

West Deptford Middle School Curriculum Map
Digital Design - Grade 6

Unit/ Duration	Essential Questions	Content	Skills	Assessment	Standards
<p><u>Unit 1: Intro to Tinkercad</u></p> <p>Approx. 5 sessions</p> <p><u>Unit 4: TinkerCad</u></p>	<ul style="list-style-type: none"> How can a 3D Printer be used to create an entire project or a part to fit in an existing project? How do I select which 3D design software application is best to design my project? How can a 3D Printer be used to create an entire project or a part to fit in an existing project? How do I select which 3D design software application is best to design my project? 	<ul style="list-style-type: none"> 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. How 3D Print settings: (layers, rafts, infills and default settings) affect the object's printing. How the 3D design process works: design idea, using 3D design software to build the design, and the steps needed to get it successfully printed on the 3D 	<ul style="list-style-type: none"> Getting Started- Navigation and Menus Testing your New Navigation Skills Moving, Rotating, and Scaling Objects Making and Manipulating Grouped Objects Using the Align Tools and the Workplane Helper Create a digital design using a 3D Design software application (TinkerCad) Move, rotate, scale, make, and group objects in a 3D design software application. Use grouping strategically to 	<ul style="list-style-type: none"> "Let's Learn Tinkercad" project Class Participation Classwork (completion of individual lessons within project) Projects/Design Challenges Class Participation Classwork Projects / Design Challenges Quiz 	<ul style="list-style-type: none"> MA.5.CCSS.Math.Content.5.MD.A.1 MA.5.CCSS.Math.Content.5.G.A.1 MA.5.CCSS.Math.Content.5.G.B.3MA.5.CCS S.Math.Content.5.OA.B.3 MA.5.CCSS.Math.Content.5.MD.A.4 MA.5.CCSS.Math.Content.5.G.A.1 MA.5.CCSS.Math.Content.5.G.A.2 MA.5.CCSS.Math.Content.5.G.B.3

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		<p>printer-(Makerbot-Fifth Generation).</p> <ul style="list-style-type: none"> • How to select the 3D printing parameters of a design so it can be successfully printed-see how much material and how much time. • How to use the Thingiverse application to start with a design. 	<p>create shapes not available from primitives.</p>		
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<u>Unit/</u>	<u>Essential Questions</u>	<u>Content</u>	<u>Skills</u>	<u>Assessment</u>	<u>Standards</u>
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<u>Duration</u>					
<u>Unit 2: Steamship Boat</u> <u>Approx. 2-3 Sessions</u>	<ul style="list-style-type: none"> • <u>How can a 3D Printer be used to create an entire project or a part to fit in an existing project?</u> • <u>How do I select which 3D design software application is best to design my project?</u> 	<ul style="list-style-type: none"> • <u>Students will be creating a steamship boat using primitive shapes and features within Tinkercad program</u> 	<ul style="list-style-type: none"> • <u>Grouping shapes to form new objects</u> • <u>Creating holes or negative space within objects.</u> • <u>Scaling shapes or objects</u> • <u>Moving and Rotating objects</u> 	<ul style="list-style-type: none"> • <u>"Steamboat Ship" project</u> • <u>Class Participation</u> • <u>Classwork (completion of individual lessons within projects)</u> • <u>Projects/Design Challenges</u> 	<ul style="list-style-type: none"> • <u>MA.5.CCSS.Math.Content.5.MD.A.1</u> • <u>MA.5.CCSS.Math.Content.5.G.A.1</u> • <u>MA.5.CCSS.Math.Content.5.G.B.3</u>

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

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<p>Unit 3: 3D Print your own Ring</p> <p>Approx. 2-3 Sessions</p>	<ul style="list-style-type: none"> • <u>How can a 3D Printer be used to create an entire project or a part to fit in an existing project?</u> • <u>How do I select which 3D design software application is best to design my project?</u> • <u>How can we use a 3D printer to create jewelry?</u> 	<ul style="list-style-type: none"> • <u>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.</u> • <u>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.</u> 	<ul style="list-style-type: none"> • <u>How to design models for 3D printing (i.e. creating flat side, overhang, consideration)</u> • <u>How to create basic features while considering design requirements</u> • <u>Reinforcement of basic tools of TinkerCAD (i.e. scaling, grouping, copy/paste, etc)</u> • <u>Students use a measuring tape to measure circumference of their fingers and calculate diameter of their fingers.</u> 	<ul style="list-style-type: none"> • <u>Basic Ring</u> • <u>Heart Ring</u> • <u>Diamond Ring</u> • <u>Class Participation</u> • <u>Classwork (completion of individual lessons within projects)</u> • <u>Projects/Design Challenges</u> 	<ul style="list-style-type: none"> • <u>MA.5.CCSS.Math.Content.5.MD.A.1</u> • <u>MA.5.CCSS.Math.Content.5.G.A.1</u> • <u>MA.5.CCSS.Math.Content.5.G.B.3</u>

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

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

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

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Unit 7: Building Word Blocks Approx. 4-5 Sessions	<ul style="list-style-type: none"> How can a 3D Printer be used to create an entire project or a part to fit in an existing project? How do I select which 3D design software application is best to design my project? 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Creating, scaling, and positioning objects Aligning and grouping objects Grouping objects to create holes 	<ul style="list-style-type: none"> Create your Word Create your Block Create your Word Block Class Participation Classwork (completion of individual lessons within projects) Projects/Design Challenges 	<ul style="list-style-type: none"> MA.5.CCSS.Math.Content.5.MD.A.1 MA.5.CCSS.Math.Content.5.G.A.1 MA.5.CCSS.Math.Content.5.G.B.3

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

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

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

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<p><u>Unit 10: How to Create an Alien</u></p> <p><u>Approx. 5-6 Sessions</u></p>	<ul style="list-style-type: none"> How can a 3D Printer be used to create an entire project or a part to fit in an existing project? How do I select which 3D design software application is best to design my project? 	<ul style="list-style-type: none"> Students will use the guided step-by-step Tinkercad lessons in the Project Ignite project to create an alien figure. Their figure will include features such as a mouth, eyes, arms, and a back shell. 	<ul style="list-style-type: none"> Scaling shapes and objects Rotating Objects Grouping Objects Changing the profile of objects using the Inspector window Aligning Objects 	<ul style="list-style-type: none"> Creating the Body Adding the Arms Adding Details Class Participation Classwork (completion of individual lessons within projects) Projects/Design Challenges 	<ul style="list-style-type: none"> <u>MA.5.CCSS.Math.Content.5.MD.A.1</u> <u>MA.5.CCSS.Math.Content.5.G.A.1</u> <u>MA.5.CCSS.Math.Content.5.G.B.3</u>

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