

West Deptford Middle School Curriculum Map  
Digital Design - Grade 8

Unit/ Duration	Essential Questions	Content	Skills	Assessment	Standards
Unit 1: Intro to Tinkercad  Approx. 5 sessions	<ul style="list-style-type: none"> <li>• How can a 3D Printer be used to create an entire project or a part to fit in an existing project?</li>   <li>• How do I select which 3D design software application is best to design my project?</li> </ul>	<ul style="list-style-type: none"> <li>• Students will be guided through the 3D design process via easy hands-on "Lessons", that teach you the basics of Tinkercad before moving on to more complex modeling techniques.</li> </ul>	<ul style="list-style-type: none"> <li>• Getting Started- Navigation and Menus</li>   <li>• Testing your New Navigation Skills</li>   <li>• Moving, Rotating, and Scaling Objects</li>   <li>• Making and Manipulating Grouped Objects</li>   <li>• Using the Align Tools and the Workplane Helper</li> </ul>	<ul style="list-style-type: none"> <li>• "Let's Learn Tinkercad" project</li>   <li>• Class Participation</li>   <li>• Classwork (completion of individual lessons within project)</li>   <li>• Projects/Design Challenges</li> </ul>	<ul style="list-style-type: none"> <li>• <b>MA.5.CCSS.Math.Content.5.MD.A.1</b></li>   <li>• <b>MA.5.CCSS.Math.Content.5.G.A.1</b></li>   <li>• <b>MA.5.CCSS.Math.Content.5.G.B.3</b></li> </ul>

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Unit 2: Steamship Boat  Approx. 2-3 Sessions	<ul style="list-style-type: none"> <li>• How can a 3D Printer be used to create an entire project or a part to fit in an existing project?</li>   <li>• How do I select which 3D design software application is best to design my project?</li> </ul>	<ul style="list-style-type: none"> <li>• Students will be creating a steamship boat using primitive shapes and features within Tinkercad program</li> </ul>	<ul style="list-style-type: none"> <li>• Grouping shapes to form new objects</li>   <li>• Creating holes or negative space within objects.</li>   <li>• Scaling shapes or objects</li>   <li>• Moving and Rotating objects</li> </ul>	<ul style="list-style-type: none"> <li>• “Steamboat Ship” project</li>   <li>• Class Participation</li>   <li>• Classwork (completion of individual lessons within projects)</li>   <li>• Projects/Design Challenges</li> </ul>	<ul style="list-style-type: none"> <li>• <b>MA.5.CCSS.Math.Content.5.MD.A.1</b></li>   <li>• <b>MA.5.CCSS.Math.Content.5.G.A.1</b></li>   <li>• <b>MA.5.CCSS.Math.Content.5.G.B.3</b></li> </ul>

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Unit 3: 3D Print your own Buttons  Approx. 2-3 Sessions	<ul style="list-style-type: none"> <li>• How can a 3D Printer be used to create an entire project or a part to fit in an existing project?</li> <li>• How do I select which 3D design software application is best to design my project?</li> <li>• How can we use a 3D printer to create fasteners for clothing?</li> </ul>	<ul style="list-style-type: none"> <li>• In this introductory Project Based Learning activity students will be guided through a series of projects that show them how to create buttons for their clothing with the end goal of 3D printing them.</li> <li>• Students will have to implement the basics of TinkerCAD.</li> <li>• Students will learn how to design a product with a set of design requirements.</li> </ul>	<ul style="list-style-type: none"> <li>• How to design models for 3D printing (i.e. creating flat side, overhang consideration)</li> <li>• How to create basic features while considering design requirements (i.e. Hole Placement for thread)</li> <li>• Reinforcement of basic tools of TinkerCAD (i.e. scaling, grouping, copy/paste, etc)</li> </ul>	<ul style="list-style-type: none"> <li>• Basic Button</li> <li>• Smiley Face Button</li> <li>• Heart Button</li> <li>• Class Participation</li> <li>• Classwork (completion of individual lessons within projects)</li> <li>• Projects/Design Challenges</li> </ul>	<ul style="list-style-type: none"> <li>• MA.5.CCSS.Math.Content.5.MD.A.1</li> <li>• MA.5.CCSS.Math.Content.5.G.A.1</li> <li>• MA.5.CCSS.Math.Content.5.G.B.3</li> </ul>

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Unit 3: 3D Print your own Ring  Approx. 2-3 Sessions	<ul style="list-style-type: none"> <li>• How can a 3D Printer be used to create an entire project or a part to fit in an existing project?</li> <li>• How do I select which 3D design software application is best to design my project?</li> <li>• How can we use a 3D printer to create jewelry?</li> </ul>	<ul style="list-style-type: none"> <li>• In this introductory Project Based Learning activity students will be guided through a series of projects that show them how to create rings with the end goal of 3D printing them.</li> <li>• Students will have to implement the basics of TinkerCAD. Additionally, students will have to investigate and consider their findings in order to design rings that fit.</li> </ul>	<ul style="list-style-type: none"> <li>• How to design models for 3D printing (i.e. creating flat side, overhang consideration)</li> <li>• How to create basic features while considering design requirements</li> <li>• Reinforcement of basic tools of TinkerCAD (i.e. scaling, grouping, copy/paste, etc)</li> <li>• Students use a measuring tape to measure circumference of their fingers and calculate diameter of their fingers.</li> </ul>	<ul style="list-style-type: none"> <li>• Basic Ring</li> <li>• Heart Ring</li> <li>• Diamond Ring</li> <li>• Class Participation</li> <li>• Classwork (completion of individual lessons within projects)</li> <li>• Projects/Design Challenges</li> </ul>	<ul style="list-style-type: none"> <li>• MA.5.CCSS.Math.Content.5.MD.A.1</li> <li>• MA.5.CCSS.Math.Content.5.G.A.1</li> <li>• MA.5.CCSS.Math.Content.5.G.B.3</li> </ul>

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Unit 4: Sugar Rush: Custom Candy Mold  Approx. 1-2 Sessions	<ul style="list-style-type: none"> <li>• How can a 3D Printer be used to create an entire project or a part to fit in an existing project?</li> <li>• How do I select which 3D design software application is best to design my project?</li> <li>• How can we use a 3D printer to create a custom candy mold?</li> </ul>	<ul style="list-style-type: none"> <li>• In this introductory Project Based Learning activity students will be guided through a series of steps that show them how to create a custom candy mold with the end goal of 3D printing them.</li> <li>• Students will have to implement the basics of TinkerCAD.</li> </ul>	<ul style="list-style-type: none"> <li>• Grouping shapes</li> <li>• Creating negative space (holes)</li> <li>• Scaling objects</li> <li>• Aligning objects</li> <li>• Use the “mirror” function</li> </ul>	<ul style="list-style-type: none"> <li>• Candy Mold</li> <li>• Class Participation</li> <li>• Classwork (completion of individual lessons within projects)</li> <li>• Projects/Design Challenges</li> </ul>	<ul style="list-style-type: none"> <li>• MA.5.CCSS.Math.Content.5.MD.A.1</li> <li>• MA.5.CCSS.Math.Content.5.G.A.1</li> <li>• MA.5.CCSS.Math.Content.5.G.B.3</li> </ul>

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Unit 5: Minecraft Bobbleheads  Approx. 2-3 Sessions	<ul style="list-style-type: none"> <li>• How can a 3D Printer be used to create an entire project or a part to fit in an existing project?</li> <li>• How do I select which 3D design software application is best to design my project??</li> </ul>	<ul style="list-style-type: none"> <li>• Students will be creating their favorite Minecraft Bobblehead figure from scratch using primitive shapes within the Tinkercad program.</li> </ul>	<ul style="list-style-type: none"> <li>• How to research a topic</li> <li>• How to use Tinkercad basic commands</li> <li>• Grouping Shapes</li> <li>• Transfer Shapes from right menu to the workspace</li> <li>• Insert Holes</li> <li>• Measure and transfer measurements to Work plane</li> <li>• Download .stl files</li> </ul>	<ul style="list-style-type: none"> <li>• Minecraft Bobblehead</li> <li>• Class Participation</li> <li>• Classwork (completion of individual lessons within projects)</li> <li>• Projects/Design Challenges</li> </ul>	<ul style="list-style-type: none"> <li>• MA.5.CCSS.Math.Content.5.MD.A.1</li> <li>• MA.5.CCSS.Math.Content.5.G.A.1</li> <li>• MA.5.CCSS.Math.Content.5.G.B.3</li> </ul>

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Unit 6: Explore Buoyancy: Design Sea Craft  Approx. 3-4 Sessions	<ul style="list-style-type: none"> <li>• How can a 3D Printer be used to create an entire project or a part to fit in an existing project?</li> <li>• How do I select which 3D design software application is best to design my project?</li> <li>• How can we use a 3D printer to create boats that can carry weight?</li> </ul>	<ul style="list-style-type: none"> <li>• In this Project Based Learning activity, students will be guided through a series of lessons that show them how to create functional boat that can be 3D printed easily.</li> <li>• Students will have to implement the basics of Tinkercad. Additionally, students will learn about density through an additional hands-on investigation.</li> </ul>	<ul style="list-style-type: none"> <li>• How to design models for 3D printing (i.e. creating flat side, overhang consideration)</li> <li>• Reinforcement of basic tools of Tinkercad (i.e. scaling, grouping, copy/paste, etc)</li> <li>• Students will be able to conduct a small investigation about density.</li> <li>• Students will develop a deeper understand of density through this investigation.</li> </ul>	<ul style="list-style-type: none"> <li>• Start with a Simple Raft</li> <li>• Haul with a Boat</li> <li>• Make it your Own</li> <li>• Class Participation</li> <li>• Classwork (completion of individual lessons within projects)</li> <li>• Projects/Design Challenges</li> </ul>	<ul style="list-style-type: none"> <li>• MA.5.CCSS.Math.Content.5.MD.A.1</li> <li>• MA.5.CCSS.Math.Content.5.G.A.1</li> <li>• MA.5.CCSS.Math.Content.5.G.B.3</li> </ul>

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Unit 7: Building Word Blocks  Approx. 4-5 Sessions	<ul style="list-style-type: none"> <li>• How can a 3D Printer be used to create an entire project or a part to fit in an existing project?</li> <li>• How do I select which 3D design software application is best to design my project?</li> </ul>	<ul style="list-style-type: none"> <li>• In this project, students will learn about 3D design and 3D printing by creating their own Word Block. Each student can create their own block with a word of their choice. After the Word Blocks are printed, students can snap their words together to create fun phrases and messages.</li> </ul>	<ul style="list-style-type: none"> <li>• Creating, scaling, and positioning objects</li> <li>• Aligning and grouping objects</li> <li>• Grouping objects to create holes</li> </ul>	<ul style="list-style-type: none"> <li>• Create your Word</li> <li>• Create your Block</li> <li>• Create your Word Block</li> <li>• Class Participation</li> <li>• Classwork (completion of individual lessons within projects)</li> <li>• Projects/Design Challenges</li> </ul>	<ul style="list-style-type: none"> <li>• MA.5.CCSS.Math.Content.5.MD.A.1</li> <li>• MA.5.CCSS.Math.Content.5.G.A.1</li> <li>• MA.5.CCSS.Math.Content.5.G.B.3</li> </ul>



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Unit 8: How to Create a Ringed Planet  Approx. 4-5 Sessions	<ul style="list-style-type: none"> <li>• How can a 3D Printer be used to create an entire project or a part to fit in an existing project?</li>   <li>• How do I select which 3D design software application is best to design my project?</li> </ul>	<ul style="list-style-type: none"> <li>• In this project, students will create a small scale version of a planet with rings surrounding it.</li> </ul>	<ul style="list-style-type: none"> <li>• Scaling Objects</li>   <li>• Aligning and grouping objects</li> </ul>	<ul style="list-style-type: none"> <li>• Creating the Planet</li> <li>• Creating the Rings</li> <li>• Aligning the Rings to the Planet</li> <li>• Class Participation</li>   <li>• Classwork (completion of individual lessons within projects)</li>   <li>• Projects/Design Challenges</li> </ul>	<ul style="list-style-type: none"> <li>• MA.5.CCSS.Math.Content.5.MD.A.1</li>   <li>• MA.5.CCSS.Math.Content.5.G.A.1</li>   <li>• MA.5.CCSS.Math.Content.5.G.B.3</li> </ul>

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Unit 9: Build a Tinkercad House  Approx. 7-8 Sessions	<ul style="list-style-type: none"> <li>• How can a 3D Printer be used to create an entire project or a part to fit in an existing project?</li> <li>• How do I select which 3D design software application is best to design my project?</li> <li>• How can we use a 3D printer to build a small scale replica of a house?</li> </ul>	<ul style="list-style-type: none"> <li>• In this activity you will follow along with the steps to create a simple house shape. After completing this activity, you will be let loose to create your own unique design or personalize your house further on your own.</li> <li>• Begin to learn the basics of how Architects design a house by creating a simple floor plan from the house you create.</li> </ul>	<ul style="list-style-type: none"> <li>• Scaling Objects</li> <li>• Aligning and grouping objects</li> <li>• How to take a simple slice from the house they create to see a basic floor plan of their design.</li> </ul>	<ul style="list-style-type: none"> <li>• Creating the Walls of the House</li> <li>• Create the Arched Doorway</li> <li>• Add a Roof to the House</li> <li>• Create a Floor Plan of your House</li> <li>• Make it your Own</li> <li>• Class Participation</li> <li>• Classwork (completion of individual lessons within projects)</li> <li>• Projects/Design Challenges</li> </ul>	<ul style="list-style-type: none"> <li>• <b>MA.5.CCSS.Math.Content.5.MD.A.1</b></li> <li>• <b>MA.5.CCSS.Math.Content.5.G.A.1</b></li> <li>• <b>MA.5.CCSS.Math.Content.5.G.B.3</b></li> </ul>

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<p>Unit 10: Making Everyday Objects (Part One)</p> <p>Approx. 7-8 Sessions</p>	<ul style="list-style-type: none"> <li>• How can a 3D Printer be used to create an entire project or a part to fit in an existing project?</li> <li>• How do I select which 3D design software application is best to design my project?</li> </ul>	<ul style="list-style-type: none"> <li>• The project starts with a very basic lesson (creating a button) that introduces students how to create objects, cut holes and group. The lesson begins to add levels of freedom by allowing you to customize objects, create a stamp with a pattern of your own design and finally solve an open-ended challenge problems. When finished, you will be ready to move on to Intermediate Tinkercad lessons or continue to enjoy more beginner lessons and really hone your Tinkercad skills.</li> </ul>	<p>Upon completion of these lessons, students who have demonstrated mastery will be able to:</p> <ul style="list-style-type: none"> <li>• Create objects using shape primitives, letters and imported STL files</li> <li>• Move, scale and rotate objects using handles</li> <li>• Scale objects using the ruler</li> <li>• Pan the camera in, out and around the model</li> <li>• Group objects to make holes</li> <li>• Plan how to create simple objects</li> <li>• Modify existing objects to their own</li> </ul>	<ul style="list-style-type: none"> <li>• Simple Button</li> <li>• Make a Trick Die</li> <li>• Custom Stamp</li> <li>• Backpack Zipper Pull</li> <li>• Build a Spork for Outer Space</li> <li>• Class Participation</li> <li>• Classwork (completion of individual lessons within projects)</li> <li>• Projects/Design Challenges</li> </ul>	<ul style="list-style-type: none"> <li>• <b>CCSS.MATH.CONTENT.6.SP.B.5.A</b></li> <li>• <b>CCSS.MATH.CONTENT.6.SP.B.5.A</b></li> <li>• <b>CCSS.MATH.CONTENT.6.SP.B.5.A</b></li> <li>• <b>CCSS.MATH.CONTENT.6.SP.B.4</b></li> <li>• <b>CCSS.MATH.CONTENT.6.SP.B.4</b></li> </ul>

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			<p>specifications</p> <ul style="list-style-type: none"><li>• Understand the design constraints involved in using a 3-D printer</li><li>• Import a two-dimensional file to make a custom design</li></ul>		
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Unit 11: Build a Better Puck Challenge  Approx. 5-6 Sessions	<ul style="list-style-type: none"> <li>• How can a 3D Printer be used to create an entire project or a part to fit in an existing project?</li> <li>• How do I select which 3D design software application is best to design my project?</li> </ul>	<ul style="list-style-type: none"> <li>• These easy, step-by-step Tinkercad lessons will guide you through the process of designing your own awesome hockey puck; designs that push performance and style to the limits!</li> <li>• This lesson has two objectives: Use the scientific process to increase the performance of the regulation hockey puck. Take artistic license of your design by adding graphics to your puck.</li> </ul>	<ul style="list-style-type: none"> <li>• Copying/Pasting</li> <li>• Move, Scale, Rotate objects</li> <li>• Group primitive shapes to create new objects</li> <li>• Use vector art to add graphic designs to an object</li> </ul>	<ul style="list-style-type: none"> <li>• Getting Started: Simple Experiments</li> <li>• Filletting: Taking the Edge Off</li> <li>• Reducing Friction</li> <li>• Personalizing Your Puck</li> <li>• Class Participation</li> <li>• Classwork (completion of individual lessons within projects)</li> <li>• Projects/Design Challenges</li> </ul>	<ul style="list-style-type: none"> <li>• CCSS.MATH.CONTENT.6.SP.B.5.A</li> <li>• CCSS.MATH.CONTENT.6.SP.B.4</li> </ul>

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Unit 12: How to Create an Alien  Approx. 5-6 Sessions	<ul style="list-style-type: none"> <li>• How can a 3D Printer be used to create an entire project or a part to fit in an existing project?</li> <li>• How do I select which 3D design software application is best to design my project?</li> </ul>	<ul style="list-style-type: none"> <li>• Students will use the guided step-by-step Tinkercad lessons in the Project Ignite project to create an alien figure.</li> <li>• Their figure will include features such as a mouth, eyes, arms, and a back shell.</li> </ul>	<ul style="list-style-type: none"> <li>• Scaling shapes and objects</li> <li>• Rotating Objects</li> <li>• Grouping Objects</li> <li>• Changing the profile of objects using the Inspector window</li> <li>• Aligning Objects</li> </ul>	<ul style="list-style-type: none"> <li>• Creating the Body</li> <li>• Adding the Arms</li> <li>• Adding Details</li> <li>• Class Participation</li> <li>• Classwork (completion of individual lessons within projects)</li> <li>• Projects/Design Challenges</li> </ul>	<ul style="list-style-type: none"> <li>• <b>MA.5.CCSS.Math.Content.5.MD.A.1</b></li> <li>• <b>MA.5.CCSS.Math.Content.5.G.A.1</b></li> <li>• <b>MA.5.CCSS.Math.Content.5.G.B.3</b></li> </ul>