Unit 2: AutoCAD Tools and Processes

Content Area: **Industrial Technology**
Course(s): **Auto CAD I**
Time Period: **1 marking period**
Length: **10 Weeks**
Status: **Published**

Unit Overview

In this unit, Students will be learning the basics of AutoDesk AutoCAD software. This unit focuses on the basic tools that students will be consistently utilizing throughout the course. Students begin with the basics of coordinate systems, a skill first highlighted in their middle school math classes, and continue to grow their new skills by exploring each of the tools by highlighting them in demos and practice drawings through the unit.

Transfer

Students will be able to independently use their learning to

- Complete real world tasks typically asked of architects and engineers
- Work as a drafter for any design firm without any college experience
- Utilize design principles normally used by engineerings and architects
- Apply critical thinking skills for any task, especially ones focused on utilizing design aspects

---

For more information, read the following article by Grant Wiggins.

http://www.authenticeducation.org/ae_bigideas/article.lasso?artid=60

Meaning

Understandings

Students will understand that

- Different Tools they will have access to in the AutoCAD Software from AutoDesk
- How to utilize those tools in drawing scenarios
- How to apply these tools in design challenges
- Short cuts on how to complete tasks more quickly and efficiently

Essential Questions

Students will keep considering

- What tools should be done for any given task?
- What would I use this program for in the real world?
- Is there anything I can do with this program beyond a classroom setting?
- Do I foresee myself finding a career or job involving this program?

Application of Knowledge and Skill

Students will know...

Students will know

- How to create a variety of basic shapes and objects using AutoCAD
- Dimensioning principles and conventions
- Present and submit drawing documentation in the proper formats
- Both replication and design of objects given different levels of prompt difficulty

Students will be skilled at...

Students will be skilled at

- Completing drawing and drafitng tasks quickly and efficiently
- Being able to design anything objects when prompted
- Applying drawing principles to greater design work, such as full on architure or engineering designs
- Replication of drawings based on reading dimensions and analysis of structure of presented objects.

Academic Vocabulary

Coordinate Systems

AutoCAD Tools

Line

Circle

Angle

Mirror

Array

Filet

Chamfer

Isometric Drawing

Engineering Paper

Learning Goal 1 - Coordinate Systems

SWBAT Create sketches utilizing each of the different types of coordinate systems in AutoCAD

TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.2	Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.
TECH.8.1.12.A.CS1	Understand and use technology systems.

TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.F.CS2	Plan and manage activities to develop a solution or complete a project.
TECH.8.1.12.F.CS4	Use multiple processes and diverse perspectives to explore alternative solutions.
TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.
TECH.8.2.12.D.CS3	Assess the impact of products and systems.

Target 1 - Absolute and Relative Coordinates

SWBAT Create sketches utilizing the standard absolute coordinate system

SWBAT Create sketches utilizing the standard relative coordinate system

TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.

Target 2 - Absolute and Relative Polar Coordinates

SWBAT Create sketches utilizing the polar absolute coordinate system

SWBAT Create sketches utilizing the polar relative coordinate system

TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.

Learning Goal 2 - Lines, Angles, and Circles

SWBAT Utilize lines, angles, and circles to construct objects and sketches in AutoCAD

TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.2	Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.

TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.F.CS2	Plan and manage activities to develop a solution or complete a project.
TECH.8.1.12.F.CS4	Use multiple processes and diverse perspectives to explore alternative solutions.
TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.
TECH.8.2.12.D.CS3	Assess the impact of products and systems.

Target 1 - Introduction

SWBAT Sketch simple objects utilizing the line, circle, and angle tools by following instructor notes and demostration

TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.

Target 2 - Task / Performance Understanding and Assessment

SWBAT Utilize the line, circle, and angle tools in order to complete drawings contained within the Lines, Angles, and Circles Assessment

TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.

Learning Goal 3 - Mirror and Array

SWBAT Utilize the mirror and array tools, in addition to the previously learned tools, to construct objects and sketches in AutoCAD

TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.2	Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.
TECH.8.1.12.A.CS1	Understand and use technology systems.

TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.F.CS2	Plan and manage activities to develop a solution or complete a project.
TECH.8.1.12.F.CS4	Use multiple processes and diverse perspectives to explore alternative solutions.
TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.
TECH.8.2.12.D.CS3	Assess the impact of products and systems.

Target 1 - Introduction

SWBAT Sketch simple objects utilizing the mirror and array tools, in addition to the previously learned tools, by following instructor notes and demonstrations

TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.

Target 2 - Task / Performance Understanding and Assessment

SWBAT Utilize the mirror and array tools, in addition to the previously learned tools, in order to complete drawings contained with the Mirror and Array Assessment

TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.

Learning Goal 4 - Filet and Chamfer

SWBAT Utilize the filet and chamfer tools, in addition to the previously learned tools, to construct objects and sketches in AutoCAD

TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.2	Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.F.CS2	Plan and manage activities to develop a solution or complete a project.
TECH.8.1.12.F.CS4	Use multiple processes and diverse perspectives to explore alternative solutions.

TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.
TECH.8.2.12.D.CS3	Assess the impact of products and systems.

Target 1 - Introduction

SWBAT Sketch simple objects utilizing the filet and chamfer tools, in addition to the previously learned tools, by following instructor notes and demonstrations

TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.

Target 2 - Task / Performance Understanding and Assessment

SWBAT Utilize the filet and chamfer tools, in addition to the previously learned tools, in order to complete drawings contained with the Filet and Chamfer Assessment

TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.

Learning Goal 5 - Isometric Drawing in AutoCAD

SWBAT Utilize the tools for Isometric Drawing, in addition to the previously learned tools, to construct 3D objects and sketches in AutoCAD

TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.2	Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.F.CS2	Plan and manage activities to develop a solution or complete a project.
TECH.8.1.12.F.CS4	Use multiple processes and diverse perspectives to explore alternative solutions.
TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.
TECH.8.2.12.D.CS3	Assess the impact of products and systems.

Target 1 - Introduction

SWBAT Sketch simple objects utilizing the tools for Isometric Drawing, in addition to the previously learned tools, by following instructor notes and demonstrations

TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.

Target 2 - Task / Performance Understanding and Assessment

SWBAT Utilize the tools for isometric drawing, in addition to the previously learned tools, in order to complete drawings contained with the Isometric Drawing Assessment

TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.

Summative Assessment

- Performance Tasks
- Test/Quiz
- Benchmark Exam Drawing
- Challenge Drawing of Marking Period

21st Century Life and Careers

CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CAEP.9.2.12.C	Career Preparation

CAEP.9.2.12.C.1	Review career goals and determine steps necessary for attainment.
CAEP.9.2.12.C.3	Identify transferable career skills and design alternate career plans.
CAEP.9.2.12.C.5	Research career opportunities in the United States and abroad that require knowledge of world languages and diverse cultures.
CAEP.9.2.12.C.9	Analyze the correlation between personal and financial behavior and employability.

Formative Assessment and Performance Opportunities

- Academic Games
- Classroom Discussions
- Classwork
- Closures
- Do Nows / Warm Ups
- Group Work
- Homework
- Student / Teacher Discussions
- Think-Pair-Share
- After School and Lunch Opportunities

Accommodations/Modifications

- Alternative Drawings for Students that have a difficulty reading the notation provided on the replication sketches contained within each tool set packet
- For each specific tool set lesson, additional 1 on 1 instruction students who have difficulty understanding tools and usage during demonstrations
- For each tool set lesson, Video Tutorials for General Student that use also provide subtitles in English and other languages to provide support
- Project Time Frame Negotiations and Performance Evaluation for Unfinished Work, given communication with the instructor on issues
- If Vision issues with computer screens, can adjust size of text font and icons to fit the needs of the students
- If ESL, Language adjustments can be implimented into AutoCAD
- If ESL, Alternative Notes can be provided
- Preferential Seating will be provided for the sake of demonstrations, note taking, and general physical and behavioral accommodations
- 504 Accomodations
- Additional Challenging / Enrichment Tasks
- Grouping
- IEPs
- Drawing of the Month
- Scaffolding Questions
- General Use of Technology Accommondations (Adjusted to meet needs of student in accordance to 504/IEP)

Unit Resources

- AutoDesk Design Handbook
- General AutoCAD Practice Websites - https://www.investintech.com/resources/blog/archives/5947-free-online-autocad-tutorials-courses.html
- Khan Academy
- Youtube Tutorials - https://www.youtube.com/channel/UC0bEfqT1FZudcnyegNvtu1A?view_as=subscriber

Interdisciplinary Connections

LA.RH.9-10.3	Analyze in detail a series of events described in a text; draw connections between the events, to determine whether earlier events caused later ones or simply preceded them.
LA.RH.9-10.7	Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text, to analyze information presented via different mediums.
LA.WHST.9-10.6	Use technology, including the Internet, to produce, share, and update writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
9-12.HS-ETS1-1.1	Asking Questions and Defining Problems
9-12.HS-ETS1-4.5	Using Mathematics and Computational Thinking
9-12.HS-ETS1-4.ETS1.B.1	Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs.