

# Seymour Public Schools Curriculum

## **Computer Aided Architectural Engineering Design One & Two Curriculum**

### **Unit One: Introduction to the Design Processes**

Narrative.....

In this unit students are provided with overview of key terms, vocabulary, building codes, conventions used in Architectural design and design intent of a structure. Students will use both board drawing techniques and CAD to produce basic design layouts. Emphasis is placed on the planning and specifications of structures in light of their intended functions, and the characteristics of their component parts. Architecture 1 is a hands-on learning experience that teaches students technological literacy, academic and personal development, technical knowledge, problem solving, and career awareness. The design project is task driven culminating with a finished design layout package and a design model.

Subject or course name 1

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<b>Grade:</b> 10-12	<b>Subject:</b>
	<b>Unit One: Introduction to the Design Processes</b>
<b>CSDE Standard</b>	<p><b>CTSTDS:</b> <b>Pre-Engineering Technology</b></p> <ul style="list-style-type: none"> <li>A. Career Awareness: Identify and describe various careers in the engineering field including educational requirements and ethical expectations.</li> <li>B. Design Process: Describe the design process including identifies the problem, determining constraints and limitations, analyzing potential solutions as well as the creation of a prototype for testing.</li> </ul> <p><b>COMPUTER AIDED DRAFTING AND DESIGN</b></p> <ul style="list-style-type: none"> <li>A. Materials and Processes: Identify and describe the basic elements used in computer aided drafting and design.</li> <li>B. Identifying Hardware and Operating Systems: Identify and describe the basic hardware and operating systems used in computer aided drafting and design.</li> <li>C. Using Hardware and Operating Systems: Describe the process of utilizing various hardware and operating systems.</li> <li>D. Interpreting and Reading Blueprints: Identify various symbols to interpret and read blueprints.</li> <li>E. Creating and Manipulating Mechanical Drawing Information: Describe and demonstrate the process for creating various types of views using a well- organized process.</li> </ul> <p><b>Mathematics Standards</b></p> <ul style="list-style-type: none"> <li>1. Extend the understanding of numbers to include integers rational numbers and real numbers</li> <li>3. Develop strategies for computation and estimation using properties of number systems to solve problems.</li> </ul> <p><b>Reading Standards</b></p> <ul style="list-style-type: none"> <li>6. Make connection between text and the text and outside experiences and knowledge.</li> <li>8. Use evidence from the text to draw and or support a conclusion.</li> <li>9. Use information from the text to make a prediction based on what is read.</li> </ul>
<b>Enduring Understanding</b>	<ul style="list-style-type: none"> <li>✓ Standards are essential to clear communications.</li> <li>✓ Knowledge of technical field leads to job introduction</li> <li>✓ Measurement Standards are essential to clear representation of in a technical rendering.</li> <li>✓ Communicating design intent clarifies technical design details</li> <li>✓ Accurately communicating design intent clarifies technical design details</li> <li>✓ Historical influences that help shaped today’s home designs.</li> <li>✓ Elements of contemporary dwellings have been influenced from the past.</li> </ul>

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	<ul style="list-style-type: none"> <li>✓ Trends in architecture are forever changing.</li> </ul>
<p><b>Essential Questions</b></p>	<ul style="list-style-type: none"> <li>✓ To what extent does historical design influenced design worldwide?</li> <li>✓ How does furniture allocation and family requirements influence a layout or design?</li> <li>✓ How is design intent affected by building codes and design standards?</li> <li>✓ How do traffic flow specifications affect room design and placement?</li> <li>✓ How does the analysis of the differences between living space and non-living space affect choices when designing a dwelling?</li> </ul>
<p><b>Content Standard:</b></p>	<p><b>CTSTDS:</b></p> <p><b>Pre-Engineering Technology</b></p> <ul style="list-style-type: none"> <li>□ Career Awareness: Identify and describe various careers in the engineering field including educational requirements and ethical expectations.             <ul style="list-style-type: none"> <li>A1. Describe major engineering fields.</li> <li>A2. Identify functions of an engineer.</li> <li>A3. Identify educational requirements for an engineer.</li> </ul> </li> <li>□ Design Process: Describe the design process including identify the problem, determining constraints and limitations, analyzing potential solutions as well as the creation of a prototype for testing.             <ul style="list-style-type: none"> <li>B5. Identify principles of a problem.</li> <li>B6. Describe the process for researching known, relevant information, constraints and limitations.</li> <li>B7. Analyze and research between alternate solutions.</li> </ul> </li> </ul> <p><b>COMPUTER AIDED DRAFTING AND DESIGN</b></p> <ul style="list-style-type: none"> <li>□ Materials and Processes: Identify and describe the basic elements used in computer aided drafting and design.             <ul style="list-style-type: none"> <li>A2. Describe and demonstrate the process of using mechanical and electronic measuring devices accurately as required by the design intent.</li> <li>A3. Describe and demonstrate the use of graphic communication skills through sketching.</li> <li>A4. Evaluate and select appropriate method of communication for a given problem.</li> <li>A9. Revise a design and update finished drawings appropriately.</li> </ul> </li> <li>□ Identifying Hardware and Operating Systems: Identify and describe the basic hardware and operating systems used in computer aided drafting and design.</li> </ul>

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- B12. Identify and describe various types of hardware and software.
- B13. Identify and describe the purpose of operating system components.
- B14. Define and apply computer terminology

- Using Hardware and Operating Systems: Describe the process of utilizing various hardware and operatingsystems.
- C15. View file names of a storage device.
- C16. Store, copy, move, and retrieve information to/from various drives.
- Interpreting and Reading Blueprints: Identify various symbols to interpret and read blueprints.
- D18. Interpret basic views and dimensions in a working drawing.
- D20. Interpret drawings, pictures, and symbols.
- Creating and Manipulating Mechanical Drawing Information: Describe and demonstrate the process for creating various types of views using a well- organized process.
- E21. Explain the Cartesian Coordinate System.
- E22. Describe the process for setting and manipulating drawing elements.
- E23. Create and manipulate line types, colors and layers/levels.
- E24. Create and edit basic geometry by inputting coordinates.
- E25. Insert and manipulate text and fonts.
- E27. Insert and manipulate dimensions.
- E28. Generate a 2-D multiview drawing.
- E30. Scale and print hard copy of output device.
- E31. Explain the use and need for scaled drawings.

## ***Mathematics Standards***

1. Extend the understanding of numbers to include integers rational numbers and real numbers
  - Compare, locate, label and order real numbers on number lines, scales, coordinate grids and measurement tools.
3. Develop strategies for computation and estimation using properties of number systems to solve problems.
  - Select and use appropriate methods for computing to solve problem in a variety of contexts.

## ***Reading Standards***

8. Use evidence from the text to draw and or support a conclusion.
9. Use information from the text to make a prediction based on what is read.

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	(refer to frameworks)
<b>Performance Expectations (Student outcomes)</b>	<p><b>Content Overview:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Careers In Architecture</b></li> <li><input type="checkbox"/> <b>Past and Present Structures:</b> <ul style="list-style-type: none"> <li>▪ How home designs reflect classic or historic influences:           <ul style="list-style-type: none"> <li>• Cape, Colonial, Garrison, Salt Box, Southern Colonial, Contemporary structures, Ranches, Multifamily structures, Condominiums, Trends of architecture.</li> <li>• Walking tour of neighborhood-students identify architectural styles .</li> </ul> </li> </ul> </li> <li><input type="checkbox"/> <b>Basic Home Design:</b> <ul style="list-style-type: none"> <li>▪ Primary Considerations:           <ul style="list-style-type: none"> <li>• Site Considerations, Family needs, Traffic circulation, Advantages/ Disadvantages, Single story/Multistory designs, Split level designs, septic system and Cost restrictions</li> </ul> </li> <li>▪ Room Planning:           <ul style="list-style-type: none"> <li>• Sleeping areas, Living Areas, Service Areas</li> <li>• Furniture Considerations and layout</li> <li>• Square foot calculations</li> </ul> </li> <li>▪ Floor Plan Layout           <ul style="list-style-type: none"> <li>• Room to room layout requirements, Wall thickness, Kitchen appliance symbols and cabinet layout (working Triangle), Traffic considerations, Staircase location, Bathrooms and Clothing care center, Partition/Load Bearing wall location and fire box and chimney location</li> </ul> </li> <li>▪ Foundation Plan Layout           <ul style="list-style-type: none"> <li>• Wall thickness, Utility room location, Carrying beam and lily columns symbols and location, Floor joist direction and slab floor note</li> </ul> </li> </ul> </li> </ul> <p><b>Objectives/Competencies:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Students will have a working knowledge of the architectural design process.</li> <li><input type="checkbox"/> Students will begin to create a set of architectural plans for a building of their own design</li> <li><input type="checkbox"/> Students will be able to layout and design a floor plan using the Architectural design process.</li> </ul>

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- Students will be able recognize and apply elements of good design
- Students will be able to describe the many career paths that relate closely associated with the architectural field
- Students will be able to identify the historical influences that helped shaped today's home designs.
- Students will be able recognize and describe the elements of contemporary dwellings.
- Students will be able discuss family needs that should be considered when planning a dwelling
  
- Students will be able to discuss factors and implement design principals and standards into a floor plan that are important in the design of:
  - ❖ Sleeping Areas
    - Master bedroom
    - Bedrooms
  - ❖ Service Areas
    - Efficient kitchen
    - Laundry
  - ❖ Living Areas
    - Living room
    - Dining room
    - Family room
    - Family recreation room / den
  - ❖ Non Living Space
    - Garage space
    - Closets
- Students will be able to plan the size and location of closets for a typical residence.
- Implement important design considerations for a bathroom and design a bathroom using solid design principals
- Students will be able to apply furniture symbols, using templates, in order to plan room arrangement for their home design.
- Students will be able to identify the rooms and areas that compromise the living area and nonliving space.
- Students will be able to design a functional entryway and foyer for their house plans.
- Describe the many career paths that relate closely associated with the architectural field

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Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
<p><b>Instructional Methods:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Lectures, demonstrations, laboratory activities, cooperative learning, discussion, individualized tutoring, peer instruction and mentoring</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Text book</li> <li><input type="checkbox"/> Smart board resources</li> <li><input type="checkbox"/> Internet research</li> <li><input type="checkbox"/> Cataloged research</li> </ul>	<p><b>Task Based Rubric Assessments:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Home analysis and measurement and square foot calculations.</li> <li><input type="checkbox"/> Room design and furniture integration               <ul style="list-style-type: none"> <li>❖ Living room</li> <li>❖ Dining room</li> <li>❖ Master bedrooms</li> <li>❖ Bedrooms</li> </ul> </li> <li><input type="checkbox"/> Closet and storage design and layout</li> <li><input type="checkbox"/> Plan a bathroom that follows solid design principals.</li>   <li><input type="checkbox"/> Service area layouts               <ul style="list-style-type: none"> <li>❖ Kitchen</li> <li>❖ Laundry Area</li> </ul> </li> <li><input type="checkbox"/> Map the traffic circulation for maximum efficiency.</li> <li><input type="checkbox"/> Floor plan development and synthesis.</li> <li><input type="checkbox"/> Foundation plan development and synthesis.</li> </ul>

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## **Computer Aided Architectural Engineering Design One & Two Curriculum**

### **Unit Two: Detail Specifications and Designs**

Narrative.....

In this unit students are provided with overview of key terms, vocabulary, building codes, conventions used in Architectural design and design intent of a structure. Students will use CAD to produce Detail Design Layouts for their design packet. Emphasis is placed on the specifications of the designed structure in light of it intended functions, and the characteristics of their component parts. The task will focus on technological literacy, academic and personal development, technical knowledge, problem solving, and structure awareness. The design task is based on individually designed structural floor plan layouts.

Subject or course name 8



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<b>Grade:</b> <b>10-12</b>	<p style="text-align: right;"><b>Subject:</b></p> <p><b>Unit Two: Detail Specifications and Designs</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Door Allocation</li> <li><input type="checkbox"/> Window Allocation</li> <li><input type="checkbox"/> Wall Detail</li> <li><input type="checkbox"/> Stair Detail</li> </ul>
<b>CSDE Standard</b>	<p><b>CTSTDS:</b></p> <p><b>Pre-Engineering Technology</b></p> <p style="padding-left: 20px;">B. Design Process: Describe the design process including identify the problem, determining constraints and limitations, analyzing potential solutions as well as the creation of a prototype for testing.</p> <p><b>COMPUTER AIDED DRAFTING AND DESIGN</b></p> <p style="padding-left: 20px;">A. Materials and Processes: Identify and describe the basic elements used in computer aided drafting and design.</p> <p style="padding-left: 20px;">B. Identifying Hardware and Operating Systems: Identify and describe the basic hardware and operating systems used in computer aided drafting and design.</p> <p style="padding-left: 20px;">C. Using Hardware and Operating Systems: Describe the process of utilizing various hardware and operating systems.</p> <p style="padding-left: 20px;">D. Interpreting and Reading Blueprints: Identify various symbols to interpret and read blueprints.</p> <p style="padding-left: 20px;">E. Creating and Manipulating Mechanical Drawing Information: Describe and demonstrate the process for creating various types of views using a well- organized process.</p> <p><b>Mathematics Standards</b></p> <p style="padding-left: 20px;">1. Extend the understanding of numbers to include integers rational numbers and real numbers</p> <p style="padding-left: 20px;">3. Develop strategies for computation and estimation using properties of number systems to solve problems.</p> <p><b>Reading Standards</b></p> <p style="padding-left: 20px;">6. Make connection between text and the text and outside experiences and knowledge.</p> <p style="padding-left: 20px;">8. Use evidence from the text to draw and or support a conclusion.</p> <p style="padding-left: 20px;">9. Use information from the text to make a prediction based on what is read.</p>

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<p><b>Enduring Understanding</b></p>	<ul style="list-style-type: none"> <li>✓ Standards are essential to clear communications.</li> <li>✓ Detail specifications is essential for design data transfer</li> <li>✓ Measurement Standards are essential to clear representation of in a technical rendering.</li> <li>✓ Communicating design intent clarifies technical design details</li> <li>✓ Detail specifications have direct influences on the constructions of a home.</li> <li>✓ Trends in architecture are forever changing.</li> </ul>
<p><b>Essential Questions</b></p>	<ul style="list-style-type: none"> <li>✓ How do window and door choices affect the comfort of a home?</li> <li>✓ To what extent does window type affect the aesthetic value of a home?</li> <li>✓ Natural light requirements dictate necessary window sizes, how is natural light calculated?</li> <li>✓ Why are detail layouts critical to a set of home plans?</li> <li>✓ How do specifications and code requirements affect detail layouts?</li> </ul>
<p><b>Content Standard:</b></p>	<p><b>CTSTDS:</b>  <b>Pre-Engineering Technology</b></p> <ul style="list-style-type: none"> <li>□ Design Process: Describe the design process including identify the problem, determining constraints and limitations, analyzing potential solutions as well as the creation of a prototype for testing.             <ul style="list-style-type: none"> <li>B5. Identify principles of a problem.</li> <li>B6. Describe the process for researching known, relevant information, constraints and limitations.</li> <li>B7. Analyze and research between alternate solutions.</li> </ul> </li> </ul> <p><b>COMPUTER AIDED DRAFTING AND DESIGN</b></p> <ul style="list-style-type: none"> <li>□ Materials and Processes: Identify and describe the basic elements used in computer aided drafting and design.             <ul style="list-style-type: none"> <li>A2. Describe and demonstrate the process of using mechanical and electronic measuring devices accurately as required by the design intent.</li> <li>A3. Describe and demonstrate the use of graphic communication skills through sketching.</li> <li>A4. Evaluate and select appropriate method of communication for a given problem.</li> <li>A9. Revise a design and update finished drawings appropriately.</li> </ul> </li> </ul>

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- Identifying Hardware and Operating Systems: Identify and describe the basic hardware and operating systems used in computer aided drafting and design.
  - B12. Identify and describe various types of hardware and software.
  - B13. Identify and describe the purpose of operating system components.
  - B14. Define and apply computer terminology
- Using Hardware and Operating Systems: Describe the process of utilizing various hardware and operatingsystems.
  - C15. View file names of a storage device.
  - C16. Store, copy, move, and retrieve information to/from various drives.
- Interpreting and Reading Blueprints: Identify various symbols to interpret and read blueprints.
  - D18. Interpret basic views and dimensions in a working drawing.
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- Creating and Manipulating Mechanical Drawing Information: Describe and demonstrate the process for creating various types of views using a well- organized process.
  - E21. Explain the Cartesian Coordinate System.
  - E22. Describe the process for setting and manipulating drawing elements.
  - E23. Create and manipulate line types, colors and layers/levels.
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  - E25. Insert and manipulate text and fonts.
  - E27. Insert and manipulate dimensions.
  - E28. Generate a 2-D multiview drawing.
  - E30. Scale and print hard copy of output device.
  - E31. Explain the use and need for scaled drawings.
- ***Mathematics Standards***
  - 1. Extend the understanding of numbers to include integers rational numbers and real numbers
    - Compare, locate, label and order real numbers on number lines, scales, coordinate grids and measurement tools.
  - 3. Develop strategies for computation and estimation using properties of number systems to solve problems.
    - Select and use appropriate methods for computing to solve problem in a variety of contexts.
- ***Reading Standards***
  - 8. Use evidence from the text to draw and or support a conclusion.

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9. Use information from the text to make a prediction based on what is read.

(refer to frameworks)

**Performance Expectations (Student outcomes)**

**Content Overview:**

- **Door Allocation:**
  - ❖ Interior/ Exterior, Door details and sizes
  - ❖ Recognize the function that doors and windows perform.
  - ❖ Compare the types of doors used in a residential dwelling.
  - ❖ Illustrate proper door symbols on a typical floor plan.
- **Windows Allocation:**
  - ❖ Analyze window style; casement, double hung, awning
  - ❖ Analyze window sizes, code requirements, natural light specifications and personal choice considerations and requirements for a home design
  - ❖ Analyze the function that windows perform.
  - ❖ Develop a window schedule
  - ❖ Illustrate proper window symbols on a typical floor plan.
  - ❖ Interpret the information contained in a window detail.
- **Wall Detail and Layout**
  - ❖ Define common wall terminology
  - ❖ Develop a wall detail for their floor layout
  - ❖ Illustrate structural details common to residential construction
- **Stair Detail and layout**
  - ❖ Define common stair terminology.
  - ❖ Analyze the appropriate use of various stair designs.
  - ❖ Design a stairway for a residential structure.
  - ❖ Draw structural details for a main stairs.
  - ❖ Perform stair calculations for a residential stairway.
- **Kitchen detail and layout**
  - ❖ Analyze different kitchen designs
    - Straight line kitchen, L-shaped kitchen, U-shaped kitchen and Peninsula kitchen
  - ❖ Apply good design principles to planning the service area

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- ❖ Illustrate a design of an efficient functional kitchen meeting the needs of the home design
  - Cabinets and appliances selection
  - Island design
  - Kitchen Eating Areas layout

- **Decks and Porch Designs**

- ❖ Analyze different porch and deck designs
- ❖ Develop a deck or porch frame layout for their design
- ❖ Create elevation views of deck and porch layout

**Objectives:**

- Students will be able to recognize and integrate appropriate size doors and windows that will perform the desired function.
- Students will be able to compare and symbolize different types of doors and windows used in a residential dwelling.
- Students will be able to interpret and create a window and door detail that containing pertinent information about their design.
- Students will be able analyze a home design and calculate natural light requirements for the rooms in a dwelling.
- Students will use and interpret living space verses non-living space for a home design
- Students will be able to analyze and apply design principles for:
  - ❖ Stair detail
  - ❖ Wall detail
  - ❖ Kitchen detail
  - ❖ Porch and deck details
- Students will be able to design a functional stair detail based on home design specifications
- Students will be able to analyze a dwelling design and synthesize a wall detail plan
- Students will be able to design a functional kitchen to meet family needs based on efficiency specifications.
- Students will Synthesize decks and porches into the total floor plan of a dwelling

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Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
<p><b>Instructional Methods:</b> Lectures, smart board demonstrations, laboratory activities, cooperative learning, discussion, individualized tutoring, peer instruction and mentoring</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Text book</li> <li><input type="checkbox"/> Smart board resources</li> <li><input type="checkbox"/> Internet research</li> <li><input type="checkbox"/> Cataloged research</li> </ul>	<p><b>Task Based Rubric Assessments:</b></p> <ul style="list-style-type: none"> <li>▪ Plan the allocation of windows following the guidelines presented for ventilation, light, and view in a floor plan.</li> <li>▪ Record the information on a window schedule.               <ul style="list-style-type: none"> <li>❖ Natural light specification and calculations</li> </ul> </li> <li>▪ Specify door type and swing on floor plan.</li> <li>▪ Apply good design principles to planning the service area               <ul style="list-style-type: none"> <li>❖ Design a functional kitchen to meet a family’s needs.</li> <li>❖ Select and layout appliances for a modern efficient kitchen.</li> </ul> </li> <li><input type="checkbox"/> Analyze and apply design principals in the development of wall detail for their home layout               <ul style="list-style-type: none"> <li>❖ Cutaway section view</li> <li>❖ Vocabulary</li> </ul> </li> <li><input type="checkbox"/> Analyze and apply design principals in the develop a stair detail for their home layout               <ul style="list-style-type: none"> <li>❖ Main Staircase/Service Staircase</li> <li>❖ Stair Terminology</li> <li>❖ Stair Design</li> </ul> </li> </ul>

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		<ul style="list-style-type: none"> <li>❖ Stair Calculations and Drawing procedure</li> <li>□ Analyze and apply design principals in the development of a deck detail for their home layout             <ul style="list-style-type: none"> <li>❖ Porch and deck designs</li> <li>❖ Deck frame layout</li> <li>❖ Decking layout</li> <li>❖ Elevation views</li> </ul> </li> </ul>
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## Computer Aided Architectural Engineering Design One & Two Curriculum Unit Three: Exterior Specifications and Designs

Narrative.....

Subject or course name 15

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In this unit students are provided with overview of key terms, vocabulary, building codes, conventions used in Architectural design and design intent of an exterior design of a structure. Students will use CAD to produce Elevation Plan Layouts for their design packet. Emphasis is placed on exterior specifications of the designed structure in light of its intended functions, and the characteristics of their component parts. The task will focus on technological literacy, academic and personal development, technical knowledge, problem solving, and structure awareness. The design tasks will be based on previously designed structural detail and floor plans.



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<b>Grade:</b> 10-12	<b>Subject:</b>
	<b>Unit Three: Exterior Specifications and Designs</b>
<b>CSDE Standard</b>	<p><b>CTSTDS:</b>  <b>Pre-Engineering Technology</b>          B. Design Process: Describe the design process including identify the problem, determining constraints and limitations, analyzing potential solutions as well as the creation of a prototype for testing.</p> <p><b>COMPUTER AIDED DRAFTING AND DESIGN</b>          A. Materials and Processes: Identify and describe the basic elements used in computer aided drafting and design.          B. Identifying Hardware and Operating Systems: Identify and describe the basic hardware and operating systems used in computer aided drafting and design.          C. Using Hardware and Operating Systems: Describe the process of utilizing various hardware and operating systems.          D. Interpreting and Reading Blueprints: Identify various symbols to interpret and read blueprints.          E. Creating and Manipulating Mechanical Drawing Information: Describe and demonstrate the process for creating</p> <p><b>Mathematics Standards</b>          1. Extend the understanding of numbers to include integers rational numbers and real numbers          3. Develop strategies for computation and estimation using properties of number systems to solve problems.</p> <p><b>Reading Standards</b>          6. Make connection between text and the text and outside experiences and knowledge.          8. Use evidence from the text to draw and or support a conclusion.          9. Use information from the text to make a prediction based on what is read.          various types of views using a well- organized process.</p>
<b>Enduring Understanding</b>	<ul style="list-style-type: none"> <li>✓ Human needs and wants directly influence desired trends in design.</li> <li>✓ Aesthetic value of a design is a characteristic that must be considered when creating a home design.</li> <li>✓ Symmetry is a characteristic important to exterior elevation designs</li> <li>✓ Communicating design intent through functionality is important for all designs and designers.</li> <li>✓ Detail specifications and current trends influences elevation designs.</li> <li>✓ Layout designs need to be functional.</li> </ul>

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<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>✓ Analyze how society and human needs and wants affect the aesthetic value of a design.</li> <li>✓ How does symmetrical appearance reflect into a design?</li> <li>✓ Analyze the functionality of multiple roof designs for their home designs</li> <li>✓ What affect do building codes and specification have on a structures appearance?</li> </ul>
<b>Content Standard:</b>	<p><b>CTSTDS:</b></p> <p><b>Pre-Engineering Technology</b></p> <ul style="list-style-type: none"> <li>□ Design Process: Describe the design process including identify the problem, determining constraints and limitations, analyzing potential solutions as well as the creation of a prototype for testing.             <ul style="list-style-type: none"> <li>B5. Identify principles of a problem.</li> <li>B6. Describe the process for researching known, relevant information, constraints and limitations.</li> <li>B7. Analyze and research between alternate solutions.</li> </ul> </li> </ul> <p><b>COMPUTER AIDED DRAFTING AND DESIGN</b></p> <ul style="list-style-type: none"> <li>□ Materials and Processes: Identify and describe the basic elements used in computer aided drafting and design.             <ul style="list-style-type: none"> <li>A2. Describe and demonstrate the process of using mechanical and electronic measuring devices accurately as required by the design intent.</li> <li>A3. Describe and demonstrate the use of graphic communication skills through sketching.</li> <li>A4. Evaluate and select appropriate method of communication for a given problem.</li> <li>A9. Revise a design and update finished drawings appropriately.</li> </ul> </li> <li>□ Identifying Hardware and Operating Systems: Identify and describe the basic hardware and operating systems used in computer aided drafting and design.             <ul style="list-style-type: none"> <li>B12. Identify and describe various types of hardware and software.</li> <li>B13. Identify and describe the purpose of operating system components.</li> <li>B14. Define and apply computer terminology</li> </ul> </li> <li>□ Using Hardware and Operating Systems: Describe the process of utilizing various hardware and operatingsystems.             <ul style="list-style-type: none"> <li>C15. View file names of a storage device.</li> <li>C16. Store, copy, move, and retrieve information to/from various drives.</li> </ul> </li> <li>□ Interpreting and Reading Blueprints: Identify various symbols to interpret and read blueprints.             <ul style="list-style-type: none"> <li>D18. Interpret basic views and dimensions in a working drawing.</li> <li>D20. Interpret drawings, pictures, and symbols.</li> </ul> </li> </ul>

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	<ul style="list-style-type: none"> <li>□ Creating and Manipulating Mechanical Drawing Information: Describe and demonstrate the process for creating various types of views using a well- organized process.             <ul style="list-style-type: none"> <li>E21. Explain the Cartesian Coordinate System.</li> <li>E22. Describe the process for setting and manipulating drawing elements.</li> <li>E23. Create and manipulate line types, colors and layers/levels.</li> <li>E24. Create and edit basic geometry by inputting coordinates.</li> <li>E25. Insert and manipulate text and fonts.</li> <li>E27. Insert and manipulate dimensions.</li> <li>E28. Generate a 2-D multiview drawing.</li> <li>E30. Scale and print hard copy of output device.</li> <li>E31. Explain the use and need for scaled drawings.</li> </ul> </li> <li>□ <b><i>Mathematics Standards</i></b> <ul style="list-style-type: none"> <li>1. Extend the understanding of numbers to include integers rational numbers and real numbers                 <ul style="list-style-type: none"> <li>● Compare, locate, label and order real numbers on number lines, scales, coordinate grids and measurement tools.</li> </ul> </li> <li>3. Develop strategies for computation and estimation using properties of number systems to solve problems.                 <ul style="list-style-type: none"> <li>● Select and use appropriate methods for computing to solve problem in a variety of contexts.</li> </ul> </li> </ul> </li> <li>□ <b><i>Reading Standards</i></b> <ul style="list-style-type: none"> <li>8. Use evidence from the text to draw and or support a conclusion.</li> <li>9. Use information from the text to make a prediction based on what is read.</li> </ul> </li> </ul> <p style="text-align: center;"><b>(refer to frameworks)</b></p>
<p><b>Performance Expectations (Student outcomes)</b></p>	<p><b>Content Overview:</b></p> <ul style="list-style-type: none"> <li>□ <b>House Elevation Plans:</b> <ul style="list-style-type: none"> <li>❖ Exterior design specifications</li> <li>❖ Draw a typical exterior elevation that demonstrates proper techniques.</li> <li>❖ List features that should be included on an exterior elevation.</li> <li>❖ Symmetrical window placement</li> <li>❖ Illustrate symbols that are often found on elevations                 <ul style="list-style-type: none"> <li>▪ Siding Layout symbols</li> </ul> </li> </ul> </li> </ul>

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	<ul style="list-style-type: none"> <li>▪ Window/Door symbols</li> <li>▪ Roof Design symbols</li> <li>❖ Identify the dimensions commonly shown on elevations</li> <li>□ <b>RoofPeak and Valley Design Layout:</b> <ul style="list-style-type: none"> <li>❖ Sketch different types of basic roof designs for their structure/dwelling.</li> <li>❖ Analyze the construction of a typical frame roof.</li> <li>❖ Develop a roof system using a typical roof slope or pitch.</li> <li>❖ Anile the importance of proper ventilation and flashing.</li> </ul> </li> <li>□ <b>House Model:</b> <ul style="list-style-type: none"> <li>❖ Exterior Model of House Design                             <ul style="list-style-type: none"> <li>▪ Scale: 1/4 " = 12"</li> </ul> </li> </ul> </li> <li>□ <b>Packet Presentation:</b> <ul style="list-style-type: none"> <li>❖ Complete House Design Plans                             <ul style="list-style-type: none"> <li>▪ 48x36 Printing Process</li> </ul> </li> <li>❖ Oral Presentation of Designs and Model</li> </ul> </li> </ul>	
<p><b>Strategies/Modes (examples)</b></p> <p><b>Instructional Methods:</b> Lectures, smart board demonstrations, laboratory activities, cooperative learning, discussion, individualized tutoring, peer instruction and mentoring</p>	<p><b>Materials/Resources (examples)</b></p> <ul style="list-style-type: none"> <li>□ Text book</li> <li>□ Smart board resources</li> <li>□ Internet research</li> <li>□ Cataloged research</li> </ul>	<p><b>Assessments (examples)</b></p> <p><b>Task Based Rubric Assessments:</b></p> <ul style="list-style-type: none"> <li>□ Analyze and apply design principals in the development of multiple elevation designs for their previously designed floor plans.</li> <li>□ Develop and layout a functional bird's eye view of a roof design for their floor plan layout.</li> <li>□ Analyze and apply design principals in the development of a model of their previously designed home plan scaled to 1/4" = 1'</li> </ul>

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		<ul style="list-style-type: none"><li>□ Formally present a set of professionally created home plans with a scaled model demonstrating creativity, organization and proper use of technology.</li></ul>
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## **Computer Aided Architectural Engineering Design One & Two Curriculum Unit Four: Detail Specifications Designs**

Narrative.....

In this unit students are provided with overview of key terms, vocabulary, building codes, conventions used in Architectural design and design intent of interior details of a structure. Students will use a CAD to produce multiple detail layouts for their design packet. Emphasis is placed on interior and exterior detail specifications of the designed structure in light of it intended functions, and the characteristics of their component parts. The task will focus on

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technological literacy, academic and personal development, technical knowledge, problem solving, and structure awareness. The design tasks will be based on previously designed structural detail and floor plans.

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<b>Grade:</b> <b>10-12</b>	<p style="text-align: right;"><b>Subject:</b></p> <p><b>Unit Four: Detail Specifications Designs</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Kitchen Detail</li> <li><input type="checkbox"/> Deck Detail</li> <li><input type="checkbox"/> Electrical Detail</li> <li><input type="checkbox"/> Plumbing Detail</li> </ul>
<b>CSDE Standard</b>	<p><b>CTSTDS:</b></p> <p><b>Pre-Engineering Technology</b></p> <p style="padding-left: 20px;">B. Design Process: Describe the design process including identify the problem, determining constraints and limitations, analyzing potential solutions as well as the creation of a prototype for testing.</p> <p><b>COMPUTER AIDED DRAFTING AND DESIGN</b></p> <p style="padding-left: 20px;">A. Materials and Processes: Identify and describe the basic elements used in computer aided drafting and design.</p> <p style="padding-left: 20px;">B. Identifying Hardware and Operating Systems: Identify and describe the basic hardware and operating systems used in computer aided drafting and design.</p> <p style="padding-left: 20px;">C. Using Hardware and Operating Systems: Describe the process of utilizing various hardware and operating systems.</p> <p style="padding-left: 20px;">D. Interpreting and Reading Blueprints: Identify various symbols to interpret and read blueprints.</p> <p style="padding-left: 20px;">E. Creating and Manipulating Mechanical Drawing Information: Describe and demonstrate the process for creating various types of views using a well- organized process.</p> <p><b>Mathematics Standards</b></p> <p style="padding-left: 20px;">1. Extend the understanding of numbers to include integers rational numbers and real numbers</p> <p style="padding-left: 20px;">3. Develop strategies for computation and estimation using properties of number systems to solve problems.</p> <p><b>Reading Standards</b></p> <p style="padding-left: 20px;">6. Make connection between text and the text and outside experiences and knowledge.</p> <p style="padding-left: 20px;">8. Use evidence from the text to draw and or support a conclusion.</p> <p style="padding-left: 20px;">9. Use information from the text to make a prediction based on what is read.</p>

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<p><b>Enduring Understanding</b></p>	<ul style="list-style-type: none"> <li>✓ Human needs and wants directly influence desired trends in design.</li> <li>✓ Aesthetic value of a design is a characteristic that must be considered when creating a home design.</li> <li>✓ Symmetry is a characteristic important to exterior elevation designs</li> <li>✓ Communicating design intent through functionality is important for all designs and designers.</li> <li>✓ Detail specifications and current trends influences elevation designs.</li> <li>✓ Layout designs need to be functional.</li> </ul>
<p><b>Essential Questions</b></p>	<ul style="list-style-type: none"> <li>✓ Analyze how society and human needs and wants affect the aesthetic value of a design.</li> <li>✓ How does symmetrical appearance reflect into a design?</li> <li>✓ Analyze the functionality of multiple specification detail layouts for their home designs.</li> <li>✓ What affect do building codes and specification have on a structures appearance?</li> </ul>
<p><b>Content Standard:</b></p>	<p><b>CTSTDS:</b></p> <p><b>Pre-Engineering Technology</b></p> <ul style="list-style-type: none"> <li>□ Design Process: Describe the design process including identify the problem, determining constraints and limitations, analyzing potential solutions as well as the creation of a prototype for testing.             <ul style="list-style-type: none"> <li>B5. Identify principles of a problem.</li> <li>B6. Describe the process for researching known, relevant information, constraints and limitations.</li> <li>B7. Analyze and research between alternate solutions.</li> </ul> </li> </ul> <p><b>COMPUTER AIDED DRAFTING AND DESIGN</b></p> <ul style="list-style-type: none"> <li>□ Materials and Processes: Identify and describe the basic elements used in computer aided drafting and design.             <ul style="list-style-type: none"> <li>A2. Describe and demonstrate the process of using mechanical and electronic measuring devices accurately as required by the design intent.</li> <li>A3. Describe and demonstrate the use of graphic communication skills through sketching.</li> <li>A4. Evaluate and select appropriate method of communication for a given problem.</li> <li>A9. Revise a design and update finished drawings appropriately.</li> </ul> </li> </ul>



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- Identifying Hardware and Operating Systems: Identify and describe the basic hardware and operating systems used in computer aided drafting and design.
  - B12. Identify and describe various types of hardware and software.
  - B13. Identify and describe the purpose of operating system components.
  - B14. Define and apply computer terminology
- Using Hardware and Operating Systems: Describe the process of utilizing various hardware and operatingsystems.
  - C15. View file names of a storage device.
  - C16. Store, copy, move, and retrieve information to/from various drives.
- Interpreting and Reading Blueprints: Identify various symbols to interpret and read blueprints.
  - D18. Interpret basic views and dimensions in a working drawing.
  - D20. Interpret drawings, pictures, and symbols.
- Creating and Manipulating Mechanical Drawing Information: Describe and demonstrate the process for creating various types of views using a well- organized process.
  - E21. Explain the Cartesian Coordinate System.
  - E22. Describe the process for setting and manipulating drawing elements.
  - E23. Create and manipulate line types, colors and layers/levels.
  - E24. Create and edit basic geometry by inputting coordinates.
  - E25. Insert and manipulate text and fonts.
  - E27. Insert and manipulate dimensions.
  - E28. Generate a 2-D multiview drawing.
  - E30. Scale and print hard copy of output device.
  - E31. Explain the use and need for scaled drawings.
- ***Mathematics Standards***
  - 1. Extend the understanding of numbers to include integers rational numbers and real numbers
    - Compare, locate, label and order real numbers on number lines, scales, coordinate grids and measurement tools.
  - 3. Develop strategies for computation and estimation using properties of number systems to solve problems.
    - Select and use appropriate methods for computing to solve problem in a variety of contexts.
- ***Reading Standards***

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- 8. Use evidence from the text to draw and or support a conclusion.
- 9. Use information from the text to make a prediction based on what is read.

**(refer to frameworks)**

**Performance Expectations (Student outcomes)**

**Content Overview:**

**Content Overview:**

- Kitchen detail and layout**
  - ❖ Analyze different kitchen designs
    - Straight line kitchen, L-shaped kitchen, U-shaped kitchen and Peninsula kitchen
  - ❖ Apply good design principles to planning the service area
  - ❖ Illustrate a design of an efficient functional kitchen meeting the needs of the home design
    - Cabinets and appliances selection
    - Island design
    - Kitchen Eating Areas layout
- Decks and Porch Designs**
  - ❖ Analyze different porch and deck designs
  - ❖ Develop a deck or porch frame layout for their design
  - ❖ Create elevation views of deck and porch layout
- Electrical Detail Layout**
  - ❖ Analyze different Electrical designs
  - ❖ Develop a Electrical design layout for their home
- Plumbing Detail Layout**
  - ❖ Analyze different Plumbing designs
  - ❖ Develop a Plumbing design layout for their home

**Objectives:**

- Students will be able to analyze and apply design principles for:
  - ❖ Kitchen detail
  - ❖ Porch and deck details
  - ❖ Electrical Detail
  - ❖ Plumbing Detail
- Students will be able to analyze a dwelling design and synthesize a set of detail plan for the dwelling
- Students will be able to design a functional kitchen to meet family needs based on efficiency specifications.

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	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Students will synthesize decks and porches into the total floor plan of a dwelling Students will synthesize plumbing details into the total floor plan of a dwelling Students will synthesize electrical details into the total floor plan of a dwelling
<b>Strategies/Modes (examples)</b>  <b>Instructional Methods:</b> Lectures, smart board demonstrations, laboratory activities, cooperative learning, discussion, individualized tutoring, peer instruction and mentoring	<b>Materials/Resources (examples)</b>  <input type="checkbox"/> Text book <input type="checkbox"/> Smart board resources <input type="checkbox"/> Internet research <input type="checkbox"/> Cataloged research	<b>Assessments (examples)</b>  <b>Task Based Rubric Assessments:</b> <ul style="list-style-type: none"> <li>▪ Apply good design principles to planning the service area                             <ul style="list-style-type: none"> <li>❖ Design a functional kitchen to meet a family's needs.</li> <li>❖ Select and layout appliances for a modern efficient kitchen.</li> </ul> </li>   <li>□ Analyze and apply design principals in the development of a deck detail for their home layout                             <ul style="list-style-type: none"> <li>❖ Porch and deck designs</li> <li>❖ Deck frame layout</li> <li>❖ Decking layout</li> </ul> </li>   <li>□ Analyze and apply design principals in the development of a electrical detail for their home layout                             <ul style="list-style-type: none"> <li>❖ Electrical Floor Plan designs</li> </ul> </li>   <li>□ Analyze and apply design</li> </ul>

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		<p>principals in the development of a plumbing detail for their home layout</p> <p>❖ Plumbing Floor Plan designs</p>
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# Seymour Public Schools Curriculum

## **Computer Aided Architectural Engineering Design One & Two Curriculum** **Unit Five: Commercial Detail designs**

Narrative.....

In this unit students are provided with overview of key terms, vocabulary, building codes, conventions used in Architectural design and design intent of interior details for a commercial structure. Students will use a CAD to produce multiple detail layouts for their design packet. Emphasis is placed on interior detail specifications of the designed structure in light of its intended functions, and the characteristics of their component parts. The task will focus on a comparison of technological literacy, academic and personal development, technical knowledge, problem solving, and structure awareness. The design tasks will be based on previously designed structural detail and floor plans of newly researched layouts.

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<b>Grade:</b> <b>10-12</b>	<p style="text-align: right;"><b>Subject:</b></p> <p><b>Unit Five: Detail Specifications Designs</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Commercial Kitchen Detail Compared to a Residential Detail</li> <li><input type="checkbox"/> <b>Commercial Bathroom Detail Compared to a Residential Detail</b></li> <li><input type="checkbox"/> <b>Commercial Staircase Detail Compared to a Residential Detail</b></li> </ul>
<b>CSDE Standard</b>	<p><b>CTSTDS:</b></p> <p><b>Pre-Engineering Technology</b></p> <p style="padding-left: 20px;">B. Design Process: Describe the design process including identify the problem, determining constraints and limitations, analyzing potential solutions as well as the creation of a prototype for testing.</p> <p><b>COMPUTER AIDED DRAFTING AND DESIGN</b></p> <p style="padding-left: 20px;">A. Materials and Processes: Identify and describe the basic elements used in computer aided drafting and design.</p> <p style="padding-left: 20px;">B. Identifying Hardware and Operating Systems: Identify and describe the basic hardware and operating systems used in computer aided drafting and design.</p> <p style="padding-left: 20px;">C. Using Hardware and Operating Systems: Describe the process of utilizing various hardware and operating systems.</p> <p style="padding-left: 20px;">D. Interpreting and Reading Blueprints: Identify various symbols to interpret and read blueprints.</p> <p style="padding-left: 20px;">E. Creating and Manipulating Mechanical Drawing Information: Describe and demonstrate the process for creating various types of views using a well- organized process.</p> <p><b>Mathematics Standards</b></p> <p style="padding-left: 20px;">1. Extend the understanding of numbers to include integers rational numbers and real numbers</p> <p style="padding-left: 20px;">3. Develop strategies for computation and estimation using properties of number systems to solve problems.</p> <p><b>Reading Standards</b></p> <p style="padding-left: 20px;">6. Make connection between text and the text and outside experiences and knowledge.</p> <p style="padding-left: 20px;">8. Use evidence from the text to draw and or support a conclusion.</p> <p style="padding-left: 20px;">9. Use information from the text to make a prediction based on what is read.</p>

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<b>Enduring Understanding</b>	<ul style="list-style-type: none"> <li>✓ Human needs and wants directly influence desired trends in design.</li> <li>✓ Aesthetic value of a design is a characteristic that must be considered when creating a home design.</li> <li>✓ Symmetry is a characteristic important to exterior elevation designs</li> <li>✓ Communicating design intent through functionality is important for all designs and designers.</li> <li>✓ Detail specifications and current trends influences elevation designs.</li> <li>✓ Layout designs need to be functional.</li> </ul>
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>✓ Analyze how society and human needs and wants affect the aesthetic value of a design.</li> <li>✓ How does symmetrical appearance reflect into a design?</li> <li>✓ What affect do building codes and specification have on a structures appearance?</li> </ul>
<b>Content Standard:</b>	<p><b>CTSTDS:</b></p> <p><b>Pre-Engineering Technology</b></p> <ul style="list-style-type: none"> <li>□ Design Process: Describe the design process including identify the problem, determining constraints and limitations, analyzing potential solutions as well as the creation of a prototype for testing.             <ul style="list-style-type: none"> <li>B5. Identify principles of a problem.</li> <li>B6. Describe the process for researching known, relevant information, constraints and limitations.</li> <li>B7. Analyze and research between alternate solutions.</li> </ul> </li> </ul> <p><b>COMPUTER AIDED DRAFTING AND DESIGN</b></p> <ul style="list-style-type: none"> <li>□ Materials and Processes: Identify and describe the basic elements used in computer aided drafting and design.             <ul style="list-style-type: none"> <li>A2. Describe and demonstrate the process of using mechanical and electronic measuring devices accurately as required by the design intent.</li> <li>A3. Describe and demonstrate the use of graphic communication skills through sketching.</li> <li>A4. Evaluate and select appropriate method of communication for a given problem.</li> <li>A9. Revise a design and update finished drawings appropriately.</li> </ul> </li> <li>□ Identifying Hardware and Operating Systems: Identify and describe the basic hardware and operating systems used in computer aided drafting and design.             <ul style="list-style-type: none"> <li>B12. Identify and describe various types of hardware and software.</li> <li>B13. Identify and describe the purpose of operating system components.</li> <li>B14. Define and apply computer terminology</li> </ul> </li> </ul>

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- Using Hardware and Operating Systems: Describe the process of utilizing various hardware and operatingsystems.
  - C15. View file names of a storage device.
  - C16. Store, copy, move, and retrieve information to/from various drives.
- Interpreting and Reading Blueprints: Identify various symbols to interpret and read blueprints.
  - D18. Interpret basic views and dimensions in a working drawing.
  - D20. Interpret drawings, pictures, and symbols.
- Creating and Manipulating Mechanical Drawing Information: Describe and demonstrate the process for creating various types of views using a well- organized process.
  - E21. Explain the Cartesian Coordinate System.
  - E22. Describe the process for setting and manipulating drawing elements.
  - E23. Create and manipulate line types, colors and layers/levels.
  - E24. Create and edit basic geometry by inputting coordinates.
  - E25. Insert and manipulate text and fonts.
  - E27. Insert and manipulate dimensions.
  - E28. Generate a 2-D multiview drawing.
  - E30. Scale and print hard copy of output device.
  - E31. Explain the use and need for scaled drawings.
- ***Mathematics Standards***
  - 1. Extend the understanding of numbers to include integers rational numbers and real numbers
    - Compare, locate, label and order real numbers on number lines, scales, coordinate grids and measurement tools.
  - 3. Develop strategies for computation and estimation using properties of number systems to solve problems.
    - Select and use appropriate methods for computing to solve problem in a variety of contexts.
- ***Reading Standards***
  - 8. Use evidence from the text to draw and or support a conclusion.
  - 9. Use information from the text to make a prediction based on what is read.



# Seymour Public Schools Curriculum

(refer to frameworks)

**Performance Expectations (Student outcomes)**

**Content Overview:**

**Content Overview:**

- Commercial Kitchen detail and layout**
  - ❖ Analyze different kitchen designs
  - ❖ Apply good design principles to planning a commercial service area
  - ❖ Analyze main differences between commercial and residential designs of an efficient functional kitchen
- Commercial Bathroom detail and layout**
  - ❖ Analyze different bathroom designs
  - ❖ Apply good design principles to planning a commercial bathroom area
  - ❖ Analyze main differences between commercial and residential designs of an efficient functional bathroom.
- Commercial Stair detail and layout**
  - ❖ Analyze different staircase designs
  - ❖ Apply good design principles to planning a commercial staircase
  - ❖ Analyze main differences between commercial and residential designs of an efficient functional Staircase.

**Objectives:**

- Students will be able to analyze, compare and apply design principles for:
  - ❖ Commercial Kitchen detail
  - ❖ Commercial Bathroom.
  - ❖ Commercial Staircase
- Students will be able to analyze designs and synthesize a set of detail plan for the building
- Students will be able to design a functional commercial kitchen, bathroom, and staircase to meet commercial needs specifications.
- Students will analyze and compare residential and commercial differences of kitchens, bathrooms and staircases.

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Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
<p><b>Instructional Methods:</b> Lectures, smart board demonstrations, laboratory activities, cooperative learning, discussion, individualized tutoring, peer instruction and mentoring</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Text book</li> <li><input type="checkbox"/> Smart board resources</li> <li><input type="checkbox"/> Internet research</li> <li><input type="checkbox"/> Cataloged research</li> </ul>	<p><b>Task Based Rubric Assessments:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Apply good design principles to planning of commercial service areas:               <ul style="list-style-type: none"> <li>▪ Design of a functional kitchen to meet needs of a commercial work place.</li> <li>▪ Design of a functional bathroom to meet the needs of a commercial work place.</li> <li>▪ Design of a functional staircase to meet the needs of a commercial work place.</li> </ul> </li>   <li><input type="checkbox"/> Analyze applied design principals and compare specifications to a residential design.</li> </ul>