

## Grade 5 Science Unit: Structures (STR)

Unifying Theme: System, Order and Organization

<b>Why</b>	<b>What</b>	<b>How</b>
<p><b>Enduring Understandings</b></p> <ul style="list-style-type: none"> <li>• The force of a load on a structure has to be balanced by the forces produced by the structure.</li> <li>• The strength of a structure is determined by its materials and shape.</li> </ul>	<p><b>Essential Questions</b></p> <ul style="list-style-type: none"> <li>• Why do structures stand?</li> <li>• What forces affect a structure’s ability to stand?</li> <li>• What are some principles of good construction?</li> <li>• How can a structure be made stronger?</li> </ul>	<p><b>Major Indicators, Prioritized</b></p> <ul style="list-style-type: none"> <li>• 1.5.6 use appropriate instruments (e.g., metric scales, beakers, meter sticks...) and metric units when making measurements and collecting data. (MLO 1.1.5)</li> <li>• 1.5.22 explain that observing the changes in models may simulate how real objects act when those same changes are applied. (MLO 1.4.1)</li> <li>• 5.5.3 explain that forces acting on objects cause actions and reactions (e.g., objects falling, rolling, and bouncing).</li> <li>• 1.5.24 design, plan, and construct things in response to a particular need or problem (e.g., instruments, machines, structures, and systems).</li> </ul>
		<p><b>Assessment Examples</b></p> <p>Pre-assessment:</p> <ul style="list-style-type: none"> <li>• “Structures Introductory Questionnaire”#1-4 in kit.</li> </ul> <p>Formative Assessment:</p> <ul style="list-style-type: none"> <li>• In lesson 5, use metric scales to make measurements and collect data to calculate the ratio of dead load to live load.</li> </ul> <p>Summative Assessment:</p> <ul style="list-style-type: none"> <li>• “Doctor Aqua’s Problem” developed by MCPS Science Office.</li> </ul>

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### How

Suggested Instructional Sequence	Differentiation Examples
<ul style="list-style-type: none"> <li>• Exploring Structures in the Neighborhood (Scientific Inquiry)               <ul style="list-style-type: none"> <li>- Take a field trip to look at structures and materials.</li> </ul> </li> <li>• Making a First Straw Structure (Scientific Inquiry)               <ul style="list-style-type: none"> <li>- Learn about the characteristics of straws and paperclips.</li> </ul> </li> <li>• Dead Loads/Live Loads (Scientific Inquiry, Critical Thinking)               <ul style="list-style-type: none"> <li>- Learn what it feels like to be a structure.</li> </ul> </li> <li>• Live Load Challenge (Scientific Inquiry, Critical Thinking)               <ul style="list-style-type: none"> <li>- Make improvements to straw structures based on feedback.</li> </ul> </li> <li>• Building Good Structural Frameworks (Scientific Inquiry, Applications)               <ul style="list-style-type: none"> <li>- Discover the value of beams, columns, and diagonals.</li> </ul> </li> <li>• Build Structures with Index Cards (Scientific Inquiry, Critical Thinking, Applications)               <ul style="list-style-type: none"> <li>- Different materials are useful for different functions.</li> </ul> </li> <li>• Working with Tension and Compression (Critical Thinking, Applications)               <ul style="list-style-type: none"> <li>- Learn about tension and compression in structures.</li> </ul> </li> <li>• Building Bridges (Applications, Technology)               <ul style="list-style-type: none"> <li>-Solve a problem of building a freestanding bridge.</li> </ul> </li>   <li>• Career Awareness               <ul style="list-style-type: none"> <li>-Engage students in career awareness activities to learn about structure engineers and urban planners.</li> </ul> </li> </ul>	<p>Challenge:</p> <ul style="list-style-type: none"> <li>• Challenge students to research shapes and designs in nature. Apply these ideas to design and build a new structure.</li> </ul> <p>Adjust:</p> <ul style="list-style-type: none"> <li>• Adjust materials through the Structures kit by using Lincoln logs, Duplos and large wooden building blocks instead of straws, paper clips, and index cards.</li> </ul> <p>ESOL:</p> <ul style="list-style-type: none"> <li>• Provide demonstration in step by step direction for using the materials.</li> </ul>