Unit 08: Landscape Architecture

Content Area: **Applied Technology**
Course(s):
Time Period: **Marking Period 3**
Length: **5 Weeks**
Status: **Published**

Brief Summary of Unit

Introduction: Students will study historically important parks as inspiration and reference for their own landscape design solutions. Students will make professional and informed design choices when designing landscapes, locating buildings, and other improvements.

Revision Date: July 2023

Essential Questions/Enduring Understandings

Essential Questions

How do landscape architects solve problems?

What is landscape architecture?

How do landscape architects communicate solutions to a design?

Enduring Understandings

Landscape design is a technological response to a problem.

Sustainable design relates to ecological and environmental concerns.

Objectives

Students Will Know:

key terms: grade, contour line, slope, English Garden, French Garden, Japanese Garden, sustainable design, park, garden.

the characteristics of a Japanese, French, and English garden.

important historical gardens, including those in our area.

the characteristics of common flora used in gardens and parks in our climate.

how to draw, and communicate graphically, elements of a garden.

what sustainable design is.

how to design and communicate through drawings the design for a park.

how to critically choose elements for and make a model of a park.

Students Will Be Skilled At:

developing plans for gardens that demonstrate sustainability, and historical precedent that are communicated effectively through drawings and models.

designing parks and foundation plantings.

making informed decisions about choosing flora for a garden.

Learning Plan

Pre-assessment to determine the direction of work.

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

Lecture and discussion about the guiding questions.

Possible field trip to parks in the area.

Formative assessments will be conducted throughout the research problem.

Research problem(s): What are the characteristics of a Japanese or other type of garden?

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 assessment will be conducted thorough out the process with class discussion, student writing, practice quiz, and review of student work.

Formative assessments will be conducted throughout the design process.

Design problem: design a park in an urban (or suburban downtown) area that applies the concepts from the research. Create drawings and a model.

Design problem: modify existing park plans.

Design problem: remodel a courtyard.

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

Formative assessments will be conducted throughout the design process.

Design problem: design a house that employs strategies to heat and cool efficiently. Summative assessment will be conducted by the student and teacher using a rubric specific to the research problem which may include student-driven goals.

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

Complete quizzes and test.

Assessment

Formative

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

Guiding questions: What are the characteristics of French and English gardens? Is there a difference between a park and a garden? What other types of gardens are there? Have you ever been to a park in a downtown or urban area? What are the characteristics of Bryant Park and Paley Park and The High Line? (provide images)

exit ticket

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

Summative

Design a park in an urban setting that applies the principles of the unit. The presentation will include drawings and a model. Evaluation will be based on both teacher and student designed rubrics.

Assess digital presentation using a rubric.

Complete written tests and quizzes on unit topics and vocabulary.

Benchmark

Midterm Exam/Final Exam

Alternative Assessment

Research a garden type (like Japanese), and provide an oral report & visual presentation of the garden. Evaluation will be based on both teacher and student designed rubrics.

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

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.3	Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis.
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.9-12.8.2.12.ED.6	Analyze the effects of changing resources when designing a specific product or system (e.g., materials, energy, tools, capital, labor).
CS.9-12.ED	Engineering Design
LA.RST.9-10	Reading Science and Technical Subjects
LA.RST.9-10.1	Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions.
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.9-10.5	Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LA.RST.9-10.6	Determine the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.
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.9-10.8	Determine if the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.
LA.RST.9-10.9	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
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-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
SCI.HS-ETS1-3	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.
SCI.HS-ETS1	Engineering Design
SCI.HS-ETS1-4	Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.
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.
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.c	use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.
TECH.K-12.1.1.d	understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
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.b	evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.
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-12.1.4.d	exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
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.
	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.
	Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.
	Integration of Knowledge and Ideas
	Asking Questions and Defining Problems
	Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative 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.
	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.
	Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems.
	Using Mathematics and Computational Thinking
	Constructing Explanations and Designing Solutions

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.

Mathematical and computational thinking in 9–12 builds on K–8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.

Range of Reading and Level of Text Complexity

Engineering design evaluation, a process for determining how well a solution meets requirements, involves systematic comparisons between requirements, specifications, and constraints.

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.

Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs.

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

Key Ideas and Details

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