

Course Title:	Content Area:	Grade Level:	Credit (if applicable)		
Architectural Concepts	CTE-Engineering & Technical Sciences	9-12	0.5		
Course Description:					
Students will design and model current and historical building styles using manual drafting, digital CAD, and physical model creation. Students will create models of homes, businesses, and public spaces.					
Aligned Core Resources:		Connection to the BPS Vision of the Graduate			
		COLLABORATION • Demonstrates ability to work effectively and respectfully with diverse teams. • Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal. • Assume shared responsibility for collaborative work and value the individual contributions made by each team member. CRITICAL THINKING AND PROBLEM SOLVING • Collect, assess and analyze relevant information • Reason effectively. Use systems thinking • Make sound judgments and decisions. Identify, define and solve authentic problems and essential questions. • Reflect critically on learning experience, processes and solutions • Transfer knowledge to other situations COMMUNICATIONS AND TECHNOLOGY LITERACY • Use digital technology, communication tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society			
Additional Course Information: <i>Knowledge/Skill Dependent courses/prerequisites</i>		Link to Completed Equity Audit			
Standard Matrix					
Advance CTE Standard	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
AC 1.2 Utilize vocabulary and visual cues in context of design and construction situations. • Confirm understanding of verbal and visual instructions. • Ask questions concerning details of instructions.	X	X	X	X	X

• Perform assignments as requested.					
AC 2.2 Estimate resources/materials required for a specific project or problem. • Estimate correct amount of required resources/materials. • Create a budget.					X
AC 2.3 Use available resources/ materials effectively while completing a project or resolving a problem with a project plan. • Evaluate waste of resources/materials. • Evaluate necessity for additional resources/materials.					X
AC 2.4 Determine alternative solutions for a specific project/problem. • Evaluate feasibility of alternative suggestions. • Implement appropriate alternatives.			X		
AC 3.2 Identify workplace/jobsite environmental hazards of a given situation. • Follow safe practices relating to environmental hazards. • Identify workplace hazards common to design and construction situations.					X
AC 3.3 Identify governmental regulations and national, state, and/or local building codes that apply to a given workplace/jobsite. • Follow governmental regulations and building codes. • Follow industry regulations and building codes. • Follow jurisdictional regulations and building codes. • Use information given in regulations and codes correctly. • Pass job inspections and comply with regulations at all times. • Pass required substance abuse screening			X		
AC 4.1 Describe how relationships between trades/professions can facilitate smooth workflow and outcome to meet project goals. • Coordinate work between trades.	X				
AC 6.1 Interpret drawings used in project planning • Recognize elements and symbols of blueprints and drawings.	X	X	X	X	X
AC 6.2: Recognize how specifications and			X		

standards are arranged for proper access. • Use specifications and standards. • Apply specifications and standards appropriately					
AC 6.3 Use architect's plan, manufacturer's illustrations and other materials to communicate specific data and visualize proposed work. • Sketch/draw/illustrate concepts and ideas. • Draw or sketch plan/layout to be completed. • Use proper measurements to determine layout.	X	X	X	X	X
AC 7.1 Research and match career opportunities based upon their fit with personal career goals. • Locate and interpret career information for at least one career pathway within the cluster. • Identify job requirements for the career cluster/pathway. • Identify educational and credentialing requirements for careers within the cluster.	X				
AC 7.2 Match personal interests and aptitudes to careers when researching opportunities within the pathways. • Identify personal interests and aptitudes. • Identify job requirements and characteristics for selected careers. • Compare personal interests and aptitudes with job requirements and characteristics of the career selected. • Modify career goals based on results of personal interests and aptitudes with career requirements and characteristics.	X				
AC DES 1.1 Use available research methods when project planning and problem-solving. • Select and employ the proper method for a given project.			X		
AC DES 2.1 AC-DES 2.1: Employ facilitation skills while leading meetings that involve a variety of clients and agencies. • Identify types of client/agency needs. • Mediate diversity to meet needs.			X		
AC DES 2.2 Employ appropriate representational media to communicate concepts and design.			X		

• Deliver a presentation that explains a concept of design or preconstruction. • Show project plans for visual impact. • Evaluate customer comprehension.					
AC DES 4.1 Explain how the Americans with Disabilities Act influences the compliance requirements for project designs. • Integrate Americans with Disabilities Act compliance into project designs.	X		X		
AC DES 5.1 Identify the geographic and cultural issues related to project design in a given situation. • Apply cultural traditions and diversity to project design.	X				
AC DES 6.1 Apply basic organizational, spatial, structural, and constructional principles to the design of interior and exterior space to produce an effective design. • Develop design alternatives that address a given problem. • Evaluate and select the best solution.		X	X		X
AC DES 6.2 Read and produce technical drawings, understanding the significance of each line in a drawing.		X	X	X	X
AC DES 6.3 Use communication skills and strategies to work effectively with people (including clients, team members, and others) to identify design/construction requirements. • Develop technical drawings drafted by hand and computer-generated plans to design structures that meet the client's specifications. • Draw and sketch by hand to communicate ideas effectively.			X		X
AC DES 7.1 Convey graphic information using multi-dimensional drawings. • Employ basic drawing skills. • Conceptualize a three-dimensional form from a two-dimensional drawing to visualize proposed work. • Build three-dimensional form models.		X	X		X
AC DES 7.2 Build models using referenced drawings and sketches. • Employ basic model building techniques. • Verify accuracy of model based on drawings and sketches used.					X

AC DES 7.3 Utilize computer technology when communicating concepts and designs. Employ basic computer modeling techniques.			X	X	
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Unit Links

If unit headings are formatted as a heading, then we can link a Table of Contents to better organize and provide faster access to each unit

- [1: History of Architecture](#)
- [2: Fundamentals of Drafting](#)
- [3: Floor Plan Design \(CAD\)](#)
- [4: Wall Section Design](#)
- [5: Architectural Models](#)

Unit Title:	
1: History of Architecture	
Relevant Standards: Bold indicates priority	
AC 1.2; AC 4.1; AC 6.1; AC 6.3; AC7.1; AC 7.2; AC DES 4.1; AC DES 5.1	
Essential Question(s):	Enduring Understanding(s):
What do architects do? How does architecture impact society?	
Demonstration of Learning:	Pacing for Unit
Written Response, Research Document regarding current residential architectural trends	6 classes
Family Overview (link below)	Integration of Technology:
	<i>Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning</i>
Unit-specific Vocabulary:	Aligned Unit Materials, Resources, and Technology (beyond core resources):
Architecture, Architect, Ranch, Raised Ranch, Split level, Colonial, Bungalow, Studio, Classical Architecture, Byzantine, Gothic, Romanesque, Islamic, Drafting, CAD, Design Process, Floorplan, Elevation	
Opportunities for Interdisciplinary Connections:	Anticipated misconceptions:
Concepts related to World History classes may connect to historical architectural styles based on available resources and environmental needs. Students may also see connections with personal finance and construction courses as they explore costs and construction of residential structures.	Students may struggle with basic algebraic operations as they calculate costs of construction and purchase of residential structures.
Connections to Prior Units:	Connections to Future Units:
N/A	Students will utilize skills and knowledge acquired in this unit as they begin to create personalized designs.
Differentiation through <i>Universal Design for Learning</i>	
UDL Indicator	Teacher Actions:
Engagement: Optimize relevance, value, and authenticity	Vary activities and sources of information so that they can be:

		● Personalized and contextualized to learners' lives ● Culturally relevant and responsive ● Socially relevant ● Appropriate for different racial, cultural, ethnic, and gender groups ● Design activities so that learning outcomes are authentic, communicate to real audiences, and reflect a purpose that is clear to the participants ● Provide tasks that allow for active participation, exploration and experimentation ● Invite personal response, evaluation and self-reflection to content and activities
Supporting Multilingual/English Learners		
Related <i>CELP standards</i>:		Learning Targets:
An EL can conduct research and evaluate and communicate findings to answer questions or solve problems.		See <i>italicized</i> learning targets.
Lesson Sequence	Learning Target	Success Criteria/Assessment/Resources
1	<i>I can understand the role of architecture in society.</i>	● I can define architecture. ● I can explore careers related to the field of architecture. ● I can explain the importance of architecture in culture and society.
2	<i>I can compare and contrast modern and historical approaches to architecture.</i>	● I can identify and name a variety of modern architectural styles. ● I can describe the cultural traditions and factors that influence architecture throughout history. ● I can identify similarities and differences in modern architectural trends and historical trends.
3	<i>I can explain an architect's design process.</i>	● I can define the components of an architect's design process. ● I can hypothesize, with evidence, why architect's make certain design choices when designing dwellings. ● I can explain the sequence from inspection through CAD modeling.
4	<i>I can understand how a blueprint communicates information about a structure.</i>	● I can explain what the different views in the blueprint mean. ● I can identify the scale of the blueprint. ● I can understand and explain how the symbols used in a blueprint communicate information for the building process.

Unit Title:	
2: Fundamentals of Drafting	
Relevant Standards: Bold indicates priority	
AC 1.2; AC 6.1; AC 6.3; AC DES 6.1; AC DES 6.2; AC DES 7.1	
Essential Question(s):	Enduring Understanding(s):
How do I create a sketch or blueprint by hand? How do I measure a space?	• Reading a Sketch • Creating a Scaled/proportional sketch • Measurement
Demonstration of Learning:	Pacing for Unit
Oral and written response, Peer to peer feedback, Measurement Quiz, Dimensioned Sketch, Scaled Drawing	8 classes
Family Overview (link below)	Integration of Technology:
	<i>Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning</i>
Unit-specific Vocabulary:	Aligned Unit Materials, Resources, and Technology (beyond core resources):
Blueprint, Sketch, Scale, Measure, Inch, Ruler, Tape, Measure, Convert, Architectural Scale, Symbol, T Square, Triangle, Eraser Shield, Paper Sizes	Manual drafting supplies
Opportunities for Interdisciplinary Connections:	Anticipated misconceptions:
Students will use and reinforce what they learned in math and science classes regarding the relationship between fractions and decimals, addition and subtraction of fractions, and use of scale factor.	Students may struggle differentiating decimal scaled instruments and fractional scaled instruments. Students may also struggle to differentiate between a scaled value and a full size value of a measurement.
Connections to Prior Units:	Connections to Future Units:
Students will better understand the intentionality of design decisions they learned about in Unit 1.	Students will understand the importance of accurate measurements when they move on from flexible sketches to perfectly accurate computer models.
Differentiation through Universal Design for Learning	
UDL Indicator	Teacher Actions:
Optimize relevance, value, and authenticity	Vary activities and sources of information so that they can be

		● Age and ability appropriate ○ Appropriate for different racial, cultural, ethnic, and gender groups ○ Design activities so that learning outcomes are authentic, communicate to real audiences, and reflect a purpose that is clear to the participants ● Provide tasks that allow for active participation, exploration and experimentation.
Supporting Multilingual/English Learners		
Related <i>CELP standards</i>:		Learning Targets:
An EL can conduct research and evaluate and communicate findings to answer questions or solve problems.		See <i>italicized</i> learning targets.
Lesson Sequence	Learning Target	Success Criteria/Assessment/Resources
1	<i>I can accurately take and use measurements of a design space.</i>	● I can understand how to read a ruler/tape measure to accurately measure a space. ● I can convert fractional measurements and decimal measurements. ● I can convert total inches and feet plus inches. ● I can accurately communicate the dimensions of a design space.
2	<i>I can accurately create a scaled/proportional sketch.</i>	● I can select a scale appropriate to the drawing size. ● I can convert a full size measurement to a scale size measurement. ● I can identify and use basic drawing tools to create a scaled sketch.
3	<i>I can communicate information pulled from a blueprint drawing.</i>	● I can interpret the text and symbols in a sketch or blueprint. ● I understand the relationship between sketched elements and physical objects in a blue print. ● I can interpret the scale of the sketch or blueprint.

Unit Title:	
3: Floor Plan Design (CAD)	
Relevant Standards: Bold indicates priority	
AC 1.2; AC 2.4; AC 3.3; AC 6.1; AC 6.2; AC 6.3; AC DES 1.1; AC DES 2.1; AC DES 2.2; AC DES 4.1; AC DES 6.1; AC DES 6.2; AC DES 6.3; AC DES 7.1; AC DES 7.3	
Essential Question(s):	Enduring Understanding(s):
What is a floor plan and what is it used for? How do I make a floor plan using CAD?	CAD software exists to create blueprints Various tools and techniques serve specific purposes in CAD
Demonstration of Learning:	Pacing for Unit
Oral and written response, Peer to peer feedback, Basic CAD models, 3d renderings,	9 classes
Family Overview (link below)	Integration of Technology:
	<i>Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning</i>
Unit-specific Vocabulary:	Aligned Unit Materials, Resources, and Technology (beyond core resources):
CAD, File management, Component, Elevation, Floorplan, Browser, Workspace, Double Hung, Pocket,, Door, Rolling door, Sliding door, Bay Window, Component, Floor, Ceiling, Level	Autodesk Revit
Opportunities for Interdisciplinary Connections:	Anticipated misconceptions:
Students who took Computer Software Applications will reinforce file management skills acquired there. Students who took any design focused courses in art classes can integrate learning acquired there as they design in CAD.	Students will confuse measurements taken from interior faces as they enter measurements that by default are located at the core centerline of a wall.
Connections to Prior Units:	Connections to Future Units:
Students will experience the increased specify and decreased tolerances as they progress from manual sketching to CAD drawings.	Students will later utilize the floor plans and schematics created in CAD to create scale models of the structures they are modeling.
Differentiation through <i>Universal Design for Learning</i>	
UDL Indicator	Teacher Actions:

Language And Symbols: Clarify vocabulary and symbols		• Pre-teach vocabulary and symbols, especially in ways that promote connection to the learners' experience and prior knowledge • Provide graphic symbols with alternative text descriptions • Highlight how complex terms, expressions, or equations are composed of simpler words or symbols • Embed support for vocabulary and symbols within the text (e.g., hyperlinks or footnotes to definitions, explanations, illustrations, previous coverage, translations) • Embed support for unfamiliar references within the text (e.g., domain specific notation, lesser known properties and theorems, idioms, academic language, figurative language, mathematical language, jargon, archaic language, colloquialism, and dialect)
Supporting Multilingual/English Learners		
Related <u>CELP standards:</u>		Learning Targets:
An EL can conduct research and evaluate and communicate findings to answer questions or solve problems.		See <i>italicized</i> learning targets.
Lesson Sequence	Learning Target	Success Criteria/Assessment/Resources
1	<i>I can explain the value of Computer Aided Design (CAD) in architecture.</i>	• I can list some different CAD applications that support architects. • I understand how to use a sketch to create a digital blueprint. • I understand the advantages and disadvantages of sketches vs CAD.
2	<i>I can use CAD to create a floorplan.</i>	• I can explore the features in the CAD program. • I can accurately create elevations, walls, floors, and components to meet the specifications of a floorplan. • I can modify existing elements in a CAD model to improve my floor plan design or to meet ADA specifications. • I can provide constructive feedback to my peers in regard to their CAD generated floor plans and required specifications.

Unit Title:	
4: Wall Section Design	
Relevant Standards: Bold indicates priority	
AC 1.2; AC 6.1; AC 6.3; AC DES 6.2; AC DES 7.3	
Essential Question(s):	Enduring Understanding(s):
How are walls made? How does that impact architecture?	Not all walls are the same The type of wall used will impact the design
Demonstration of Learning:	Pacing for Unit
Oral and written responses, CAD Modeling,	5 classes
Family Overview (link below)	Integration of Technology:
	<i>Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning</i>
Unit-specific Vocabulary:	Aligned Unit Materials, Resources, and Technology (beyond core resources):
Interior, Exterior, Stud, Header, Footer, Vapor barrier, Air gap, Insulation, Drywall, Finish, Siding, Clapboard, Brick, Cement, Cinderblock , Rebar	Autodesk Revit
Opportunities for Interdisciplinary Connections:	Anticipated misconceptions:
Students who took PLTW Principles of Engineering will understand the U and R values of heat transmissions through wall sections.	
Connections to Prior Units:	Connections to Future Units:
Differentiation through Universal Design for Learning	
UDL Indicator	Teacher Actions:
Representation-Language & Symbols: Clarify vocabulary and symbols	• Pre-teach vocabulary and symbols, especially in ways that promote connection to the learners' experience and prior knowledge • Provide graphic symbols with alternative text descriptions • Highlight how complex terms, expressions, or equations are composed of simpler words or symbols

		• Embed support for vocabulary and symbols within the text (e.g., hyperlinks or footnotes to definitions, explanations, illustrations, previous coverage, translations) • Embed support for unfamiliar references within the text (e.g., domain specific notation, lesser known properties and theorems, idioms, academic language, figurative language, mathematical language, jargon, archaic language, colloquialism, and dialect.
Supporting Multilingual/English Learners		
Related CELP standards :		Learning Targets:
An EL can conduct research and evaluate and communicate findings to answer questions or solve problems.		See <i>italicized</i> learning targets.
Lesson Sequence	Learning Target	Success Criteria/Assessment/Resources
1	<i>I can compare and contrast the structures of interior and exterior walls.</i>	• I can explain the differences between interior and exterior walls. • I can list and explain the purpose of different layers of a wall. • I can explain how different wall types and thicknesses will impact a floor plan. • I can apply my understanding of differences in wall structures to my CAD floor plan/design.

Unit Title:	
5: Architectural Models	
Relevant Standards: Bold indicates priority	
AC 1.2; AC 2.2; AC 2.3; AC 3.2; AC 6.1; AC 6.3; AC DES 6.1; AC DES 6.2; AC DES 6.3; AC DES 7.1; AC DES 7.2	
Essential Question(s):	Enduring Understanding(s):
What are architectural models? How are models made?	Models exist to communicate 3d information about a structure. Various materials and tools are used to make models.
Demonstration of Learning:	Pacing for Unit
Oral and written Response Peer feedback Physical Model Creation	9 classes
Family Overview (link below)	Integration of Technology:
	<i>Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning</i>
Unit-specific Vocabulary:	Aligned Unit Materials, Resources, and Technology (beyond core resources):
Model, Scale, Foamcore, Xacto Knife, Utility Knife, Blade, Adhesive, Blueprint, Landscape, CNC, Laser Cut, Stereolithography	Manual Drafting Supplies Foam Core Poster Board Hot glue guns with glue sticks Cutting tools
Differentiation through Universal Design for Learning	
UDL Indicator	Teacher Actions:
Representations-Language & Symbols: Illustrate through multiple media	- Present key concepts in one form of symbolic representation (e.g., an expository text or a math equation) with an alternative form (e.g., an illustration, dance/movement, diagram, table, model, video, comic strip, storyboard, photograph, animation, physical or virtual manipulative) - Make explicit links between information provided in texts and any accompanying representation of that information in illustrations, equations, charts, or diagrams
Supporting Multilingual/English Learners	
Related CELP standards:	Learning Targets:
An EL can conduct research and evaluate and	See <i>italicized</i> learning targets.

communicate findings to answer questions or solve problems.		
Lesson Sequence	Learning Target	Success Criteria/Assessment/Resources
1	<i>I can understand how architectural models are used in the real world.</i>	• I can explain who would want a model created. • I can explain how models are professionally created.
2	<i>I can translate information from a blueprint or sketch to a real life model accurately.</i>	• I can identify key safety factors for using tools to create a model. • I can safely follow procedures to make a physical model. • I can create a scaled floor plan model based on my blueprint/sketch.