Unit 2: Fundamentals of Computer Aided Drafting

Content Area: **Applied Technology**
Course(s):
Time Period: **Marking Period 1**
Length: **2 weeks**
Status: **Published**

Summary

Students will develop skills in AutoCAD to make a one story house. Students will draw the house they made using manual drafting skills on AutoCAD. Using similar strategies mastered in Unit 1, students will first draw a plan, followed by the section, and finishing with an elevation(s).

Revision Date: July 2024

Essential Questions/Enduring Understandings

Essential Questions:

How are computer-aided drawings made?

What are efficient and effective strategies for making CAD drawings?

What are the basic commands that are used in AutoCAD?

Essential Understandings:

strategies used to make drawings by hand have parallels in AutoCAD.

a few essential commands are used to complete the bulk of a drawing.

CAD systems provide advantages over traditional drafting techniques, especially with regards to the repetition of elements, integration of systems, and alteration of drawings.

Objectives

Students Will Know:

vocabulary and terms and commands including but not limited to: scale, arc, line, construction line, zoom, copy, ortho, snap, fillet, rectangle, mirror, offset.

strategies to create drawings

drawings made in CAD can be modified and reused.

methodical naming of files and revised files saves time.

methodical saving of files and backup files saves time.

CAD is a good tool for drafting, but not for all aspects of design work.

dimensions in AutoCAD are scale-less.

computer file management skills, including the use of folders and file naming.

Students Will Be Skilled At:

how to navigate in the program AutoCAD

how to set up a drawing with appropriate units in AutoCAD

how to use basic commands to make elements in plans, sections, and elevations

how to use strategies analogous to those in hand drawing to create sections and elevations.

how to create folders and save files.

how to back up work on the INTERNET

how to use existing drawings as references for future drawings.

Learning Plan

Preview the essential questions and connect to learning throughout the unit.

Provide topical lectures on using AutoCAD. Provide critical feedback on an individual basis on fundamental processes.

Suggested activity: students will replicate a project they have completed using traditional drawing techniques using CAD. Students will use techniques which parallel traditional techniques. Students may complete a house from a teacher provided sketch.

The teacher will demonstrate skills using a computer linked to a Smart Board as well as other methods.

Students will develop and practice skills.

Teacher will provide formative and summative assessments of skills attainment.

Complete word prompts.

Materials

Computer lab with AutoCAD software, one computer per student

White board with projector or Smartboard

core book list

Standards

9.4.12.CI	Creativity and Innovation
9.2.12.CAP	Career Awareness and Planning
1	Developing Responsibility for Learning: Cultivating independence, self-reflection, and responsibility for one's own learning.
	With a growth mindset, failure is an important part of success.
9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
	Innovative ideas or innovation can lead to career opportunities.
4	Building Knowledge: Building strong content knowledge and connecting ideas across disciplines using a variety of text resources and media.
5	Leveraging Technology: Employing technology and digital media thoughtfully, strategically and capably to enhance reading, writing, speaking, listening, and language use.
9.4.12.CI.2	Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).
9.4.12.CI.3	Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).
	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.
9.2.12.CAP.4	Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.
9.4.12.CT	Critical Thinking and Problem-solving
9.2.12.CAP.5	Assess and modify a personal plan to support current interests and post-secondary plans.
	Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed.
9.4.12.CT.1	Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).
9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.
9.4.12.CT.2	Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).
9.2.12.CAP.7	Use online resources to examine licensing, certification, and credentialing requirements at

	the local, state, and national levels to maintain compliance with industry requirements in areas of career interest.
9.4.12.CT.3	Enlist input from a variety of stakeholders (e.g., community members, experts in the field) to design a service learning activity that addresses a local or global issue (e.g., environmental justice).
9.4.12.CT.4	Participate in online strategy and planning sessions for course-based, school-based, or other project and determine the strategies that contribute to effective outcomes.
	An individual's income and benefit needs and financial plan can change over time.
9.2.12.CAP.13	Analyze how the economic, social, and political conditions of a time period can affect the labor market.
A.REI	Reasoning with Equations and Inequalities
A.REI.A	Understand solving equations as a process of reasoning and explain the reasoning
9.4.12.TL	Technology Literacy
	Digital tools differ in features, capacities, and styles. Knowledge of different digital tools is helpful in selecting the best tool for a given task.
ED	Engineering Design
9.4.12.TL.1	Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task (e.g., W.11-12.6.).
	Engineering design is a complex process in which creativity, content knowledge, research, and analysis are used to address local and global problems. Decisions on trade-offs involve systematic comparisons of all costs and benefits, and final steps that may involve redesigning for optimization.
	Collaborative digital tools can be used to access, record and share different viewpoints and to collect and tabulate the views of groups of people.
8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.
9.4.12.TL.3	Analyze the effectiveness of the process and quality of collaborative environments.
8.2.12.ED.3	Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis.
9.4.12.TL.4	Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem (e.g., 7.1.AL.IPERS.6).
8.2.12.ED.4	Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.
	Engineering design evaluation, a process for determining how well a solution meets requirements, involves systematic comparisons between requirements, specifications, and constraints.
8.2.12.ED.5	Evaluate the effectiveness of a product or system based on factors that are related to its requirements, specifications, and constraints (e.g., safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, ergonomics).
EC	Ethics & Culture
HS-ETS1	Engineering Design
HS-ETS1-1	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
ETS1.A	Delimiting Engineering Problems
HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more

	manageable problems that can be solved through engineering.
ETS1.C	Optimizing the Design Solution
HS-ETS1-3	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.
ETS1.B	Developing Possible Solutions
HS-ETS1-4	Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.
ETS1.B	Developing Possible Solutions

Assessment

Formative Assessment:

demonstrate knowledge and understanding of vocabulary through correct usage as indicated on drawings and quizzes

participation in class discussion on AutoCAD

Exit tickets

Whole class discussion on procedures for making drawings.

Assess transfer of manual drawing skills to the computer.

Summative assessment:

answer the essential questions.

create plans, sections, and elevations that meet the requirements of rubrics.

demonstrate the use of established procedures to efficiently make drawings as graded with rubrics.

demonstrate knowledge and understanding of vocabulary through correct usage as indicated on drawings and quizzes

Summative assessment: Complete writing prompts: Example: What is the difference between how scale is used in hand drawing and CAD? Example: Why is the fixture layout for the bathroom efficient? Example: What is the advantage of having a large workspace compared to working at a scale on a drawing board? Example: What is the advantage to using CAD to make an elevation from a section compared to drawing by hand?

Benchmark:

Final Exam

Alternative:

Create a tutorial on AutoCADD

Integrated Accommodation and Modifications,

Integrated Accommodation and Modifications, Special Education students, English Language Learners, At-Risk students, Gifted and Talented students, Career Education and those with 504s