Unit 2: Introduction to Computer Aided Design

Content Area: **Applied Technology**
Course(s):
Time Period: **Marking Period 1**
Length: **15 Days**
Status: **Published**

Brief Summary of Unit

Students will use a Computer-Aided Design (CAD) program to design a variety of projects, including floor plans, emojis, glow toys, and kitchen layouts. Through these activities, students will apply the Engineering Design Process, identify design criteria and constraints, and develop solutions that meet specified requirements while demonstrating creativity and problem-solving skills.

Revision Date: June 2026

L.SS.6.1	Demonstrate command of the system and structure of the English language when writing or speaking.
L.KL.6.2	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
L.VL.6.3	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 6 reading and content, including technical meanings, choosing flexibly from a range of strategies.
TECH.K-12.1.4.a	know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
5.2	Utilize positive communication and social skills to interact effectively with others
8.2.8.ED.3	Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).
8.2.8.ED.4	Investigate a malfunctioning system, identify its impact, and explain the step-by-step process used to troubleshoot, evaluate, and test options to repair the product in a collaborative team.
8.2.8.ED.5	Explain the need for optimization in a design process.
8.2.8.ED.7	Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches).

Essential Questions/Enduring Understandings

Essential Questions:

Why is Computer-Aided Design (CAD) an important tool in engineering and design?

How does CAD support the Engineering Design Process?

What are the benefits of using CAD to create and test designs before production?

How can CAD be used to create, modify, analyze, and improve designs?

Enduring Understandings:

CAD software enables designers and engineers to efficiently create, visualize, test, and refine solutions to design problems.

Effective designs are developed by considering criteria and constraints and using an iterative process of evaluation and improvement.

Objectives

Students will know how to set up their drawings.

Students will know how to use the commands necessary to complete their designs.

Students will know how to draw using three dimensions.

Students will be skilled at layering objects in CAD projects.

Students will be skilled at changing measurements and grid sizes.

Students will be skilled at viewing 3D projects from all angles and distances.

Students will be skilled at creating different sized/shaped holes in object to create unique shaped spaces in their designs.

Learning Plan

Introduction to CAD: Students will be introduced to the CAD program, Tinkercad, through tutorials. Students will be introduced to various features in Tinkercad, including zooming in and out, changing the size of the snap grid, using the view cube and/or mouse controls for angle views, adding and deleting shapes, basic dimension changes for shapes, duplicating shapes, using workplanes, and rotating shapes.

Gift Box and Emoji Projects: Students will complete a project in which they will create a box that has no lid and has an item inside. The focus on this project will be to use another shape to create a box shapes hole, along with using workplanes in specific areas. Students will then create their own emojis out of a shape of their choosing, along with the requirement of a hole in the shape of their choosing. This project challenges students to focus on creating holes out of various shapes and sizes.

Kitchen Design: Students will begin their kitchen design project by reviewing various styles of kitchens (L-shape, U-shape, G-shape, parallel, etc.) and focus on the design feature of having the three major appliances forming a triangle in the kitchen. Students will select the type of kitchen they would like to create using CAD. Students will then follow along in drawing their design idea from an aerial view on grid paper with an example provided by the teacher. Students will then move into recreating their 2D designs into 3D designs on Tinkercad. Students will focus on all the techniques they have learned previously, while also incorporating color and

using elements.

Glow Circuit: Students will make a toy that will incorporate an electrical circuit element. Using Tinkercad, students will develop a digital model of their design while considering criteria and constraints related to functionality and appearance. Students will apply the Engineering Design Process by brainstorming ideas, creating prototypes, testing their designs, and making improvements based on observations and feedback. Upon completion, students will assemble the circuit components and evaluate the effectiveness of their final product.

Assessment

Formative Assessments:

Google Forms, Docs, or Slides

Do Nows

Guided Notes

Class discussions

Exit tickets

Teacher observation

Summative Assessments:

Completion of kitchen design project

Completion of glow circuit design challenge

Benchmark Assessment:

Completion of gift box project

Completion of emoji project

Tinkercad tutorials

Exit tickets

Alternative Assessment:

Checklists

Verbal discussions

Modified project requirements

Materials

Tinkercad

Chromebook

Projector

Pencil

Grid paper

Ruler

Google Slides presentation

3D printer

3D filament

Integrated Accommodation and Modifications, Special Ed, ELLs, At-Risk, G & T, Career Education, 504s

See attached document:

https://docs.google.com/spreadsheets/d/1elkfGwG4CoxIRxyxZ6eem_INsnuGIXXiG4CkOug9_wg/edit?usp=sharing