

DELAWARE VALLEY SCHOOL DISTRICT

**PLANNED INSTRUCTION**

A PLANNED COURSE FOR:

**Mechanical Drawing I / CAD**

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Grade: 9-12

Date of Board Approval: 2016

# DELAWARE VALLEY SCHOOL DISTRICT

## PLANNED INSTRUCTION

**Title of Planned Instruction:** Mechanical Drawing I / CAD

**Subject Area:** Technology Education

**Grade Level:** 9-12

**Course Description:** Students will learn the basic principles of mechanical drawing through the use of traditional hand drawing techniques and computer aided drafting & design (CADD). Students must have a thorough knowledge of addition, subtraction and division of fractions. This class is ideal for students interested in careers related to drawing and design, including architecture and engineering.

**Time/Credit for the Course:** 1 semester (70 hours) / ½ credit

**Curriculum Writing Committee:** \_\_\_\_\_ Tom Moran

# DELAWARE VALLEY SCHOOL DISTRICT

## Curriculum Map

**Marking Period 1- Sketching, Lettering, Measuring, Use of mechanical drawing hand tool, concepts of Multiview drawings, 45 Days**

**Subject/Unit: M.P. 1: Mechanical Drawing I / Principles of Sketching Unit #1**

- Students will sketch lines, angles, circles, arcs, and geometric shapes
- Students will know the rules and techniques for sketching.
- Students will know the importance of sketching
- Students will understand that sketching is the first step in the creation of any object.
- Students will know the proper techniques and steps for sketching geometric shapes.

**Subject/Unit: M.P. 1: Mechanical Drawing I / Lettering Unit #2**

- Students will be able to create the single-stroke gothic alphabet by hand, which is standard lettering used in Mechanical Drawing.
- Students will know the proper appearance for single stroke gothic numbers
- Students will demonstrate their ability to create proper text by hand

**Subject/Unit: M.P. 1: Mechanical Drawing I / Measuring Unit #3**

- Students will know how to use a ruler to measure and create lines accurately to 1/16 of an inch
- Students will learn how to reduce fractions
- Students will increase their speed and accuracy of taking measurements using a ruler

**Subject/Unit: M.P. 1: Mechanical Drawing I / Line Structure Unit #4**

- Students will know how to use all of the hand tools to draw.
- Students will be able to neatly and consistently create lines, and shapes (single-view drawings)
- Students will learn how to use proper mechanical drawing techniques
- Students will demonstrate the proper techniques to holding a pencil
- Students will demonstrate their ability to create proper line structure

**Subject/Unit: M.P. 1: Mechanical Drawing I / Orthographic Drawing Unit #5**

- Students will apply theories of orthographic projection in the development of multiview drawings.
- Students will also reinforce and assess their ability to create proper line structure.
- Students will be able to center multiview drawings using the centering formula.
- Students will know how to use the transfer method to project dimensions for the side and top views
- Students will use proper darkening methods
- Students will use these same theories to create drawings using CAD in the next unit.

## DELAWARE VALLEY SCHOOL DISTRICT

Understanding of:

- Using technical sketching techniques to creating sketches
- Creating single stroke gothic letters
- Learning how to read a ruler to 1/16"
- Knowing how to use drafting hand tools to develop mechanical drawings
- Applying the concepts of orthographic drawing to create Multiview drawings

**Marking Period 2- Computer aided drawing software, CAD drawing skills, Dimensioning rules, dimensioning drawings Section Views, 45 Days**

Marking Period 2 Goals:

**Subject/Unit: M.P. 2: Mechanical Drawing I / Intro to Computer Aided Drawing Unit #6**

- Students will be able to effectively use CAD software.
- Students will develop their knowledge of the electronic tools and functions such as: drawing setup, saving and opening, using line, circle, polygon and all other essential drawing tools and printing

**Subject/Unit: M.P. 2: Mechanical Drawing I / Applying Computer Aided Drawing Unit #7**

- Students will know how to effectively use electronic devices and CAD software to effectively create orthographic drawings.
- Students will learn how to efficiently edit drawings
- Students will be able to use all of the basic tools in the latest versions of AutoCAD
- Students will know how to set up a drawing to print
- Students will produce CAD drawings using the HP Design Jet 800 plotter

**Subject/Unit: M.P. 2: Mechanical Drawing I / Dimensioning Unit #8**

- Students will know all of the general rules for dimensioning
- Students will learn how to setup dimension styles
- Students will utilize the rules for dimensioning and the dimensioning tools in AutoCAD to apply dimensions to a drawing
- Students will be assessed on their knowledge of dimensioning rules and the use of AutoCAD dimensioning tools

**Subject/Unit: M.P. 2: Mechanical Drawing I / Section Views Unit #9**

- Students will know the basic theory of section views
- Students will learn the AutoCAD tools used to create section views
- Students will identify the different types of section views and when they should be utilized
- Students will be able to develop a cross section of an object.
- Students will label section views with the proper notation

## DELAWARE VALLEY SCHOOL DISTRICT

Understanding of:

- Learning how to use the AutoCAD software
- Applying the skills learned in using the CAD software to create Multiview drawings
- Understanding the rules of dimensioning
- Applying dimensions to drawings using the dimensioning rules
- Knowing how to create a section view drawing

# DELAWARE VALLEY SCHOOL DISTRICT

## UNIT 1: Principles of Sketching

### Big Idea # 1:

- The skills, techniques, elements and principles of the arts can be learned, studied, refined and practiced
  - **Essential Questions:**
    - How do artists document the development of their artistic process?
  - **Concepts:**
    - Artists work to develop skills, techniques, and ideas in a sketchbook or visual journal to document and refine their process.
  - **Competencies:**
    - Generate a series of entries in a sketchbook or visual journal that demonstrates attention to skills, techniques, and ideas in process.

### Big Idea #2:

- Artists use tools and resources as well as their own experiences and skills to create art
  - **Essential Questions:**
    - How do artists use tools and techniques to convey emotion and evoke emotional response?
  - **Concepts:**
    - Artists choose tools and techniques that convey emotion and evoke emotional response
  - **Competencies:**
    - Explain how artists choose tools and techniques to convey emotion and evoke emotional response.

# DELAWARE VALLEY SCHOOL DISTRICT

## Curriculum Plan

**Time Range in Days:** 8-10 Day

**Standard(s):**

Arts and Humanities: 9.1: Production, Performance and Exhibition of Dance, Music, Theatre and Visual Arts

**Standards Addressed:** (Number only- See Appendix for Description)

Standard - 9.1.12.A, 9.1.12B

**Overview:** Use of hand drawn sketches to effectively communicate your ideas

**Focus Question(s):** How can we create sketches to effectively communicate our ideas to others?

**Goals:** Students will be able to create sketches which will allow them to effectively communicate their ideas to someone else

**Objectives:**

1. Students will sketch lines, angles, circles, arcs, and geometric shapes. (DOK 1)
2. Students will know how to apply the rules and techniques for sketching. (DOK 4)
3. Students will understand the importance of sketching. (DOK 1)
4. Students will be able to apply the proper techniques and steps for sketching geometric shapes. (DOK 4)

**Core Activities and Corresponding Instructional Methods:**

1. Discuss principles of sketching. Rules and techniques used to properly create a sketch of an object.
  - a. Lecture: sketching rules and techniques
  - b. Demonstration: sketching techniques
2. Students will sketch a variety of lines, circles, arcs, ellipses and geometric shapes.
  - a. Hands-on: practice sketching techniques by drawing given objects

**Assessments:**

**Diagnostic:**

-oral response

**Formative:**

-practice sketches

-sketching worksheets

## DELAWARE VALLEY SCHOOL DISTRICT

**Summative:**

-Unit examination

**Extensions:** Students that have mastered the basic sketching principles will be given more challenging sketching activities.

**Correctives:** Individual instruction and demonstrations will be given to students having difficulty

**Materials and Resources:** Smart Board, White board, *Exploring Drafting* textbook (Used only as a reference for Unit 3, Pages 42-65), drafting: paper, pencils, erasers, and desks, and sketching worksheets



# DELAWARE VALLEY SCHOOL DISTRICT

## UNIT 2: Lettering

### Big Idea # 1:

- The skills, techniques, elements and principles of the arts can be learned, studied, refined and practiced
  - **Essential Questions:**
    - How do artists document the development of their artistic process?
  - **Concepts:**
    - Artists work to develop skills, techniques, and ideas in a sketchbook or visual journal to document and refine their process.
  - **Competencies:**
    - Generate a series of entries in a sketchbook or visual journal that demonstrates attention to skills, techniques, and ideas in process.

### Big Idea #2:

- Artists use tools and resources as well as their own experiences and skills to create art
  - **Essential Questions:**
    - How do artists use tools and techniques to convey emotion and evoke emotional response?
  - **Concepts:**
    - Artists choose tools and techniques that convey emotion and evoke emotional response
  - **Competencies:**
    - Explain how artists choose tools and techniques to convey emotion and evoke emotional response.

# DELAWARE VALLEY SCHOOL DISTRICT

## Curriculum Plan

**Time Range in Days:** 2-3 days

**Standard(s):**

Arts and Humanities: 9.1: Production, Performance and Exhibition of Dance, Music, Theatre and Visual Arts

**Standards Addressed:**

9.1.12.A, 9.1.12B

**Overview:** Proper lettering is essential in to achieve high quality drawings.

**Focus Question(s):** Can students use lettering techniques to create neat lettering in order to achieve high quality drawings?

**Goals:** Students will be able to create neat lettering to develop high quality drawings

**Objectives:**

- Students will be able to create the single-stroke gothic alphabet by hand, which is standard lettering used in Mechanical Drawing. (DOK 4)
- Students will know how to create proper single stroke gothic numbers (DOK 4)
- Students will demonstrate their ability to create proper text by hand (DOK 4)

**Core Activities and Corresponding Instructional Methods:**

1. Students will complete the lettering worksheets
  - a. Discuss: lettering strokes and techniques
  - b. Demonstrate: letter techniques and strokes.
  - c. Hands-on: lettering worksheets

**Assessments:**

**Diagnostic:**

-oral response

**Formative:**

-lettering worksheets

**Summative:**

-lettering on hand drawings

**Extensions:**

Students that have mastered the basic lettering principles will be give more challenging fonts to attempt.

## DELAWARE VALLEY SCHOOL DISTRICT

### **Correctives:**

Individual instruction and demonstrations will be given to students having difficulty

### **Materials and Resources**

Smart Board, Whiteboard, drafting tables, pencils, and worksheets

## DELAWARE VALLEY SCHOOL DISTRICT

### UNIT 3: Measuring

**Big Idea # 1:** A technological world requires that humans develop capabilities to solve technological challenges and improve products for the way we live.

**Essential Questions:** How have technological developments impacted devices, processes, and systems for the way we live?

**Concepts:** The abilities required in a technological world include diagnosing, troubleshooting, analyzing and maintaining systems.

**Competencies:** Develop the abilities to use and maintain technological products and systems.

**Big Idea #2:** A technological world requires that humans develop capabilities to solve technological challenges and improve products for the way we live.

**Essential Questions:** How have technological developments impacted devices, processes, and systems for the way we live?

**Concepts:** The abilities required in a technological world include diagnosing, troubleshooting, analyzing and maintaining systems.

**Competencies:** Improve an existing product, process, or system.

# DELAWARE VALLEY SCHOOL DISTRICT

## Curriculum Plan

**Time Range in Days:** 2-3 days

**Standard(s):**

PACS Math: 2.3 Measurement and Estimation

**Standards Addressed:**

2.3.8.F

**Overview:** Use of measuring tools to take and make measurements to  $1/16''$

**Focus Question(s):** Can students use a ruler to measure and/or take measurements to  $1/16''$ ?

**Goals:** Students will be able to use a ruler to measure to  $1/16''$

**Objectives:**

1. Students will know how to use a ruler to measure and create lines accurately to  $1/16$  of an inch (DOK 1)
2. Students will learn how to reduce fractions (DOK 1)
3. Students will increase their speed and accuracy of taking measurements using a ruler (DOK 1)

**Core Activities and Corresponding Instructional Methods:**

1. Reading a ruler to  $1/16''$ :
  - a. Discussion/demonstration
2. Using a ruler to take and make measurements on measuring worksheets
  - a. Demonstration
  - b. Hands-on

**Assessments:**

**Diagnostic:**

-oral response

**Formative:**

-measuring worksheets

**Summative:**

-measuring and accurately creating drawings

**Extensions:**

Students that have mastered the basic principles of measuring will be give more challenging assignments and will learn how to read a ruler to  $1/32$  of an inch.

## DELAWARE VALLEY SCHOOL DISTRICT

### **Correctives:**

Individual instruction and demonstrations will be given to students having difficulty

### **Materials and Resources**

Smart Board, Whiteboard, drafting tables, pencils, and worksheets

## UNIT 4: Line Structure

### Big Idea # 1:

- The skills, techniques, elements and principles of the arts can be learned, studied, refined and practiced
  - **Essential Questions:**
    - How do artists document the development of their artistic process?
  - **Concepts:**
    - Artists work to develop skills, techniques, and ideas in a sketchbook or visual journal to document and refine their process.
  - **Competencies:**
    - Generate a series of entries in a sketchbook or visual journal that demonstrates attention to skills, techniques, and ideas in process.

### Big Idea #2:

- Artists use tools and resources as well as their own experiences and skills to create art
  - **Essential Questions:**
    - How do artists use tools and techniques to convey emotion and evoke emotional response?
  - **Concepts:**
    - Artists choose tools and techniques that convey emotion and evoke emotional response
  - **Competencies:**
    - Explain how artists choose tools and techniques to convey emotion and evoke emotional response.

# DELAWARE VALLEY SCHOOL DISTRICT

## Curriculum Plan

**Time Range in Days:** 7-10 days

**Standard(s):**

Arts and Humanities: 9.1: Production, Performance and Exhibition of Dance, Music, Theatre and Visual Arts

**Standards Addressed:**

9.1.12.A, 9.1.12B

**Overview:** Use hand tools to create proper lines with high quality line structure

**Focus Question(s):** Can students use hand tools to create proper lines?

**Goals:** Students will know how to use hand tools to create high quality lines

**Objectives:**

1. Students will know how to use all of the hand tools to draw. (DOK 1)
2. Students will be able to neatly and consistently create lines, and shapes (single-view drawings). (DOK 4)
3. Students will learn how to use proper mechanical drawing techniques. (DOK 1)
4. Students will demonstrate the proper techniques to holding a pencil (DOK 2)
5. Students will demonstrate their ability to create proper line structure (DOK 4)

**Core Activities and Corresponding Instructional Methods:**

1. Students will develop their ability to create proper line structure through hands-on activities.
  - a. Discuss and demonstrate line structure and the use of hand tools.
  - b. Hands-on activities: line and single-view drawings
2. Students will use hand tools to draw single-view drawings.
  - a. Demonstrate line structure and the use of hand tools.
  - b. Hands-on activities: line and single-view drawings.

**Assessments:**

**Diagnostic:**

Oral response

**Formative:**

Drawing assignments

**Summative:**

Line structure

**Extensions:**

Students that have mastered the basic principles of line structure will be given more challenging objects to draw



## DELAWARE VALLEY SCHOOL DISTRICT

### **Correctives:**

Individual instruction and demonstrations will be given to students having difficulty

### **Materials and Resources:**

Smart Board, Hand tools, drawing paper, computers and Netop software, drawing tables.

## DELAWARE VALLEY SCHOOL DISTRICT

### UNIT 5: Orthographic Drawing

**Big Idea # 1:** Technology is created used and modified by humans

**Essential Questions:** What is technological literacy?

**Concepts:** Technology and society mutually impact each other.

**Competencies:** Describe how technological development impacts economics, culture, and policies.

**Big Idea #2:** Technological design is a creative process that anyone can do which many result in new inventions and innovations.

**Essential Questions:** How would you explain technological design and problem solving methods in the development of inventions and innovations?

**Concepts:** Technological design & problem solving utilizes a series of steps that take place in a well-defined sequence.

**Competencies:** Employ engineering design and problem solving skills to solve complex technological challenges.

# DELAWARE VALLEY SCHOOL DISTRICT

## Curriculum Plan

**Time Range in Days:** 12-15 days

**Standard(s):**

-3.4 Technology and Engineering Education

**Standards Addressed:**

-3.4.12.C2, 3.4.12.D2, 3.4.10.E7

**Anchor(s):**

-S11.A.2.1, S11.A.3.1

**Overview:** Get students to develop high quality orthographic (Multiview) drawings

**Focus Question(s):** Why are high quality orthographic drawings so important to mechanical drawing?

**Goals:** Students will be able develop high quality orthographic drawings.

**Objectives:**

1. Students will apply theories of orthographic projection in the development of Multiview drawings. (DOK 4)
2. Students will also reinforce and assess their ability to create proper line structure. (DOK 3)
3. Students will be able to center Multiview drawings using the centering formula. (DOK 1)
4. Students will know how to use the transfer method to project dimensions for the side and top views. (DOK 1)
5. Students will use proper darkening methods. (DOK 1)

**Core Activities and Instructional Methods:**

1. Discuss the theories and benefits of orthographic projection
  - a. Lecture
2. Draw 6 Multiview drawings. These drawings will progress in difficulty.
  - a. Demonstration: Process for creating an orthographic drawing
    - i. Each drawing will demonstrate the use of a different drawing technique such as: translating an isometric drawing into an orthographic, and drawings arcs and angles and centering formulas
  - b. Hands-on: Use process to create Multiview drawings

## DELAWARE VALLEY SCHOOL DISTRICT

### Assessments:

#### Diagnostic:

Oral response

#### Formative:

Multiview drawings

#### Summative:

Line structure, ability to create a Multiview drawing using the theories of orthographic projection

**Extensions:** Students that have mastered the basic principles of line structure will be given more challenging objects to draw

**Correctives:** Individual instruction and demonstrations will be given to students having difficulty

### Materials and Resources

Smart Board, *Exploring Drafting* textbook (Used only as a reference for Unit 9, pgs 191-217), white board, computers, Netop, drafting tables, drawing paper, and hand tools

## **UNIT 6: Introduction to Computer Aided Drawing**

**Big Idea # 1:** Technology is created used and modified by humans

**Essential Questions:** What is technological literacy?

**Concepts:** Technology and society mutually impact each other.

**Competencies:** Describe how technological development impacts economics, culture, and policies.

**Big Idea #2:** Technological design is a creative process that anyone can do which many result in new inventions and innovations.

**Essential Questions:** How would you explain technological design and problem solving methods in the development of inventions and innovations?

**Concepts:** Technological design & problem solving utilizes a series of steps that take place in a well-defined sequence.

**Competencies:** Employ engineering design and problem solving skills to solve complex technological challenges.

# DELAWARE VALLEY SCHOOL DISTRICT

## Curriculum Plan

**Time Range in Days:** 12-14 days

**Standard(s):**

-3.4 Technology and Engineering Education

**Standards Addressed:**

-3.4.12.C2, 3.4.12.D2, 3.4.10.E7

**Anchor(s):**

-S11.A.2.1, S11.A.3.1

**Overview:** Computer Aided Drawing (CAD) is an integral part of mechanical drawing, which is used heavily in engineering and design.

**Focus Question(s):** Why is it so important for mechanical drawing students to learn how to use CAD software?

**Goals:** Students will know how to use CAD software to create working drawings.

**Objectives:**

1. Students will be able to effectively use CAD software. (DOK 1)
2. Students will develop their knowledge of the electronic tools and functions such as: drawing setup, saving and opening, using line, circle, polygon and all other essential drawing tools and printing. (DOK 4)

**Core Activities and Instructional Methods:**

1. Practice problems will be used to reinforce the proper use of the software
  - a. Lecture & Demonstration: use of the CAD software
    - i. Students will take notes as specific tools are being demonstrated.
  - b. Hands-on: practice tools through various activities and drawings.

**Assessments:**

**Diagnostic:**

Oral response

**Formative:**

Practice problem

**Summative:**

Use of CAD software

**Extensions:** Students that have mastered the basic principles of line structure will be given more challenging objects to draw

## DELAWARE VALLEY SCHOOL DISTRICT

**Correctives:** Individual instruction and demonstrations will be given to students having difficulty

### **Materials and Resources**

-*Exploring Drafting* textbook (Unit 9, pgs 191-217), Smart board board, computers, Netop, Autodesk CADD software (latest release), composition notebooks.

## UNIT 7: Applied Computer Aided Drawing

**Big Idea # 1:** Technology is created used and modified by humans

**Essential Questions:** What is technological literacy?

**Concepts:** Technology and society mutually impact each other.

**Competencies:** Describe how technological development impacts economics, culture, and policies.

**Big Idea #2:** Technological design is a creative process that anyone can do which many result in new inventions and innovations.

**Essential Questions:** How would you explain technological design and problem solving methods in the development of inventions and innovations?

**Concepts:** Technological design & problem solving utilizes a series of steps that take place in a well-defined sequence.

**Competencies:** Employ engineering design and problem solving skills to solve complex technological challenges.



# DELAWARE VALLEY SCHOOL DISTRICT

## Curriculum Plan

**Time Range in Days:** 20-25 days

**Standard(s):**

-3.4 Technology and Engineering Education

**Standards Addressed:**

-3.4.12.C2, 3.4.12.D2, 3.4.10.E7

**Anchor(s):**

-S11.A.2.1, S11.A.3.1

**Overview:** Efficient use of CAD software is essential to ones effectiveness in any perspective field in which it is be used.

**Focus Question(s):** Why must students achieve a mastery level of CAD software to be effective as a draftsperson?

**Goals:** Students will be able to CAD software at a mastery level.

**Objectives:**

1. Students will know how to effectively use electronic devices and CAD software to effectively create orthographic drawings. (DOK 1)
2. Students will learn how to efficiently edit drawings (DOK 2)
3. Students will be able to use all of the basic tools in the latest versions of AutoCAD (DOK 1)
4. Students will know how to set up a drawing to print (DOK 1)
5. Students will produce CAD drawings using the HP Design Jet 800 plotter (DOK 1)

**Core Activities:**

1. Reinforce orthographic drawing techniques and CAD tools through the development of multiview drawings. Students will translate isometric drawings problems from the *Exploring Drafting* text into orthographic drawings on the computer. These drawings will progress in difficulty to challenge the students' ability to think and solve problems. Each drawing will teach a new aspect of drawing and the computer program.
  - a. Demonstration: use of the computer program and drawing techniques through drawing problems
  - b. Hands-on: learning proper completion of CAD drawing

## DELAWARE VALLEY SCHOOL DISTRICT

### Assessments:

#### Diagnostic:

Oral response

#### Formative:

Orthographic drawings

#### Summative:

Use of CAD software

**Extensions:** Students that have mastered the basic principles of line structure will be given more challenging objects to draw

**Correctives:** Individual instruction and demonstrations will be given to students having difficulty

### Materials and Resources

-*Exploring Drafting* textbook (Unit 9, pgs. 215-217), white board, computers, Netop, Autodesk CAD software (latest release), composition notebooks.

## UNIT 8: Dimensioning

**Big Idea # 1:** Technology is created used and modified by humans

**Essential Questions:** What is technological literacy?

**Concepts:** Technology and society mutually impact each other.

**Competencies:** Describe how technological development impacts economics, culture, and policies.

**Big Idea #2:** Technological design is a creative process that anyone can do which many result in new inventions and innovations.

**Essential Questions:** How would you explain technological design and problem solving methods in the development of inventions and innovations?

**Concepts:** Technological design & problem solving utilizes a series of steps that take place in a well-defined sequence.

**Competencies:** Employ engineering design and problem solving skills to solve complex technological challenges.

# DELAWARE VALLEY SCHOOL DISTRICT

## Curriculum Plan

**Time Range in Days:** 5-6 days

**Standard(s):**

-3.4 Technology and Engineering Education

**Standards Addressed:**

-3.4.12.C2, 3.4.12.D2, 3.4.10.E7

**Anchor(s):**

-S11.A.2.1, S11.A.3.1

**Overview:** Proper dimensioning is crucial to the quality, and ease of reading a mechanical drawing.

**Focus Question(s):** Why is it so important for students to know how to correctly dimension a mechanical drawing?

**Goals:** Students will be able to correctly dimension mechanical drawings.

**Objectives:**

1. Students will know all of the general rules for dimensioning. (DOK 1)
2. Students will learn how to setup dimension styles. (DOK 1)
3. Students will utilize the rules for dimensioning and the dimensioning tools in AutoCAD to apply dimensions to a drawing. (DOK 2)

**Core Activities an Instructional Methods:**

1. Properly apply dimensions to orthographic drawings.
  - a. Lecture Unit 10 *Exploring Drafting* text Dimensioning
  - b. Demonstration: application of dimensions
  - c. Hands-on: apply dimensions to orthographic drawing assignments

**Assessments:**

**Diagnostic:**

Oral response

**Formative:**

Orthographic drawings

**Summative:**

Dimensions on drawings

**Extensions:** Students that have mastered the basic principles of line structure will be given more challenging objects to dimension

## DELAWARE VALLEY SCHOOL DISTRICT

**Correctives:** Individual instruction and demonstrations will be given to students having difficulty

### **Materials and Resources**

-*Exploring Drafting* textbook (Used only as a reference for: Unit 10, pgs 219-252), white board, computers, Netop, Autodesk CADD software (latest release), composition notebooks.

## UNIT 9: Section Views

**Big Idea # 1:** Technology is created used and modified by humans

**Essential Questions:** What is technological literacy?

**Concepts:** Technology and society mutually impact each other.

**Competencies:** Describe how technological development impacts economics, culture, and policies.

**Big Idea #2:** Technological design is a creative process that anyone can do which many result in new inventions and innovations.

**Essential Questions:** How would you explain technological design and problem solving methods in the development of inventions and innovations?

**Concepts:** Technological design & problem solving utilizes a series of steps that take place in a well-defined sequence.

**Competencies:** Employ engineering design and problem solving skills to solve complex technological challenges.

# DELAWARE VALLEY SCHOOL DISTRICT

## Curriculum Plan

**Time Range in Days:** 5-7 days

**Standard(s):**

-3.4 Technology and Engineering Education

**Standards Addressed:**

-3.4.12.C2, 3.4.12.D2, 3.4.10.E7

**Anchor(s):**

-S11.A.2.1, S11.A.3.1

**Overview:** Section views are extremely important in the understanding of the interior of more complex objects

**Focus Question(s):** Why is it so important for students to be able to draw section views?

**Goals:** Students will be able to properly draw a section view.

**Objectives:**

1. Students will know the basic theory of section views. (DOK 1)
2. Students will learn the AutoCAD tools used to create section views. (DOK 1)
3. Students will identify the different types of section views and when they should be utilized. (DOK 4)
4. Students will be able to develop a cross section of an object. (DOK 4)
5. Students will label section views with the proper notation. (DOK 2)

**Core Activities and Instructional Methods:**

1. Discuss the importance and creation of section views
  - a. Lecture: section views
2. Drawing assignments from the textbook (pgs. 269 & 270)
  - a. Demonstration: section view rules and drawing techniques
  - b. Hands-on: section view drawings to reinforce demonstrations

**Assessments:**

**Diagnostic:**

Oral response

**Formative:**

Orthographic drawings

**Summative:**

Section Views in drawings

## DELAWARE VALLEY SCHOOL DISTRICT

**Extensions:** Students that have mastered the basic principles of line structure will be given more challenging section views to draw

**Correctives:** Individual instruction and demonstrations will be given to students having difficulty

### **Materials and Resources**

-*Exploring Drafting* textbook (Unit 11, pgs 253-284), white board, computers, Netop, Autodesk CAD software (latest release), composition notebooks.



## DELAWARE VALLEY SCHOOL DISTRICT

### Primary Textbook(s) Used for this Course of Instruction

-There are no primary textbooks used in this class

## Appendix

### STANDARDS:

Standard Area - 9.1: Production, Performance and Exhibition of Dance, Music, Theatre and Visual Arts

Standard - 9.1.12.A Know and use the elements and principles of each art form to create works in the arts and humanities.

Standard - 9.1.12.B Recognize, know, use and demonstrate a variety of appropriate arts elements and principles to produce, review and revise original works in the arts.

Standard Area: Math: 2.3 Measurement and Estimation

Standards Addressed: 2.3.8.F: Estimate and verify measurements of rate and mass.

3.4. Technology and Engineering Education

3.4.C Technology and Engineering Design

- 3.4.12.C2: Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

3.4.D Abilities for a Technological World

- 3.4.12.D2: Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

3.4.E The Design World

- 3.4.10.E7: Evaluate structure design as related to function, considering such factors as style, convenience, safety, and efficiency.

### ANCHORS:

S11.A.2 Processes, Procedures, and Tools of Scientific Investigations

- S11.A.2.1 - Apply knowledge of scientific investigation or technological design to develop or critique aspects of the experimental or design process.

S11.A.3 Systems, Models, and Patterns

- S11.A.3.1 – Analyze the parts of a simple system, their roles, and their relationships to the system as a whole.

**DELAWARE VALLEY SCHOOL DISTRICT**

**Checklist to Complete and Submit with Curriculum:**

- \_\_\_ **A hard copy of the curriculum using The template entitled “Planned Instruction,” available on the district website**
- \_\_\_ **Hard copies of all supplemental resources not available electronically**
- \_\_\_ **The primary textbook form(s)**
- \_\_\_ **The appropriate payment form, in compliance with the maximum curriculum writing hours noted on the first page of this document**
- \_\_\_ **A USB/Flash Drive containing a single file that will print the curriculum in its intended sequence from beginning to end and all supplemental resources that are available in electronic format.**

**Each principal and/or department chair has a schedule of First and Second Readers/Reviewers. Each Reader/Reviewer must sign & date below.**

**First Reader/Reviewer Printed Name**\_\_\_\_\_

**First Reader/Reviewer Signature**\_\_\_\_\_ **Date**\_\_\_\_\_

**Second Reader/Reviewer Printed Name**\_\_\_\_\_

**Second Reader/Reviewer Signature** \_\_\_\_\_ **Date**\_\_\_\_\_