

West Deptford Middle School Curriculum Map  
Engineering Design - Grade 7

Unit/ Duration	Essential Questions	Content	Skills	Assessment	Standards
<p>Engineering Design 7</p> <p>45 Total Sessions</p> <p>Unit 01: Design and Problem Solving Loop</p> <p>6 Sessions</p>	<ul style="list-style-type: none"> <li>• How do safety choices I make as an individual affect myself and people around me?</li> <li>• In a world of constant technological change, what skills should I learn?</li> <li>• How does technology extend human abilities?</li> <li>• Why is the Design and Problem Solving Loop iterative (i.e. why is it a loop)?</li> </ul>	<ul style="list-style-type: none"> <li>• How to safely choose and use equipment, tools, and materials</li> <li>• Classroom rules and procedures, safety rules</li> <li>• Equipment and supplies</li> <li>• 6 Steps of the Design and Problem Solving Loop (Define the Problem, Set Goals, Brainstorm, Pick one Alternative, Design and Build, Test for Goals)</li> <li>• Self-assessment process</li> <li>• Testing as it relates to the Design and Problem Solving Loop, i.e.</li> </ul>	<ul style="list-style-type: none"> <li>• Learning and Reviewing of the Design and Problem Solving Process.</li> <li>• Brainstorming Skills</li> <li>• Decision Making Skills</li> </ul>	<ul style="list-style-type: none"> <li>• Teacher observation.</li> <li>• Grading of technological project.</li> <li>• Classwork / class participation</li> <li>• Oral/Written Test/Quiz.</li> </ul>	<p><u>English / Language Arts Standards</u></p> <ul style="list-style-type: none"> <li>• LA.6-8.CCSS.ELA-Literacy.RST.6-8.3</li> <li>• LA.6-8.CCSS.ELA-Literacy.RST.6-8.4</li> </ul> <p><u>21<sup>st</sup> Century Life and Careers</u></p> <ul style="list-style-type: none"> <li>• WORK.5-8.9.1.8</li> <li>• WORK.K-12.9.1.B.2</li> <li>• WORK.K-12.9.2.A.1</li> <li>• WORK.K-12.9.2.F.1</li> </ul> <p><u>Comprehensive Health and Physical Education</u></p> <ul style="list-style-type: none"> <li>• HE.7-8.</li> <li>• HE.7-8.2.1.8.D.1</li> <li>• HE.7-8.2.1.8.D.2</li> <li>• HE.5-6.</li> </ul> <p><u>Technology Standards</u></p> <ul style="list-style-type: none"> <li>• TEC.5-8.8.2.8</li> <li>• TEC.K-12.8.1.A.1</li> <li>• TEC.K-12.8.1.B.1</li> <li>• TEC.K-12.8.2.B.2</li> <li>• TEC.K-12.8.2.C.1</li> <li>• TEC.K-12.8.2.C.2</li> </ul>

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		Destructive Testing versus Non-Destructive Testing, and when each is appropriate			
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<p>Engineering Design 7</p> <p>Unit 02: Transportation Structures (Model Truss Bridge)</p> <p>21 Sessions</p>	<ul style="list-style-type: none"> <li>• How do safety choices I make as an individual affect myself and people around me?</li> <li>• In a world of constant technological change, what skills should I learn?</li> <li>• How does technology extend human abilities?</li> </ul>	<ul style="list-style-type: none"> <li>• How to safely choose and use equipment, tools, and materials</li> <li>• Classroom rules and procedures, safety rules</li> <li>• Equipment and supplies</li> <li>• Bridge building activities and material strength testing</li> <li>• Differences between</li> </ul>	<ul style="list-style-type: none"> <li>• Application of the Design and Problem Solving Process, Brainstorming, Constructing, Model Testing.</li> <li>• Research Skills</li> <li>• Complete a self-evaluation of their TLA project.</li> <li>• Project design techniques using criteria supplied by the teacher</li> </ul>	<ul style="list-style-type: none"> <li>• Destructive test of model (weight capacity testing of bridge)</li> <li>• Teacher observation.</li> <li>• Grading of technological project.</li> <li>• Classwork / class participation</li> <li>• Oral/Written Test/Quiz.</li> </ul>	<p><b><u>English / Language Arts Standards</u></b></p> <ul style="list-style-type: none"> <li>• LA.6-8.CCSS.ELA-Literacy.RST.6-8.3</li> <li>• LA.6-8.CCSS.ELA-Literacy.RST.6-8.4</li> </ul> <p><b><u>21<sup>st</sup> Century Life and Careers</u></b></p> <ul style="list-style-type: none"> <li>• WORK.5-8.9.1.8</li> <li>• WORK.K-12.9.1.B.2</li> <li>• WORK.K-12.9.2.A.1</li> <li>• WORK.K-12.9.2.F.1</li> </ul> <p><b><u>Comprehensive Health and Physical Education</u></b></p> <ul style="list-style-type: none"> <li>• HE.7-8.</li> <li>• HE.7-8.2.1.8.D.1</li> <li>• HE.7-8.2.1.8.D.2</li> <li>• HE.5-6.</li> </ul>

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	<ul style="list-style-type: none"> <li>• How should I orient structural members to achieve maximum strength?</li> <li>• How does cross-bracing affect the strength of bridge beams?</li> <li>• Why are communication skills and public speaking skills important</li> </ul>	<p>columns, beams, stiffener bracing, and trusses.</p> <ul style="list-style-type: none"> <li>• Designing their model truss bridge project using basic criteria as supplied by the teacher</li> <li>• Self-assessment process</li> <li>• Techniques in completing a project</li> <li>• Testing as it relates to the Design and Problem Solving Loop / Destructive Testing</li> <li>• Terminology used in project</li> </ul>	<ul style="list-style-type: none"> <li>• Follow proper techniques in construction of project as demonstrated by the teacher.</li> <li>• Properly select and use equipment and supplies while building TLA Project.</li> <li>• Use the proper terms while constructing a TLA project.</li> <li>• Work safely when handling/operating tools and equipment.</li> <li>• Documentation of the Step by Step process used in designing and constructing a project</li> <li>• Literacy across the curriculum /</li> </ul>	<ul style="list-style-type: none"> <li>• Self-assessment by use of rubric.</li> <li>• Teacher assessment by use of project rubric</li> <li>• Measurement of Project</li> </ul>	<p><b><u>Technology Standards</u></b></p> <ul style="list-style-type: none"> <li>• <b>TEC.5-8.8.2.8</b></li> <li>• <b>TEC.K-12.8.1.A.1</b></li> <li>• <b>TEC.K-12.8.1.B.1</b></li> <li>• <b>TEC.K-12.8.2.B.2</b></li> <li>• <b>TEC.K-12.8.2.C.1</b></li> <li>• <b>TEC.K-12.8.2.C.2</b></li> </ul>
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			public speaking skills	
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Unit/ Duration	Essential Questions	Content	Skills	Assessment	Standards
<p>Engineering Design 7</p> <p>Unit 03: Transportation Vehicles (Model CO<sub>2</sub> Race Car)</p> <p>18 Sessions</p>	<ul style="list-style-type: none"> <li>• How do safety choices I make as an individual affect myself and people around me?</li> <li>• In a world of constant technological change, what skills should I learn?</li> <li>• How does technology extend human abilities?</li> <li>• How does the shape and weight</li> </ul>	<ul style="list-style-type: none"> <li>• How to safely choose and use equipment, tools, and materials</li> <li>• Classroom rules and procedures, safety rules</li> <li>• Equipment and supplies</li> <li>• Aerodynamics / automotive principles and terminology, including thrust vs. drag, friction, speed, velocity, acceleration, car body, axles, wheels, engine</li> </ul>	<ul style="list-style-type: none"> <li>• Application of the Design and Problem Solving Process.</li> <li>• Complete a self-evaluation of their TLA project.</li> <li>• Follow proper techniques in construction of project as demonstrated by the teacher.</li> <li>• Construction of different project views (i.e. top view versus side view)</li> </ul>	<ul style="list-style-type: none"> <li>• Non-destructive test of model (speed testing of CO<sub>2</sub> race car)</li> <li>• Teacher observation.</li> <li>• Grading of technological project.</li> <li>• Classwork / class participation</li> <li>• Self-assessment by use of rubric.</li> <li>• Teacher assessment by use of project rubric</li> </ul>	<p><u>English / Language Arts Standards</u></p> <ul style="list-style-type: none"> <li>• LA.6-8.CCSS.ELA-Literacy.RST.6-8.3</li> <li>• LA.6-8.CCSS.ELA-Literacy.RST.6-8.4</li> </ul> <p><u>21<sup>st</sup> Century Life and Careers</u></p> <ul style="list-style-type: none"> <li>• WORK.5-8.9.1.8</li> <li>• WORK.K-12.9.1.B.2</li> <li>• WORK.K-12.9.2.A.1</li> <li>• WORK.K-12.9.2.F.1</li> </ul> <p><u>Comprehensive Health and Physical Education</u></p> <ul style="list-style-type: none"> <li>• HE.7-8.</li> <li>• HE.7-8.2.1.8.D.1</li> <li>• HE.7-8.2.1.8.D.2</li> <li>• HE.5-6.</li> </ul> <p><u>Technology Standards</u></p> <ul style="list-style-type: none"> <li>• TEC.5-8.8.2.8</li> <li>• TEC.K-12.8.1.A.1</li> <li>• TEC.K-12.8.1.B.1</li> <li>• TEC.K-12.8.2.B.2</li> </ul>

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	<p>of a car affect the speed of a car?</p>	<ul style="list-style-type: none"> <li>• Designing their CO<sub>2</sub> race car project using basic criteria as supplied by the teacher</li> <li>• Differences between sizes of front wheels and rear wheels</li> <li>• Self-assessment process</li> <li>• Techniques in completing a project</li> <li>• Testing as it relates to the Design and Problem Solving Loop / Non-Destructive Testing</li> <li>• Terminology used in project</li> </ul>	<ul style="list-style-type: none"> <li>• Properly select and use equipment and supplies while building TLA Project.</li> <li>• Use the proper terms while constructing a TLA project.</li> <li>• Work safely when handling/operating tools and equipment.</li> </ul>	<ul style="list-style-type: none"> <li>• Measurement of Project</li> </ul>	<ul style="list-style-type: none"> <li>• <b>TEC.K-12.8.2.C.1</b></li> <li>• <b>TEC.K-12.8.2.C.2</b></li> </ul>
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