Unit 2: Computer Aided Design

Content Area: **Technology**
Course(s): **Engineering Design 1**
Time Period: **October**
Length: **10 blocks**
Status: **Published**

Transfer Skills

2D and 3D CAD systems are used in conjunction with rapid prototyping equipment to aided in the design, creation and production of products.

Enduring Understandings

1. The use of computer aided design (CAD) has revolutionized the design of products.

2. There are different types of CAD systems, each with different uses and purposes.

3. There are multiple career paths, across a wide range of disciplines, that utilize CAD systems.

4. Rapid prototyping allows for an increased iterative process in the design of products.

Essential Questions

1. What are the applications of 2D and 3D CAD?

2. How has rapid prototyping influenced the design of products?

3. What is the future of CAD and rapid prototyping?

4. What are the limitations of CAD systems?

5. How can CAD systems be used to identify potential issues with the design of a product?

6. How is engineering drawing interrelated with CAD systems?

Content

Vocabulary:

Ribbon, Point, Object snap, End point, Mid Point, Tangent, Layers, Constraint, Crosshairs, Extrude, Loft,

Revolve, Fillet, Chamfer, Rapid prototyping, 3D printer, Laser cutter, CNC, Aseembly, Mate, Join, Offset

Skills

1. Create 2D engineering drawings using a CAD system.

2. Create digital 3D objects using a CAD system.

3. Design products using CAD.

4. Apply the properties of geometric shapes in the creation of engineering drawings.

5. Evaluate an engineering drawing situation and apply critical thinking and problem solving strategies to choose appropriate tools and techniques to achieve the specified degree of precision.

6. Create a 2D part using a CAD system to be laser cut as part of a design product.

7. Create a 3D part using a CAD system to be 3D printed.

8. Create an assembly of parts using a 3D CAD system.

Resources

Engineering drawing tools (various)

Engineering drawing paper

Calipers

Physical objects to be measured

Teacher presentation device

Document camera

Desktop computers

Research database access

2D & 3D CAD systems

3D printer

Laser cutter

Color laser printers

Large format printer

Prototyping equipment (hand-held and power tools)

Prototyping materials

Prototyping furniture

Presentation device

Standards

TECH.8.1.12.F.1	Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
TECH.8.1.12.F.CS4	Use multiple processes and diverse perspectives to explore alternative solutions.
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.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.
TECH.8.2.12.D.CS3	Assess the impact of products and systems.