

Architectural Drawing and Design

8492 18 weeks

8437 36 weeks

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Course Description

Suggested Grade Level: 10 or 11 or 12

Prerequisites: 8434 or 8435 or 8439

Students learn the principles of architecture and increase their understanding of working drawings and construction techniques learned in the prerequisite course. Experiences include residential and commercial building designs, rendering, model development, and structural details. Students use computer-aided drawing and design (CADD) equipment and established standards or codes to prepare models for presentation. The course is especially beneficial to future architects, interior designers, or home builders.

Task Essentials Table

- Tasks/competencies designated by plus icons (⊕) in the left-hand column(s) are essential

- Tasks/competencies designated by empty-circle icons (○) are optional
- Tasks/competencies designated by minus icons (⊖) are omitted
- Tasks marked with an asterisk (*) are sensitive.

Task Number	8437	8492	Tasks/Competencies
Exploring Architectural Design Foundations			
39	⊕	⊕	Define <i>architectural design</i> .
40	⊕	○	Analyze architectural styles.
41	⊕	⊕	Maintain a reference library of architectural data.
42	⊕	⊕	Create a construction budget.
43	⊕	⊕	Calculate square footage.
44	⊕	⊕	Summarize the purpose of building and zoning codes.
45	⊕	⊕	Apply architectural principles of annotation and dimensioning.
46	⊕	⊕	Identify the components in a complete set of architectural drawings.
47	⊕	⊕	Create an architectural title block.
Introducing the Design Process			
48	⊕	⊕	Define the architectural design process.
49	⊕	⊕	Apply the elements and principles of design in the architectural design process to create a solution.
50	⊕	○	Build a scaled presentation model.
51	⊕	○	Incorporate green technology into architectural design.
52	⊕	⊕	Design a functional floor plan for a residential or commercial building.
53	⊕	○	Incorporate Americans with Disabilities Act (ADA) regulations into design solutions.
Producing Illustrations			

54	+	+	Develop a site analysis.
55	+	+	Prepare design sketches.
56	+	+	Draw a functional floor plan.
57	+	+	Design a foundation plan, based on a floor plan.
58	+	+	Draw a reflected ceiling plan (RCP), based on a floor plan.
59	+	+	Create sectional views.
60	+	+	Create perspective views, including renderings.
61	+	+	Design exterior elevations.
62	+	○	Design interior elevations.
63	+	+	Create door and window schedules.
64	+	+	Create architectural design solutions using computer-aided drafting (CAD).
65	+	+	Create a walk-through presentation of a section of a building.

Legend: + Essential ○ Non-essential ⊖ Omitted

Curriculum Framework

Exploring Architectural Design Foundations

Task Number 39

Define *architectural design*.

Definition

Definition may include the following: Architectural design is applying the elements and principles of design to a building's function to make it aesthetically pleasing.

Process/Skill Questions

- What are the basic elements of design?
- What are the principles of design?
- What are characteristics of good design?
- What are characteristics of green design?
- What are the milestones in the history of architectural design?
- Who is considered to be one of the most famous architects of the 20th century?
- How and why does architecture vary from the different regions of the world?
- What are the career qualifications for this field?

ITEEA National Standards

Construction Technologies

The Characteristics and Scope of Technology

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Technology Bowl

Task Number 40

Analyze architectural styles.

Definition

Analysis should examine the components of various architectural styles, including

- residential types (e.g., Cape Cod, bungalow, Colonial, contemporary, salt box, ranch, Victorian, split level)
- function (e.g., steep roofs in snowy climates, heavy masses in desert areas)
- materials (e.g., interior vs. exterior, shingle types, siding types)
- construction methods (e.g., balloon frame construction vs. wood frame construction, frost line considerations for foundations).

Process/Skill Questions

- What are some of the influences on early American architecture?
- What are examples of different styles of architecture in your community?
- What are three characteristics of the mid-Atlantic Colonial architectural style?

ITEEA National Standards

The Characteristics and Scope of Technology

The Cultural, Social, Economic, and Political Effects of Technology

The Effects of Technology on the Environment

The Influence of Technology on History

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 41

Maintain a reference library of architectural data.

Definition

Maintenance should include organizing and using drawing files, spreadsheets, and other technical data.

Process/Skill Questions

- What is architectural data?
- What might be included in a reference library of architectural data?
- What are the steps for copying, moving, and deleting drawing files?
- How do you create and delete file folders on a computer?

ITEEA National Standards

Information and Communication Technologies

Use and Maintain Technological Products and Systems

TSA Competitive Events

Computer-Aided Design (CAD), Architecture

Essays on Technology

Task Number 42

Create a construction budget.

Definition

Budget should include the following components:

- Labor
- Time
- Materials
- Equipment
- Building permit fees
- Architectural fees
- Insurance
- Financing fees
- Legal costs

Process/Skill Questions

- What construction methods and material use can help reduce the costs of building?
- What are the benefits of obtaining bids from several contractors?
- What types of materials may be needed for a building project?
- How does material vary in grade, quality, and cost?

ITEEA National Standards

Agricultural and Related Biotechnologies

Apply Design Processes

Assess the Impact of Products and Systems

Construction Technologies

Engineering Design

Manufacturing Technologies

Relationships Among Technologies and the Connections Between Technology and Other Fields

The Attributes of Design

The Core Concepts of Technology

The Effects of Technology on the Environment

The Role of Society in the Development and Use of Technology

The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving

Use and Maintain Technological Products and Systems

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 43

Calculate square footage.

Definition

Calculation should be determined by multiplying, using the English System of Measurement, the length times the width of the living area, which is any area that is intended for occupancy.

Process/Skill Questions

- What units of measurement are used to calculate area?
- What is the purpose of determining square footage?
- What areas of the structure are not included in the square footage calculation?
- What is the difference between *gross* square footage and *net* square footage?

ITEEA National Standards

Relationships Among Technologies and the Connections Between Technology and Other Fields

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 44

Summarize the purpose of building and zoning codes.

Definition

Summary should center around the following:

- Building codes are legal requirements designed to protect the public by providing construction guidelines for the structural, electrical, plumbing, and mechanical areas of a building.
- Zoning codes regulate the location, size, and type of a structure that can be built on a site, such as residential, commercial, or industrial.

Process/Skill Questions

- What is a zoning code?
- What is the purpose of using building and zoning codes?
- Where can you find building and zoning specification information?
- Why is determining zoning information important to you as a designer?

ITEEA National Standards

Construction Technologies

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Debating Technological Issues

Task Number 45

Apply architectural principles of annotation and dimensioning.

Definition

Application should include documenting sizes and locations for exterior and interior design, such as

- height
- width
- depth
- angles
- fillets and rounds
- datum
- surface texture
- room identification
- direction.

Process/Skill Questions

- What is a dimension line?
- What is an extension line?
- What is the difference between a dimension and square footage annotation?
- How are the electrical and plumbing drawings annotated?
- What basic information is given by dimensioning?
- What is a size dimension?
- What is a location dimension?
- What is a datum?

ITEEA National Standards

Construction Technologies

The Role of Society in the Development and Use of Technology

Use and Maintain Technological Products and Systems

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 46

Identify the components in a complete set of architectural drawings.

Definition

Identification could include

- site plan
- elevations
- foundation plan
- floor plan
- sectional views
- electrical plan and schedule
- plumbing plan
- lighting plan and schedule
- window schedule
- construction detail view.

Process/Skill Questions

- How do the floor plans serve as a point of reference for other drawings in a set of plans?
- What is the purpose of elevation drawings?
- Why is it necessary to distinguish between the electrical and plumbing drawings?

ITEEA National Standards

Construction Technologies

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 47

Create an architectural title block.

Definition

Creation should include

- client's name
- designer's name
- design scale
- date of service
- drawing title
- drawing number.

Process/Skill Questions

- What is a title block?
- Why is the information in the title block important to the designer?
- Where is the placement of the title block located?
- What is the size of the lettering?
- What is the typical size of the title block?

ITEEA National Standards

Construction Technologies

TSA Competitive Events

Computer-Aided Design (CAD), Architecture

Introducing the Design Process

Task Number 48

Define the architectural design process.

Definition

Definition should include that the architectural design process is an assessment of client needs and preferences, budget cost, and design challenges that specifically entail

- identifying the problem
- meeting the needs of clients by identifying the criteria and constraints
- generating multiple solutions (brainstorming)
- evaluating, analyzing, and selecting solution(s)
- implementing solution(s)
- reevaluating solution(s)
- refining as necessary.

Process/Skill Questions

- Why is it important to follow a systematic design process?
- When is it important to repeat the steps of the design process?
- When is it necessary to refine the design?

ITEEA National Standards

Construction Technologies

Engineering Design

The Attributes of Design

The Core Concepts of Technology

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 49

Apply the elements and principles of design in the architectural design process to create a solution.

Definition

Application should include combining the elements of design:

- Line
- Form
- Space
- Light
- Color
- Texture
- Direction

with the principles of design:

- Balance
- Unity
- Repetition
- Contrast
- Rhythm

Process/Skill Questions

- What are the principles of design?
- What is meant by the phrase “form follows function”?
- What is the difference between elements and principles of design?

ITEEA National Standards

Engineering Design

The Attributes of Design

The Characteristics and Scope of Technology

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Structural Design and Engineering

Task Number 50

Build a scaled presentation model.

Definition

Building should include 3-D representations of a complete design, made to scale, and built to be viewed from any angle or distance.

Process/Skill Questions

- What is the purpose of a model?
- To what scale are models usually built?
- What materials can be used to construct models?

ITEEA National Standards

Apply Design Processes

Assess the Impact of Products and Systems

Construction Technologies

Engineering Design

Manufacturing Technologies

Relationships Among Technologies and the Connections Between Technology and Other Fields

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Use and Maintain Technological Products and Systems

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 51

Incorporate green technology into architectural design.

Definition

Incorporation should include using eco-friendly design technology based on research of current green options to meet goals of sustainability and best “true cost.”

Process/Skill Questions

- What is meant by *green technology*?
- What is meant by *true cost*?
- What is meant by *sustainability*, and how does it apply to architectural design?
- What are the advantages of using green technology?
- Why would it be important for you to suggest green options to a client?
- What construction materials are considered green?
- How does designing a greener structure affect the cost of construction, operation, and maintenance, and the environment?

ITEEA National Standards

The Effects of Technology on the Environment

The Role of Society in the Development and Use of Technology

Use and Maintain Technological Products and Systems

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 52

Design a functional floor plan for a residential or commercial building.

Definition

Design should include descriptions of components contained in the design, including their purpose, materials, measurements, and locations.

Process/Skill Questions

- What are the essential elements of a floor plan?
- In what way do floor plans serve as a point of reference for other drawings in a set of plans?
- What are the necessary steps in designing a residence?
- What is the importance of setting goals and objectives for a house you might design?

ITEEA National Standards

Apply Design Processes

Assess the Impact of Products and Systems

Construction Technologies

Engineering Design

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The Attributes of Design

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 53

Incorporate Americans with Disabilities Act (ADA) regulations into design solutions.

Definition

Incorporation should include a list of ADA regulations and how they affect architectural design choices.

Process/Skill Questions

- When was the Americans with Disabilities Act established?
- How and why did ADA regulations come about?
- What are some of the design specifications for residential construction or architecture?
- What are some examples of architectural design features that help buildings meet ADA requirements?

ITEEA National Standards

The Cultural, Social, Economic, and Political Effects of Technology

Producing Illustrations

Task Number 54

Develop a site analysis.

Definition

Development should involve compiling environmental information that will affect the design choices for a building and should show the exterior plans around a building, including water lines, electrical lines, and other contour details about the land.

Process/Skill Questions

- Who performs a site analysis?
- How does the site analysis affect the design choices for that site?
- Why is building orientation important to design considerations?
- What design choices can reduce the effects of wind on a building?
- What elements of the structure are typically found on an exterior elevation drawing?

ITEEA National Standards

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TSA Competitive Events

Architectural Design

Task Number 55

Prepare design sketches.

Definition

Preparation should result in documenting preliminary ideas and concepts for future technical drawings.

Process/Skill Questions

- What are the different types of sketches?
- What is the importance of design sketching in architectural drawing?

ITEEA National Standards

Apply Design Processes

Construction Technologies

Engineering Design

Information and Communication Technologies

The Attributes of Design

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Dragster Design

Flight Endurance

Structural Design and Engineering

Technology Problem Solving

Transportation Modeling

Task Number 56

Draw a functional floor plan.

Definition

Drawing should reflect an understanding of accepted principles of residential space planning and render descriptions of components, including their materials, locations, and measurements.

Process/Skill Questions

- What are the benefits of creating a functional floor plan?
- What is meant by *function*?
- What are examples of floor plan symbols?
- What is a traffic pattern, and why is it an important planning consideration?
- What are open and closed floor plans?
- What are the six basic kitchen shapes?

ITEEA National Standards

Agricultural and Related Biotechnologies

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TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 57

Design a foundation plan, based on a floor plan.

Definition

Design should provide a level and uniformly distributed support for the structure.

Process/Skill Questions

- What is meant by *function*?
- What are examples of floor plan symbols?
- What is a traffic pattern, and why is it an important planning consideration?

ITEEA National Standards

Apply Design Processes

Assess the Impact of Products and Systems

Construction Technologies

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TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 58

Draw a reflected ceiling plan (RCP), based on a floor plan.

Definition

Drawing should provide information on the location of switches, outlets, light fixtures, appliances, sprinklers, fire alarms, and media components.

Process/Skill Questions

- What is the difference in a RCP and electrical plan?
- How do you read an RCP?
- What are three methods of light disbursement?

ITEEA National Standards

Apply Design Processes

Assess the Impact of Products and Systems

Construction Technologies

Energy and Power Technologies

Engineering Design

Use and Maintain Technological Products and Systems

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 59

Create sectional views.

Definition

Creation should show internal details of an object not readily available from a single view and might include the following views:

- Full
- Half
- Broken-out
- Revolved
- Removed
- Offset

Process/Skill Questions

- Why are sectional views necessary?
- What is the difference between a transverse section and a longitudinal section?
- What is a cutting-plane line?

ITEEA National Standards

Engineering Design

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TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 60

Create perspective views, including renderings.

Definition

Creation should produce a drawing that most closely resembles the way people actually see an image. Drawings should be rendered to add realistic texture and establish shade and shadow patterns appropriate for the client and may also include exploded view and isometric circles.

Process/Skill Questions

- What is a *vanishing point*?
- What are two types of perspective drawings?
- What is the name for the location of the observer in perspective drawing?
- Why are renderings made?
- What are examples of media used for rendering?
- What is the name of black and gray tone rendering?
- What is the *isometric axis*?
- What are non-isometric lines?

ITEEA National Standards

Assess the Impact of Products and Systems

Construction Technologies

Engineering Design

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The Attributes of Design

Use and Maintain Technological Products and Systems

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 61

Design exterior elevations.

Definition

Design should show the vertical surfaces of a structure and also show the entire front, sides, and rear views of that structure and include at least one of the following:

- Simple floor plan
- Foundation cross-section

Process/Skill Questions

- What are the major horizontal lines of an elevation called?
- What elements are shown on an exterior elevation drawing?
- How can a floor plan assist in drawing elevations?

ITEEA National Standards

Apply Design Processes

Assess the Impact of Products and Systems

Construction Technologies

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TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 62

Design interior elevations.

Definition

Design should produce drawings of such elevations as the interior wall surfaces, cabinetry, windows, and doors.

Process/Skill Questions

- What are some elements of the structure found on an interior elevation?
- What is the reference line called in elevation dimensioning?

- What is the purpose of an interior elevation?

ITEEA National Standards

Apply Design Processes

Assess the Impact of Products and Systems

Construction Technologies

Engineering Design

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TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 63

Create door and window schedules.

Definition

Creation should provide information such as location, direction of swing/opening, and dimensions.

Process/Skill Questions

- What are some elements found on a door schedule?
- What kinds of information are included on door and window schedules?

ITEEA National Standards

Construction Technologies

Use and Maintain Technological Products and Systems

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 64

Create architectural design solutions using computer-aided drafting (CAD).

Definition

Creation should include

- setting drawing limits
- setting units
- using layers
- designing and using templates
- using drawing commands
- modifying commands
- using basic dimensioning.

Process/Skill Questions

- When might a designer use a template?
- What are some of the properties of a drawing layer?
- What are the advantages of using CADD over hands-on drafting?
- What are some programs available for use in CADD?

ITEEA National Standards

Assess the Impact of Products and Systems

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TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Task Number 65

Create a walk-through presentation of a section of a building.

Definition

Creation should provide views that can eliminate interference in the building process.

Process/Skill Questions

- Why is a walk-through important to the design and construction process?
- What features should a walk-through include?
- How can a walk-through be accomplished?

ITEEA National Standards

Apply Design Processes

Assess the Impact of Products and Systems

Construction Technologies

Engineering Design

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Architectural Design

Computer-Aided Design (CAD), Architecture

SOL Correlation by Task

39	Define <i>architectural design</i> .	English: 10.3, 11.3, 12.3
40	Analyze architectural styles.	English: 10.5, 11.5, 12.5
41	Maintain a reference library of architectural data.	
42	Create a construction budget.	
43	Calculate square footage.	
44	Summarize the purpose of building and zoning codes.	English: 10.5, 10.8, 11.5, 11.8, 12.5, 12.8
45	Apply architectural principles of annotation and dimensioning.	
46	Identify the components in a complete set of architectural drawings.	
47	Create an architectural title block.	
48	Define the architectural design process.	English: 10.3, 10.5, 11.3, 11.5, 12.3, 12.5
49	Apply the elements and principles of design in the architectural design process to create a solution.	
50	Build a scaled presentation model.	Mathematics: G.8, G.9, G.13, G.14
51	Incorporate green technology into architectural design.	English: 10.5, 10.8, 11.5, 11.8, 12.5, 12.8 History and Social Science: GOVT.9, GOVT.15, WG.17
52	Design a functional floor plan for a residential or commercial building.	Mathematics: G.2, G.8, G.13, G.14

53	Incorporate Americans with Disabilities Act (ADA) regulations into design solutions.	English: 10.5, 11.5, 12.5
54	Develop a site analysis.	English: 10.5, 11.5, 12.5 History and Social Science: GOVT.8, GOVT.9, GOVT.15, WG.1, WG.2, WG.3, WG.4, WG.16, WG.17 Mathematics: G.8
55	Prepare design sketches.	Mathematics: A.5
56	Draw a functional floor plan.	Mathematics: G.2, G.8, G.10, G.14
57	Design a foundation plan, based on a floor plan.	Mathematics: G.8, G.10, G.12, G.14
58	Draw a reflected ceiling plan (RCP), based on a floor plan.	
59	Create sectional views.	Mathematics: G.14
60	Create perspective views, including renderings.	Mathematics: G.14
61	Design exterior elevations.	Mathematics: G.14
62	Design interior elevations.	Mathematics: G.3, G.14
63	Create door and window schedules.	Mathematics: G.3, G.10, G.13, G.14
64	Create architectural design solutions using computer-aided drafting (CAD).	Mathematics: G.3, G.4, G.10, G.11
65	Create a walk-through presentation of a section of a building.	Mathematics: G.3, G.4, G.10, G.11

Teacher Resources

Collaborative Lesson Plans

Building a Foundation

Subjects

Earth Science, Computer-Aided Design Drafting, Design courses

Objective

Select the best foundation for a building, based on soil type, environmental stresses, and construction technique.

Real-World Application

Consumers must have an overall understanding of construction principles in order to select the contractor or builder. In addition, problems with shrink-swell soil in several residential areas of Chesterfield County have been documented in the news.

Materials Needed

- CADD workstations
- Sample drawings, demo drawings
- Handouts on soil types and building stresses
- Soil samples

Activities

- In the Earth science classroom, students gain an overview of local soil types by studying soil samples, pictures illustrating the local topography, and charts outlining the frost depths in the area.
- In the CADD lab, pairs of Earth science and CADD students draw three foundation types based on information learned and print them to scale.
- Students summarize the advantages of various foundations in each soil type.

Evaluation

Foundations should reflect appropriate materials and designs for three different types of soil found in the local community.

Related Academic Standards of Learning

Science: ES.1

This lesson plan came from Henrico County Schools.

Hermitage High School, Richmond
 Carolyn Hawthorne, Earth Science teacher
 Hermitage Technical Center
 Johnnie Collie, CAD teacher

Emergency Evacuation Plans for a Child Care Center

Subjects

Child Care Occupations II, Architectural Drawing and Design, Drafting-related courses

Objectives

- Develop an emergency evacuation plan for a child care center.
- Students in Child Care classes develop an evacuation plan to cover a number of emergencies that may occur in their building. Architectural Drafting and Design students draw a floor plan illustrating evacuation routes. Using a computer, students cooperatively design and produce a brochure that explains the plan. They present the finished product to parents to promote the proposed building's emphasis on safety and functionality.

Related Academic Standards of Learning

English: 10.7, 10.10, 11.7

This lesson plan came from Appomattox County Public Schools.

Appomattox County High School
 Marcie S. Jones, Child Care Occupations teacher
 Dianne Tuck, Drafting teacher

House Beautiful

Subjects

Economics, Architectural Drawing and Design, Drafting-related courses

Objectives

- Plan affordable housing that meets one's preferences.
- Students design a house to suit their own preferences and calculate the cost of construction using recycled materials wherever possible. Students then calculate the purchase price and research mortgage qualification procedures to determine the requirements for getting a loan.

Suggestion: Students could design living space for a variety of consumer markets such as for disabled or elderly individuals, large families, or those who prefer advanced technology (smart house). As an alternative, students could research consumer credit, lending practices in the mortgage business, and laws designed to prevent discrimination in the housing industry.

Related Academic Standards of Learning

History and Social Science: WG.7, WG.11

Mathematics: G.2, G.8

This lesson plan came from Suffolk City Schools.

Nansemond River High School, Suffolk

Hazel White, Economics teacher

Fred Wood, Engineering Drawing teacher

House Wiring

Subjects

Architectural Drawing and Design, Electricity, Physics

Objectives

- Wire a model house for the most efficient and economical use of power.
- Students take on the roles of consulting engineering teams to solve problems related to wiring a house for the most efficient and economical use of power. The project allows students to apply information and skills to the solution throughout a series of lessons, thereby enhancing workplace skills related to critical thinking, communication, and teamwork.

Related Academic Standards of Learning

Science: PH.1, PH.2, PH.3, PH.4, PH.12, PH.13

This lesson plan came from Hanover County Public Schools.

Atlee High School

Renee Reisenweaver, Principles of Technology teacher

How Did They Build That Cathedral?

Subjects

English, World History, French, Architectural Drawing and Design, Engineering, Physics, Geometry

Objectives

- Evaluate the importance of the Church in France during the Middle Ages

- Explore the methods and techniques of building cathedrals.

Real-World Application

By studying the construction of a cathedral during the Middle Ages, students learn how buildings can impact a community. By studying the architectural design of a cathedral, they learn more about the construction of large buildings--the materials, the artisans, and the labor needed. Then, students should turn their attention to an historical church in their own community and examine the construction of the church. For example, students in Petersburg may explore the role of Blandford Church in their community's history and the stained glass windows for which the church is famous.

Materials Needed

Computers with Internet access and architectural software

Activities

- Use any available technology for research.
- Use French language to describe parts of a cathedral.
- Identify various architects and builders of cathedrals.
- Describe building methods used for church construction in the Middle Ages, compare to present-day methods, and identify principles of physics employed in this construction.
- Locate and download blueprints of cathedrals.
- Describe the role of the church in France during the Middle Ages.
- Choose one cathedral and become an "expert" about it. Research the history, styles of architecture, building materials, and particular points of interest to any tourist.

Extended Activities

- Create a brochure for visitors to the French cathedral, emphasizing the history and noteworthy points about the cathedral.
- Create a brochure for visitors to a special building in your community, emphasizing the history and noteworthy features of that building.

Evaluation

Individuals will be evaluated on several different aspects of this assignment—historical accuracy of their research, their use of French, understanding of the role of the Church during the Middle Ages, and the quality of information about the local church. Students may want to present their findings through an electronic slide presentation, architectural models, and/or oral presentations.

Related Standards of Learning

English: 9.4, 9.8, 10.10

History and Social Science: WHI.12

Science: PH. 1

Mathematics: G. 3, 11

This lesson plan came from Petersburg High School.

Jacquelyn J. Hopkins, Librarian

William Lawhon, Building Trades teacher

William Richardson, French teacher

Julianne Roman-Daffron, Social Studies teacher

It's Your School

Subjects

Architectural Drawing and Design, English, Journalism

Objectives

- Design and distribute a survey related to desirable features of a new high school.
- Compile and present survey data.
- Create an architectural drawing of the building that incorporates desired features.

Students conduct a school-wide survey to determine the most important design features of a new school. They create an architectural drawing of the building and present it before the local school board.

Related Academic Standards of Learning

English: 12.1

This lesson plan came from Roanoke County Public Schools.

Cave Spring High School

Angie Griffin, Journalism teacher

Scott Hamilton, Architectural Drawing and Design teacher

Linda Johnson, English teacher

Planning around an Earthquake*

Subjects

Computer Technology, Science, Architectural Drawing and Design

Objectives

- Identify regions of the Earth where earthquakes occur.
- Apply knowledge of liquefaction in making a decision about building locations.
- Design and construct an earthquake-resistant building.
- Design an experiment to test ways of making a house resist landslides.

Real-World Application

Advanced problem-solving skills make it possible to prevent catastrophic damage from an earthquake.

Materials needed

- Maps, reports, and reference materials
- Computer simulation software
- Drawing materials and software
- Building materials (for models)

Activities

- Students research the construction methods and building materials used in actual communities that have experienced earthquakes.
- Working in teams of five or six, students design a city for a geographical area with a high risk of earthquake activity. Teams must develop a plan for an area that is within three miles on each side and includes a body of water, access to an existing highway, and varied terrain.
- As a site development team, students role play experts choosing from a geologist, chief of transportation, director of utilities, city planner, architect, and civil engineer.

Evaluation

Student projects must meet the following criteria:

- Quality recommendations for site locations, building design, and road and bridge construction, according to teachers and career professionals (consultants)
- Models to withstand simulated earthquake activity

* Lesson implemented in cooperation with business partners NAS OCEANA, Old Dominion University School of Engineering, and the Virginia Beach City Engineer

Related Academic Standards of Learning

Science: ES.1, ES.2

This lesson plan came from Virginia Beach City Public Schools.

Corporate Landing Middle School

Tom Dulaney and Janet Pugh, Exploring Technology teachers

Tonia McCree, Gifted and Talented resource teacher

Donna Schucker, Science teacher

Robin Warren, Computer Exploratory teacher

Green Building Infusion Units

The Green Building Infusion Unit (GBIU) was designed to encourage teachers to infuse instructional units on green building knowledge and skills into designated CTE courses. The infusion unit is not mandatory, and, as such, the tasks/competencies are marked as “optional,” to be taught at the instructor’s discretion.</p></div>

Entrepreneurship Infusion Units

Entrepreneurship Infusion Units may be used to help students achieve additional, focused competencies and enhance the validated tasks/competencies related to identifying and starting a new business venture. Because the unit is a complement to certain designated courses and is not mandatory, all tasks/competencies are marked “optional.”

Appendix: Credentials, Course Sequences, and Career Cluster Information

Industry Credentials: Only apply to 36-week courses

- Architectural Apprentice Drafter Examination
- Architectural Certified Drafter Examination
- Architectural Drafting Assessment
- Architectural Drafting Examination
- Autodesk Certified Professional Examinations
- Autodesk Certified User Examinations
- College and Work Readiness Assessment (CWRA+)
- National Career Readiness Certificate Assessment
- Workplace Readiness Skills for the Commonwealth Examination

Concentration sequences: *A combination of this course and those below, equivalent to two 36-week courses, is a concentration sequence. Students wishing to complete a specialization may take additional courses based on their career pathways. A program completer is a student who has met the requirements for a CTE concentration sequence and all other requirements for high school graduation or an approved alternative education program.*

- Advanced Drawing and Design (8438/36 weeks)
- Construction Technology (8431/36 weeks)
- Construction Technology (8432/18 weeks)
- Digital Visualization (8459/36 weeks)
- Engineering Drawing and Design (8436/36 weeks)
- Engineering Drawing and Design (8493/18 weeks)
- Technical Drawing and Design (8434/18 weeks)
- Technical Drawing and Design (8435/36 weeks)

Career Cluster: Architecture and Construction	
Pathway	Occupations
Construction	Cabinetmaker Carpenter Construction and Building Inspector Construction Manager Drywall Installer Electrician General Contractor Mason Plumber, Pipefitter Project Manager Roofer Tile Installer
Design/Pre-Construction	Architect Architectural Drafter

Career Cluster: Architecture and Construction	
Pathway	Occupations
	Building Code Inspector Civil Engineer Cost Estimator Electrical Engineering Technician Interior Designer Landscape Architect Mechanical Drafter Mechanical Engineer Surveyor
Maintenance and Operations	Cabinetmaker Carpenter Construction and Building Inspector Electrician Mason Plumber, Pipefitter Restoration Technician Roofer Tile Installer

Career Cluster: Arts, Audio/Video Technology and Communications	
Pathway	Occupations
Audio and Video Technology and Film	Multimedia Artist, Animator
Performing Arts	Technical Director
Visual Arts	Interior Designer