

Unit 4: Other Applications of AutoDesk Software

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

Unit Overview

In this unit, students will close out learning other potential applications for this software. Typically, AutoDesk are thought of to be exclusively an Engineering and Architecture based program, but it can be used for a plethora of applications. Students will be exploring some of these applications and allow them to potentially come up with their own project ideas for design in the future. The possibilities of this technology are really endless when you consider the implications of design. Students will also spend time working in teams as opposed to solo focused projects. They will better gain an understanding of deadlines and rallying as a team on particular points of the projects. Some students will get an opportunity as well to learn how to behave in a leadership position.

Transfer

Students will be able to independently use their learning to...

- Draw upon previously learned knowledge years after it being implemented
- Utilize processes from engineering and architectural professionals in order to construct objects and solve problems
- Read and understand provided specifications for parts, tools, and objects
- Accurately generate objects when prompted, either verbally, or with provided specifications
- Follow a scheduled time frame and deadlines for project development
- Working in teams and having a group follow established scheduling, deadlines, and responsibility
- Find creative applications for what is otherwise considered very rigidly used software applications

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

- How to work in teams and share files during a large scale project
- Nontraditional Uses of AutoCAD and Inventor
- How to follow a rigorous schedule for a project, both as an individual, and as a team
- Creatively design aspects from scratch, outside of the preestablished constraints on a project

Essential Questions

Students will keep considering

- Does the work I'm doing follow the plan and theme I had planned out?
- With the work that I have done so far, have I kept pace with the schedule that was laid out for me?
- Am I completely my role for my team properly?
- Am I keeping in mind all requests and constraints made by the client in my designs?
- Have I completed proper research towards my task before completing my own designs?

Application of Knowledge and Skill

Students will know...

Students will know

- How to lead/work in design teams
- How to properly create and follow a detailed schedule for projects
- Meet deadlines as a team at multiple stages of a project
- Intricacies of Game Design
- How to research previous potential design to derive from for own designs

Students will be skilled at...

Students will be skilled at

- Human Resource management and Teamwork
- Keeping up with deadlines in a multistage project
- Recalling knowledge of AutoCAD and Inventor for different approaches to a task
- Transferring files to a 3D printable formatting
- Utilizing 3D prints to produce prototypes for testing

Academic Vocabulary

Modeling

Generation

Printable Format

3D Printer

CNC Machine

Decal

File Format

Amusement Ride

Ticket Booth

Concession Stand

Learning Goal 1 - Board Game Modeling and Generation

SWBAT Design, Construct, and Model a board game, with a full board, pieces and rules

SWBAT Translate 1 of the Pieces into a proper 3D Printable format

TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.2.12.C.3	Analyze a product or system for factors such as safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, and human factors engineering (ergonomics).
TECH.8.2.12.C.4	Explain and identify interdependent systems and their functions.
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.3	Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.

Target 1 - Board Game Specifications

SWBAT Design a full game plan and schedule for their games design, including time tables for different pieces, and selecting a theme for their design

TECH.8.2.12.C.3	Analyze a product or system for factors such as safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, and human factors engineering (ergonomics).
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Target 2 - Utilization of Images in a 3D Space

SWBAT Stretch a 2D image over a 3D object in order to add texture to the design

TECH.8.2.12.C.3	Analyze a product or system for factors such as safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, and human factors engineering (ergonomics).
TECH.8.2.12.C.4	Explain and identify interdependent systems and their functions.
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.3	Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.

Target 3 - Designing for 3D Printers

SWBAT Translate 1 designed part from the board game into a file format that allows it to be 3D printed

TECH.8.2.12.C.3	Analyze a product or system for factors such as safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, and human factors engineering (ergonomics).
TECH.8.2.12.C.4	Explain and identify interdependent systems and their functions.
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.3	Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.

Learning Goal 2 - Amusement Park Design

SWBAT Organize, plan, schedule and design, a fully functioning amusement ride, ticket booth, and concession stand

TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.2.12.C.3	Analyze a product or system for factors such as safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, and human factors engineering (ergonomics).
TECH.8.2.12.C.4	Explain and identify interdependent systems and their functions.
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.3	Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.

Target 1 - Amusement Park Specifications

SWBAT As a team, select all components that the team wishes to design

TECH.8.2.12.C.3	Analyze a product or system for factors such as safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, and human factors engineering (ergonomics).
TECH.8.2.12.C.4	Explain and identify interdependent systems and their functions.
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.3	Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.

Target 2 - Researching Specifications for Previously Used Similar Objects

SWBAT Assign portions to different team members

SWBAT Research design plans that people have used in the past for their particular ride

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TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.
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Target 3 - Animating 3D Models for Rigid Fluidity

SWBAT Understand the term "Rigid Fluidity"

SWBAT Construct and animate final design pieces for submission

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TECH.8.2.12.C.4	Explain and identify interdependent systems and their functions.
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.3	Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.

Summative Assessment

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

21st Century Life and Careers

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
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
- Bonus Design Challenges Introduced into the Assigned Task

Accommodations/Modifications

- Adjustment to groups based on behavior and general performance with other students
- Alternative Assignment for the students on the board game project based in order to offset the weight of the design process for students who are struggling with content
- 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 Accommodations
- Additional Challenging / Enrichment Tasks
- Grouping
- IEPs
- Drawing of the Month
- Scaffolding Questions
- General Use of Technology Accommodations (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.

