6th Grade 3D Printing Project

Name of Project: 6th Grade 3D Printing Project		Duration: 2-3 Weeks
Grade Level(s): 6th	Teacher:	Subject/Course/Unit: STEAM
Big Idea:	Using technology, students will be able to create a visual art project using 3D printing, with specific project constraints, that includes their ideas and personality and talents to be displayed in the community.	
Authentic Purpose: (Why does this matter to your students?)	Student created 3D prints will be an artistic representation of what each student can contribute to the community. This project emphasizes the use of technology to showcase personalities of the young people within our community in order to nurture and facilitate a feeling of connectedness.	
Future-Ready Competencies: • Collaboration • Communication • Critical Thinking / Problem Solving • Creativity & Innovation	Objectives: STEAM students in 6th grade will be able to design a 3d printed “Me Tile” using the Tinkercad web app that meets specific 3D project constraints in order to successfully be printed and exhibited. Project constraints include: tile base will be 63mm x 63mm x 5mm tile will be visually engaging/impactful through the use of symbolic representation tile will have clean edges with all objects touching the base	
Project Statement: (Include: issue, problem or challenge; student role, purpose, beneficiary, and desired outcomes)	Restrictions that have impacted students learning in isolation have had long reaching behavioral consequences in classrooms. SEL has emerged as a way to address and then engage students to improve interpersonal skills or competencies. One critical component of SEL curriculum is learning to interact with others. By encouraging students to collaborate and contribute in a small way (personal tile creation/design) to a large scale project will assist students understanding how we all fit in our school and community. This project encourages students to cooperate, contribute, develop empathy and trust, encourages creativity and boosts self-esteem. Students will design a “Me Tile” using the Tinkercad web app, following project constraints in order to successfully 3D print. Each tile will connect to other students tiles to welcome/decorate/honor a space centrally located on the school campus.	

Empathy Anchor: (How will students develop empathy and care about this problem)	Students will help to arrange the Me Tiles so that they have a vested interest in the outcome. Once the large display is revealed students will be able to see how they connect within a community and how everyone belongs.	
Public Audience & Reveal: (Experts, audiences, or product users students will engage with during and at the end of project)	Project will be displayed in a central location so students will have a daily opportunity to appreciate their personal contribution and connect their learning to each other. Visitors to our school community will also be able to engage with the display.	
Knowledge Construction: (How are students going to construct content knowledge and practice it) Student knowledge construction and practice includes: CAD and 3D design, computational design, design thinking and visual communication.		Student Assessment: Students will participate in a final project check-list (completed by classmates) and Flipgrid reflection after prints are completed.
Design Process: 1. Discover 2. Research & Empathize 3. Brainstorm 4. Choose 5. Build 6. Test 7. Communicate 8. Redesign	Describe what (& how) students are going to do in each step: Students will complete Project Planning doc which will help them identify attributes and interests. Students will brainstorm and research symbols that exemplify these sketching a prototype of their Me Tile. Students will use the Tinkercad web app to choose images to include in the Me Tile design and build the Me Tile using the app. A digital engineering notebook will be kept for the build phase of the design process. Students will preview or test their design using the color tool with the app. The final project check-list completed by another student will allow for communication of design. Both the color tool and check- list may result in re-design. Time for redesign will be allowed before final color selection for Me Tile.	
Resources needed: (On-site people, facilities, tools, technology, materials, community connections) Chromebooks, mouse and mouse pads The Noun Project - search for graphics Tinkercad accounts (compliant to Ed Law 2D) 3D Printer and accessories for printing Filament - PLA in various color choices Large picture frames for final display and hot glue or liquid nail compound	NYS Standards: **CS & DF** 4-6.DL.4 Use a variety of digital tools and resources to create and revise digital artifacts. 4-6.DL.3 Conduct and refine advanced multi-criteria digital searches to locate content relevant to varied learning goals. 4-6.NSD.2 Model how computer hardware and software work together as a system to accomplish tasks.	Student Reflection: Students will maintain an engineering notebook using Google docs and take screenshots of their designing phase. Students will do a final end of the project reflection answering a question of their choice (given four) for their video.

	4-6.CT.10 Describe the steps taken and choices made to design and develop a solution using an iterative design process. **ELA Standards:** RST4 (6-8): Determine the meaning of symbols, key terms, and other content-specific words and phrases as they are used in scientific or technical sources. **Math:** NY-6.G Solve real-world and mathematical problems involving area, surface area, and volume. **NYS SEL Benchmarks:** 1B.3b. Explore and assess school and community assets and opportunities to identify resources that will contribute to their identity development. 2C.3a. Practice empathy in order to establish and maintain positive relationships with individuals and groups across lines of difference.	