

Auburn School District Framework: Engineering Design and Architecture 3 and 4

Course: CAD/CADD Drafting and Design Technology

Total Framework Hours: 180 Hours

CIP Code: 151302

Type: Exploratory

Career Cluster: Science, Technology, Engineering and Mathematics

Date Last Modified: Sunday, June 12, 2016

Resources and Standard used in Framework Development:

Standards used for this framework are from the OSPI Model Framework for 151302 CAD/CADD Drafting and Design Technology

Unit 1 SKETCHING AND APPLICATIONS II

Hours: 16

Performance Assessment(s):

Apply and demonstrate freehand sketching skills.
Create pictorial drawings and models.

SKETCHING AND APPLICATIONS

- 1.Utilize the creative process to develop a plan to produce and evaluate a product.
- 2.Apply mathematical thinking and problem-solving to perform tasks.
- 3.Synthesize information from a variety of sources to plan and present effective professional communications using tools and technology.
- 4.Demonstrate understanding of terms and principles used in the architectural and engineering profession.
- 5.Interpret and apply conventional General Drafting Standards to architectural and engineering drafting situations.

Leadership Alignment:

Presentation

Utilize the creative process to develop a plan to produce and evaluate a product

2.D.1 Solve different kinds of non-familiar problems in both conventional and innovative ways

Demonstrate understanding of terms and principles used in the architectural and engineering profession.

Reason Effectively

2.A.1 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation

Standards and Competencies

Standard: Drafting Technical Skills

- Use basic measurement systems
- Use and maintain appropriate tools, machines and equipment to accomplish project goals.
- Use drafting equipment, measuring scales, drafting instruments and reproduction equipment.
- Demonstrate the use of the alphabet of lines including styles and weights.
- Prepare title blocks and other drafting formats.
- Use technical skills to develop a working set of drawings.

Standard: Multi-view or Orthographic Projections

- Prepare multi-view or orthographic freehand sketches.
- Select proper drawing scale, views and layout.
- Prepare drawings containing horizontal and vertical surfaces.
- Prepare drawings containing circles and/or arcs.

Standard: Pictorial Drawings

- Apply line of sight
- Identify the use and application of pictorial drawings.
- Sketch pictorial drawings.
- Identify and create oblique drawings
- Identify and create perspective drawings

Standard: Math and Measurements for Drafting

- Demonstrate basic math principles
- Perform addition, subtraction, division and multiplication of whole numbers, fractions, decimals, metric and percentages.
- Identify different measurement tools and applications.
- Measure parts using an engineer scale (1/50th scale), fractional scale, metric scale, vernier caliper, micrometer.
- Develop drawings utilizing measurements.

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Mathematics

CC: Mathematical Practices (MP)

- 1 - Make sense of problems and persevere in solving them.
- 5 - Use appropriate tools strategically.
- 6 - Attend to precision.
- 7 - Look for and make use of structure.

Reading

CC: Reading Informational Text

- 2 - Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an
- 4 - Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word

Science

Social Studies

Writing

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation

- Think Creatively
- Work Creatively with Others
- Implement Innovations

Creative Thinking and Problem Solving

- Reason Effectively
- Use Systems Thinking
- Make Judgements and Decisions
- Solve Problems

Communication and Collaboration

- Communicate Clearly
- Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy

- Access and Evaluate Information
- Use and Manage Information

Media Literacy

- Analyze Media
- Create Media Products

Information, Communications, and Technology (ICT Literacy)

- Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability

- Adapt to Change
- Be Flexible

Initiative and Self-Direction

- Manage Goals and Time
- Work Independently
- Be Self-Directed Learners

Social and Cross-Cultural

- Interact Effectively with Others
- Work Effectively in Diverse Teams

Productivity and Accountability

- Manage Projects
- Produce Results

Leadership and Responsibility

- Guide and Lead Others
- Be Responsible to Others

Performance Assessment(s):

Apply mathematical concepts to problems in engineering and design.
Apply measurement and scale concepts in engineering and design.
Interpret engineering documents and control documents.
Create technical drawings using basic drafting procedures.

Standards and Competencies

- 1.Utilize the creative process to develop a plan to produce and evaluate a product.
- 2.Apply mathematical thinking and problem-solving to perform tasks.
- 3.Demonstrate understanding of terms and principles used in the architectural and engineering profession.
- 4.Interpret and apply conventional General Drafting Standards to architectural and engineering drafting situations.
- 5.Interpret and apply conventional Computer Aided Drafting Standards to architectural and engineering drafting situations.

Leadership Alignment:

Interpret and apply conventional General Drafting Standards to architectural and engineering drafting situations.
4.B.1 Use information accurately and creatively for the issue or problem at hand

Interpret and apply conventional Computer Aided Drafting Standards to architectural and engineering drafting situations.
2.D.1 Solve different kinds of non-familiar problems in both conventional and innovative ways

Standards and Competencies**Standard: Fundamental Computer Skills**

- Demonstrate proper care of equipment
- Operate and adjust input devices
- Correct handling and operation of storage media
- Start and shut down work station
- Perform basic operating system functions.
- Start and exit a software program as required.

Standard: Drafting Technical Skills

- Use drawing media and related drafting materials.
- Use basic measurement systems
- Use and maintain appropriate tools, machines and equipment to accomplish project goals.
- Use drafting equipment, measuring scales, drafting instruments and reproduction equipment.
- Identify and use the various drafting media and techniques.
- Demonstrate the use of the alphabet of lines including styles and weights.
- Prepare title blocks and other drafting formats.

Standard: Math and Measurements for Drafting

- Demonstrate basic math principles
- Solve problems using formulas
- Perform addition, subtraction, division and multiplication of whole numbers, fractions, decimals, metric and percentages.
- Identify different measurement tools and applications.
- Measure parts using an engineer scale (1/50th scale), fractional scale, metric scale, vernier caliper, micrometer.
- Develop drawings utilizing measurements.

Standard: Basic CAD Skills - Create

- Create new drawing
- Perform drawing set up
- Construct geometric figures of lines, splines, circles, and arcs.
- Create text using appropriate style and size to annotate drawings
- Use and control accuracy enhancement tools for entity positioning methods such as snap and XYZ.
- Identify, create, store and use standard part symbols and libraries.
- Use viewing commands to perform zooming and panning.
- Apply standard dimensioning rules.

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Mathematics

CC: Mathematical Practices (MP)

- 1 - Make sense of problems and persevere in solving them.
- 4 - Model with mathematics.
- 5 - Use appropriate tools strategically.
- 6 - Attend to precision.

Reading

CC: Reading Informational Text

- 4 - Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word
- 7 - Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or

Science

Social Studies

Writing

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation

- Think Creatively
- Work Creatively with Others
- Implement Innovations

Creative Thinking and Problem Solving

- Reason Effectively
- Use Systems Thinking
- Make Judgements and Decisions
- Solve Problems

Communication and Collaboration

- Communicate Clearly
- Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy

- Access and Evaluate Information
- Use and Manage Information

Media Literacy

- Analyze Media
- Create Media Products

Information, Communications, and Technology (ICT Literacy)

- Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability

- Adapt to Change
- Be Flexible

Initiative and Self-Direction

- Manage Goals and Time
- Work Independently
- Be Self-Directed Learners

Social and Cross-Cultural

- Interact Effectively with Others
- Work Effectively in Diverse Teams

Productivity and Accountability

- Manage Projects
- Produce Results

Leadership and Responsibility

- Guide and Lead Others
- Be Responsible to Others

Performance Assessment(s):

Explore architectural drafting design concepts and problems through;
plot plan
Floor plan
Elevation plan

Standards and Competencies

- 1.Utilize the creative process to develop a plan to produce and evaluate a product.
- 2.Apply mathematical thinking and problem-solving to perform tasks.
- 3.Demonstrate understanding of terms and principles used in the architectural and engineering profession.
- 4.Interpret and apply conventional General Drafting Standards to architectural and engineering drafting situations.
- 5.Interpret and apply conventional Computer Aided Drafting Standards to architectural and engineering drafting situations

Leadership Alignment:

- Demonstrate understanding of terms and principles used in the architectural and engineering profession.
- 1.A.3 Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts
Reason Effectively
 - 2.A.1 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation

Standards and Competencies**Standard: Fundamental Computer Skills**

- Demonstrate proper care of equipment
- Operate and adjust input devices
- Operate and adjust output devices
- Correct handling and operation of storage media
- Start and shut down work station
- Perform basic operating system functions.
- Start and exit a software program as required.
- Format and save drawings to storage devices

Standard: Architectural Drafting with AutoCad

- Careers in Architecture
- Architectural Design Process
- Architectural CADD Standards
- Starting Auto CAD
- Creating a new drawing
- Opening drawings
- Saving drawing
- Getting help

Standard: Architectural History and Styles

- The development of architectural forms
- Development of architectural styles
- Influences of Early American architecture
- New Challenges in Architecture

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Mathematics

CC: Number and Quantity (N)

1 - Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and

Reading

CC: Reading Informational Text

Key Ideas and Details (9-10)

1 - Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

Science

Social Studies

Writing

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation

- Think Creatively
- Work Creatively with Others
- Implement Innovations

Creative Thinking and Problem Solving

- Reason Effectively
- Use Systems Thinking
- Make Judgements and Decisions
- Solve Problems

Communication and Collaboration

- Communicate Clearly
- Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy

- Access and Evaluate Information
- Use and Manage Information

Media Literacy

- Analyze Media
- Create Media Products

Information, Communications, and Technology (ICT Literacy)

- Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability

- Adapt to Change
- Be Flexible

Initiative and Self-Direction

- Manage Goals and Time
- Work Independently
- Be Self-Directed Learners

Social and Cross-Cultural

- Interact Effectively with Others
- Work Effectively in Diverse Teams

Productivity and Accountability

- Manage Projects
- Produce Results

Leadership and Responsibility

- Guide and Lead Others
- Be Responsible to Others

Performance Assessment(s):

Manage basic computer concepts, operations and applications
Apply and use CADD systems and procedures
Apply and understand detail projection views/components
Explore engineering and architectural design concepts and problems
Demonstrate engineering design concepts as related to basic manufacturing processes

Standards and Competencies

- 1.Utilize the creative process to develop a plan to produce and evaluate a product.
- 2.Apply mathematical thinking and problem-solving to perform tasks.
- 3.Synthesize information from a variety of sources to plan and present effective professional communications using tools and technology.
- 4.Understand and apply science skills and concepts to develop solutions in the context of preparing for work.
- 5.Demonstrate understanding of terms and principles used in the architectural and engineering profession.
- 6.Interpret and apply conventional General Drafting Standards to architectural and engineering drafting situations.
- 7.Interpret and apply conventional Computer Aided Drafting Standards to architectural and engineering drafting situations.

Leadership Alignment:

Interpret and apply conventional Computer Aided Drafting Standards to architectural and engineering drafting situations.

2.D.1 Solve different kinds of non-familiar problems in both conventional and innovative ways

1.C.1 Act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur

Standards and Competencies**Standard: Basic CAD Skills - Edit**

- Utilize geometry editing commands
- Utilize non-geometric commands
- Construct geometric figures
- Use and control accuracy enhancement tools
- Perform Boolean operations
- Trim surface
- Manipulate surface normal
- Extend surface
- Edit control points
- Modify geometry via Boolean operations
- Edit primitives (e.g., moving, copying, resizing)
- Utilize editing commands.

Standard: Basic CAD Skills - Manipulate

- Control coordinates and display scale
- Control entity properties
- Use viewing commands
- Use display commands
- Use standard parts and/or symbol libraries
- Plot drawings on media using correct layout and scale

- Use layering techniques
 - Use grouping techniques
 - Minimize file size
- Standard: Fundamentals in Design
- Architecture and design
 - Elements of design
 - Principles of design

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Mathematics

CC: Mathematical Practices (MP)

- 1 - Make sense of problems and persevere in solving them.
- 2 - Reason abstractly and quantitatively.
- 4 - Model with mathematics.
- 5 - Use appropriate tools strategically.
- 6 - Attend to precision.
- 7 - Look for and make use of structure.

Reading

CC: Reading Informational Text

Key Ideas and Details (9-10)

- 1 - Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
- 4 - Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word

Science

Social Studies

Writing

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation

- Think Creatively
- Work Creatively with Others
- Implement Innovations

Creative Thinking and Problem Solving

- Reason Effectively
- Use Systems Thinking
- Make Judgements and Decisions
- Solve Problems

Communication and Collaboration

- Communicate Clearly
- Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy

- Access and Evaluate Information
- Use and Manage Information

Media Literacy

- Analyze Media
- Create Media Products

Information, Communications, and Technology (ICT Literacy)

- Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability

- Adapt to Change
- Be Flexible

Initiative and Self-Direction

- Manage Goals and Time
- Work Independently
- Be Self-Directed Learners

Social and Cross-Cultural

- Interact Effectively with Others
- Work Effectively in Diverse Teams

Productivity and Accountability

- Manage Projects
- Produce Results

Leadership and Responsibility

- Guide and Lead Others
- Be Responsible to Others

Performance Assessment(s):

Manage basic computer concepts, operations and applications
Apply and use CADD systems and procedures
Apply and understand detail projection views/components
Explore engineering and architectural design concepts and problems
Demonstrate engineering design concepts as related to basic manufacturing processes

Standards and Competencies

- 1.Utilize the creative process to develop a plan to produce and evaluate a product.
- 2.Apply mathematical thinking and problem-solving to perform tasks.
- 3.Synthesize information from a variety of sources to plan and present effective professional communications using tools and technology.
- 4.Understand and apply science skills and concepts to develop solutions in the context of preparing for work.
- 5.Demonstrate understanding of terms and principles used in the architectural and engineering profession.
- 6.Interpret and apply conventional General Drafting Standards to architectural and engineering drafting situations.
- 7.Interpret and apply conventional Computer Aided Drafting Standards to architectural and engineering drafting situations.

Leadership Alignment:

Synthesize information from a variety of sources to plan and present effective professional communications using tools and technology.
1.A.3 Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts
2.A.1Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation

Standards and Competencies**Standard: Architectural Drafting with AutoCad**

- Careers in Architecture
- Architectural Design Process
- Architectural CADD Standards
- Starting Auto CAD
- Creating a new drawing
- Opening drawings
- Saving drawing
- Getting help

Standard: Multi-view or Orthographic Projections

- Prepare multi-view or orthographic freehand sketches.
- Select proper drawing scale, views and layout.
- Prepare drawings containing horizontal and vertical surfaces.
- Prepare drawings containing circles and/or arcs.
- Prepare drawings incorporating removed details and conventional breaks.
- Prepare drawings containing full sections and half sections
- Prepare drawings containing revolved sections.
- Prepare drawings containing removed sections and broken-out sections.
- Prepare a sectional assembly drawing applying material symbols.

Standard: Descriptive Geometry/Revolutions

- Perform graphic solutions of points, lines, and planes.
- Perform graphic solutions of intersections (e.g. lines, planes, and solids)

- Solve true length of lines, bearing and slope of lines
- Perform graphic solutions of solids
- Construct drawings using the revolution method.

Standard: General Service Areas

- Utility Rooms
- Garages and Carports
- Mud Rooms
- Driveways
- Workshops
- Storage Areas
- Specialized Areas

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Mathematics

CC: Geometry (G)

- 1 - Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around
- 3 - Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.
- 3 - Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

Reading

Science

Social Studies

Writing

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation

- Think Creatively
- Work Creatively with Others
- Implement Innovations

Creative Thinking and Problem Solving

- Reason Effectively
- Use Systems Thinking
- Make Judgements and Decisions
- Solve Problems

Communication and Collaboration

- Communicate Clearly
- Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy

- Access and Evaluate Information
- Use and Manage Information

Media Literacy

- Analyze Media
- Create Media Products

Information, Communications, and Technology (ICT Literacy)

- Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability

- Adapt to Change
- Be Flexible

Initiative and Self-Direction

- Manage Goals and Time
- Work Independently
- Be Self-Directed Learners

Social and Cross-Cultural

- Interact Effectively with Others
- Work Effectively in Diverse Teams

Productivity and Accountability

- Manage Projects
- Produce Results

Leadership and Responsibility

- Guide and Lead Others
- Be Responsible to Others

Performance Assessment(s):

Develop a plan for a career in the fields of Engineering and Architecture.
Prepare for employment in the fields of Engineering and Architecture.
Participate in leadership activities such as those supported by career and technical student organizations

Standards and Competencies

- 1.Synthesize information from a variety of sources to plan and present effective professional communications using tools and technology.
- 2.Read with comprehension to gain information and/or perform a task in a career setting.
- 3.Demonstrate professional development skills in a simulated customer service or employment situation.

Leadership Alignment:

Participate in leadership activities such as those supported by career and technical student organizations TSA: Dream Car project.
Solve Problems
2.D.1 Solve different kinds of non-familiar problems in both conventional and innovative ways
3.A.4 Utilize multiple media and technologies, and know how to judge their effectiveness a priori as well as assess their impact

Standards and Competencies

Standard: Architectural Drafting with AutoCad

- Careers in Architecture
- Architectural Design Process
- Architectural CADD Standards
- Starting Auto CAD
- Creating a new drawing
- Opening drawings
- Saving drawing
- Getting help

Standard: Basic CAD Skills - Manipulate

- Control coordinates and display scale
- Control entity properties
- Use viewing commands
- Use display commands
- Use standard parts and/or symbol libraries
- Plot drawings on media using correct layout and scale
- Use layering techniques
- Use grouping techniques
- Minimize file size

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Mathematics

Reading

Science

Social Studies

Writing

CC: College and Career Readiness Anchor Standards for Writing

Text Types and Purposes

2 - Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of

7 - Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation

- Think Creatively
- Work Creatively with Others
- Implement Innovations

Creative Thinking and Problem Solving

- Reason Effectively
- Use Systems Thinking
- Make Judgements and Decisions
- Solve Problems

Communication and Collaboration

- Communicate Clearly
- Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy

- Access and Evaluate Information
- Use and Manage Information

Media Literacy

- Analyze Media
- Create Media Products

Information, Communications, and Technology (ICT Literacy)

- Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability

- Adapt to Change
- Be Flexible

Initiative and Self-Direction

- Manage Goals and Time
- Work Independently
- Be Self-Directed Learners

Social and Cross-Cultural

- Interact Effectively with Others
- Work Effectively in Diverse Teams

Productivity and Accountability

- Manage Projects
- Produce Results

Leadership and Responsibility

- Guide and Lead Others
- Be Responsible to Others