Unit 1: Introduction to Engineering Drawing

Content Area: **Technology**
Course(s): **Engineering Design 1**
Time Period: **September**
Length: **7 blocks**
Status: **Published**

Transfer

Engineering drawing follows basic rules so that it can be communicated and interpreted by anyone.

Enduring Understandings

1. Drawings are a communication of physical objects, ideas, and descriptions.

2. Engineering drawings follow basic rules so that all drawings are consistent and can be interpreted by anyone.

3. An orthographic projection is a means of representing a 3D object in 2D.

4. The ability to represent an object using different types of drawings is essential to communicating your ideas in the best possible manner.

5. Working drawings in engineering require information in addition to the drawing(s) including notes, annotations, and descriptions.

6. Annotations can be a written paragraph or just a few words that describe a specific part of an idea.

7. Even complex designs can be broken down and communicated as simple individual parts.

Essential Questions

1. What does it require to fabricate, manufacture or build something?

2. How do lines, measurements, basic shapes and geometric construction relate to developing mechanical drawings?

3. How are measurement and accuracy important in life?

4. How can learning how to create engineering drawings help you in the rest of your life?

5. Why is it important to communicate ideas in the field of engineering efficiently and effectively?

6. How can various techniques be used to describe a complex technological product through engineering drawings?

7. What is required to completely communicate an idea?

8. What makes a set of plans or blue prints easy to understand?

Content

Vocabulary:

Object line, Center line, Hidden line, Lead hardness, T-square, 30/60 triangle, 45 triangle, Compass, Erasing shield, Circle template, Single-view drawing, Orthographic projection, Scale, Auxiliary view, Diameter, Radius, Annotation, Tangent, Perpendicular, Pictorial drawing, Isometric, Oblique, Perspective, Thumbnail sketch, Exploded view, Sectional view, Call-out drawing, Scale

Skills

1. Demonstrate the proper use of drafting equipment, measuring scales, drafting instruments and reproduction equipment.

2. Apply geometric construction techniques in the creation of engineering drawings.

3. Evaluate an engineering drawing scenario to determine the appropriate tools and techniques to achieve the specified degree of precision and error needed in a situation.

4. Create single & multi-view engineering drawings of physical objects.

5. Interpret and translate working engineering drawings.

6. Demonstrate proper freehand sketching techniques when communicating ideas and designs.

7. Apply a combination of engineering drawings and techniques to describe a physical object.

8. Create annotations and descriptions for a designed object.

9. Create call-out drawings to zoom in on a part of a design.

10. Design and create a prototype for an engineering problem.

11. Utilize a caliper to take accurate measurements of a physical object.

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

TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.2.12.A.1	Propose an innovation to meet future demands supported by an analysis of the potential full costs, benefits, trade-offs and risks, related to the use of the innovation.
TECH.8.2.12.A.2	Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
TECH.8.2.12.B.2	Evaluate ethical considerations regarding the sustainability of environmental resources that are used for the design, creation and maintenance of a chosen product.
TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.