Unit 06: Architectural Design Influences

Content Area: **Applied Technology**
Course(s):
Time Period: **Marking Period 2**
Length: **4 Weeks**
Status: **Published**

Brief Summary of Unit

Introduction: Students develop an understanding of why buildings look a certain way. Students will study historically significant buildings and lessons about design influences. These explorations will lead students to design an institutional building like a post office, bank, or government office building.

Revision Date: July 2023

Essential Questions/Enduring Understandings

Essential Questions

What is the design loop and how is it used?

What influences building design?

What is a presentation drawing?

Enduring Understandings

Building design is influenced in large part by its function and historical buildings

Effective presentation drawings demonstrate an understanding of the principles of architecture.

Objectives

Students Will Know:

Key terms: design, layout, graphics, space planning, classicism, modernism.

A variety of historically significant architects such as Le Corbusier and Vitruvius, and how their works are relevant in the development of design in today's world.

How function affects building design. The fundamental principles of architecture include how scale,

proportion, order, and other criteria are used in design.

How to evaluate and re-evaluate the elements of a design to develop it.

How to create presentation drawings that communicate the elements of a building that reinforce the principles of architecture.

How to make careful observations and relate them to a new design.

Students Will Be Skilled At:

How a building's design is influenced in large part by its function and the significant buildings that have come before it.

Effective presentation drawings demonstrate an understanding of the principles of architecture.

Effective research involves careful observation and consideration of elements.

knowledge of historically important treatises can help the designer focus on important issues that can result in a better building design.

Designing and organizing presentations.

Learning Plan

Preview the essential questions and connect to learning throughout the unit.

Guiding questions: What does a bank, city hall, or school look like? Why? What does a church look like? Why? What are the elements of a Levittown house? What is common with your house and The Glasshouse (or other modern house)? What is important in architectural design? What are the “fundamental principles of architecture?” Does history matter when designing a building? How does the history of buildings influence design? Where in the design loop is there a place for history and research? Does history play a role in building design? What is communicated in presentation drawings? What does the designer need to do to make a better building? (Observe)

Lecture & class discussion about the overarching goals, and essential questions.

Recurrent class activities like freehand drawing to enhance observation skills.

Possible use of a sketchbook to enhance freehand drawing and observation skills.

A poster summarizing a book like Vitruvius, The Ten Books of Architecture, or another book/architect/movement.

Formative assessments will be conducted throughout the design process.

Design problem: A Post Office-a building that has modern functions and aesthetic expectations.

Summative assessment will be conducted by the student and teacher using a rubric specific to the research problem which may include student-driven goals.

Formative assessments will be conducted throughout the design process.

Design problem: create a program (design brief) and design a commercial or public building that responds to a treatise.

Summative assessment will be conducted by the student and teacher using a rubric specific to the design problem which may include student-driven goals.

The project solution will be included in a digital portfolio. A written description that uses discipline-specific language will be part of the presentation. The presentation will be presented to peers and others. The presentation will be graded with rubrics.

Complete the writing prompt.

Suggested Technology:

INTERNET resources

CAD and other software programs

Smart Board use for presentation and interactive lessons

Virtual Field Trips

Assessment

Formative

Meaningfully address the essential and guiding questions of this unit of study.

Meaningfully participate in guided question and answer sessions, group and individual discussions, and show an understanding of the purpose of the unit lesson(s), and their key terms and concepts.

Exit ticket

Demonstrate the ability to utilize the design loop as a problem-solving tool.

Complete the writing prompt. Example: Successful buildings, regardless of when they are built have certain common factors….

Summative

Design and create presentation drawings for a library that demonstrates the principles explored in a treatise. Presentation to be evaluated with the use of teacher and student-designed rubrics.

Design and create presentation drawings for a commercial or public building that demonstrates the principles explored in a treatise. Presentation to be evaluated using teacher and student-designed rubrics.

The presentation will be included in an electronic portfolio.

Pass written quizzes and tests about subject materials.

Benchmark

Midterm Exam/Final Exam

Alternative Assessment.

Perform research on a historical building and relate the work to a treatise.

Materials

Computer lab with AutoCAD software, one computer per student

White board with projector or Smartboard

CADD Lab including 3d printers, drill press, scroll saw and power drill, soldering iron, xacto knives, and hand tools.

Standards

CS.9-12.8.2.12.ED.1	Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.
CS.9-12.8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.
CS.9-12.8.2.12.ED.4	Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.
CS.9-12.8.2.12.ED.5	Evaluate the effectiveness of a product or system based on factors that are related to its requirements, specifications, and constraints (e.g., safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, ergonomics).
CS.9-12.ED	Engineering Design
LA.RST.9-10	Reading Science and Technical Subjects

LA.RST.9-10.2	Determine the central ideas, themes, or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
LA.RST.9-10.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
LA.RST.9-10.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.
LA.RST.9-10.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LA.RST.9-10.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
SCI.HS.ETS1.A	Delimiting Engineering Problems
SCI.HS.ETS1.B	Developing Possible Solutions
SCI.HS.ETS1.C	Optimizing the Design Solution
SCI.HS-ETS1-1	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
SCI.HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
WRK.9.2.12.CAP	Career Awareness and Planning
WRK.9.2.12.CAP.4	Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.
WRK.9.2.12.CAP.5	Assess and modify a personal plan to support current interests and post-secondary plans.
WRK.9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.
WRK.9.2.12.CAP.7	Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest.
TECH.9.4.12.TL	Technology Literacy
TECH.9.4.12.TL.1	Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task (e.g., W.11-12.6.).
TECH.K-12.1.1	Empowered Learner
TECH.K-12.1.1.a	articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.
TECH.K-12.1.1.b	build networks and customize their learning environments in ways that support the learning process.
TECH.K-12.1.1.c	use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.
TECH.K-12.1.2	Digital Citizen
TECH.K-12.1.2.c	demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.
TECH.K-12.1.2.d	manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online.
TECH.K-12.1.3	Knowledge Constructor

TECH.K-12.1.3.a	plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
TECH.K-12.1.3.c	curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
TECH.K-12.1.3.d	build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.
TECH.K-12.1.4	Innovative Designer
TECH.K-12.1.4.a	know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
TECH.K-12.1.4.b	select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
TECH.K-12.1.4.c	develop, test and refine prototypes as part of a cyclical design process.
TECH.K-12.1.6	Creative Communicator
TECH.K-12.1.6.a	choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
TECH.K-12.1.6.b	create original works or responsibly repurpose or remix digital resources into new creations.
TECH.K-12.1.6.c	communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.
TECH.K-12.1.6.d	publish or present content that customizes the message and medium for their intended audiences.
	Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.
	Craft and Structure
	Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities.
	Engineering design is a complex process in which creativity, content knowledge, research, and analysis are used to address local and global problems. Decisions on trade-offs involve systematic comparisons of all costs and benefits, and final steps that may involve redesigning for optimization.
	Integration of Knowledge and Ideas
	Asking Questions and Defining Problems
	Analyze complex real-world problems by specifying criteria and constraints for successful solutions.
	Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.
	Engineering design evaluation, a process for determining how well a solution meets requirements, involves systematic comparisons between requirements, specifications, and constraints.
	Constructing explanations and designing solutions 9–12 builds on K – experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories.
	When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and

environmental impacts.

Constructing Explanations and Designing Solutions

Career planning requires purposeful planning based on research, self-knowledge, and informed choices.

Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them.

Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (tradeoffs) may be needed.

Integrated Accommodation and Modifications, Special Education students, English Language Learners, At-Risk Students, Gifted and Talented students, Career Education, and those with 504s