

Ways to Make Art

Total Number of Lessons: [number of lessons]

Total Estimated Time for Module: 45-minute periods

SECTION 1: MODULE OVERVIEW AND CURRICULAR CONNECTIONS – REQUIRED

- **Module goal:** At the end of this module, students will be able to take their art from paper to model.
- **Connection to standards:** [
 - **Grade 5**
 - **VA:Cr1.1.5 (a)** Combine ideas to generate an innovative idea for art-making.
 - **VA:Cr1.2.5 (a)** Identify and demonstrate diverse methods of artistic investigation to choose an approach for beginning a work of art.
 - **VA:Cr2.1.5 (a)** Experiment and develop skills in multiple art-making techniques and approaches through practice.
 - **VA:Cr2.2.5 (a)** Demonstrate quality craftsmanship through care for and safe use of materials, tools, and equipment.
- **RET materials/ideas to be leveraged:** I learned many new things in the RET program this summer. Before this program, my experience with AI was only making award certificates for my students for the end of the school year. As far as coding, my experience was only using [Code.org](https://code.org). I will teach my students about the importance of details and explanations.

SECTION 2: OVERVIEW OF MODULE FRAMEWORK – REQUIRED

- **Real-world context:** Students have an engineering unit as part of their Reading/English Language Arts Curriculum. Students learn about designing a blueprint and the importance of having exact measurements. They will learn that things have to be done in steps and the importance of attention to detail.
 - **Lesson Background:** In this project, students act as architects designing a house for a family. Like real architects, they must consider the family's needs, available space, safety, cost, and how people will move through the home.
 - **Sketch and Tell:** Students will start by making a drawing of their house. After they have it drawn, they will write down step by step what they did to create the drawing. They will give the directions to a partner, and the partner will draw the house following the directions. When finished, they will get to see the original

drawing and compare it to theirs. They will then discuss with their partner what areas were not clear and which need to be changed.

- **Blueprint:** Students use scale drawings, measurement, area, and perimeter to create an accurate blueprint. The project shows how math, creativity, communication, and problem-solving work together in careers such as architecture, engineering, and construction.
- **Coding:** Students will use their blueprint to code their design in Tinkercad. They will have to make sure all the details are coded correctly so the 3D printer can build their house.

- **Background STEM content:**

- This project integrates science, technology, engineering, and mathematics through the authentic task of designing a house for a family.
- **Science:** Students consider how environmental and physical factors affect a home's design. They explore ideas such as structural stability, the properties of building materials, natural lighting, ventilation, energy efficiency, and household safety.
- **Technology:** Students use Tinkercad to transform a two-dimensional blueprint into a three-dimensional digital model. They develop computational thinking by entering accurate dimensions, positioning objects, following a sequence of steps, testing their design, and correcting errors. Students also learn how digital models communicate instructions to a 3D printer.
- **Engineering:** Students follow an engineering design process by identifying the family's needs and constraints, sketching possible solutions, creating a blueprint, developing a model, testing the design, and making improvements. They must balance space, safety, movement, function, and cost while explaining and defending their design decisions.
- **Mathematics:** Students apply measurement, geometry, scale, area, and perimeter to create an accurate blueprint. They work with dimensions, spatial relationships, shapes, units, and proportional reasoning to ensure that rooms and other features fit within the available space.

- **Description of Main Activity/Project:**

- The "Sketch and Tell" activity also develops technical communication and algorithmic thinking. Students write clear, sequential directions that another person must follow to reproduce a design. Comparing the two drawings helps students recognize the lack of clarity, identify missing information, and revise their instructions for greater precision.
- Throughout the project, students see how STEM disciplines work together in architecture, engineering, construction, computer-aided design, and additive manufacturing. They also practice creativity, collaboration, communication, critical thinking, and problem-solving while developing a design for a real-world

client.

SECTION 3: MODULE SEQUENCING AND ASSESSMENT – REQUIRED

- **Brief description of sequenced learning objectives:**
 - Sketch a house and write a step-by-step description of the house you just drew.
 - Give a written description to a partner and have them draw the house.
 - Compare the original sketch and the partner sketch and figure out what steps need clarifying.
 - Draw a blueprint of your house.
 - Using the blueprint, code in Tinkercad the steps to create the house.
 - Using the 3D printer and the Tinkercad coding, create the house on the 3D printer.
- **Brief description of formative and summative assessment approaches:**
 - I will make assessments at each step in the process. Making sure the students are using details, measurements, and coding to make the finished product.
- **Recommendations for implementation:**
 - Focus on details and the importance of using exact details when creating any of our artwork.
 - Have their regular classroom teacher introduce coding with [Code.org](https://code.org) and Scratch.

SECTION 4: MODULE FILES – ENCOURAGED/OPTIONAL

- **List of Supplies:**
 - Sketch and tell paper
 - Pencils
 - Rulers
 - Grid paper to help with measurements for the blueprints.
 - Blue paper so their drawing truly looks like a blueprint.
 - Chromebooks with Tinkercad installed.
 - 3D printer with filament
 - Acrylic markers to color the 3D house