the land and underground—cause weathering and erosion, which change the land’s surface features and create underground formations.</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod E U1 L2: Weathering pp. 18-27; Mod E U1 L3: Erosion and Deposition by Water pp. 28-41</p> <p><b>TE/Digital Curriculum</b> Mod E U1 L2: Weathering pp. 30-42; Mod E U1 L3: Erosion and Deposition by Water pp. 44-58</p>
<p><b>MS-ESS2-3: Earth’s Systems</b></p>	
<p><b>The History of Planet Earth:</b> (Secondary to 8-ESS2-3)</p> <ul style="list-style-type: none"> <li>Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches.</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod E U4 L2: Plate Tectonics pp. 200-213</p> <p><b>TE/Digital Curriculum</b> Mod E U4 L2: Plate Tectonics pp. 256-270</p>
<p><b>Plate Tectonics and Large-Scale System Interactions:</b></p> <ul style="list-style-type: none"> <li>Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth’s plates have moved great distances, collided, and spread apart</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod E U4 L2: Plate Tectonics pp. 200-213</p> <p><b>TE/Digital Curriculum</b> Mod E U4 L2: Plate Tectonics pp. 256-270</p>



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<b>MS-ESS3-2: Earth and Human Activity</b>	
<p><b>Human Impacts on Earth Systems:</b></p> <ul style="list-style-type: none"> <li>Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise</li> </ul>	<p><b>SE/Digital Curriculum</b> Mod D U4 L1: Human Impact on Water pp. 206-219; Mod D U4 L2: Human Impact on Land pp. 222-231; Mod D U4 L3: Human Impact on the Atmosphere pp. 232-243; Mod D U4 L4: Protecting Earth’s Water, Land, and Air pp. 244-257</p> <p><b>TE/Digital Curriculum</b> Mod D U4 L1: Human Impact on Water pp. 266-280; Mod D U4 L2: Human Impact on Land pp. 284-296; Mod D U4 L3: Human Impact on the Atmosphere pp. 298-311; Mod D U4 L4: Protecting Earth’s Water, Land, and Air pp. 312-326</p>