Unit 1: Fundamentals of Architectural Drafting

Content Area: **Applied Technology**
Course(s):
Time Period: **Marking Period 1**
Length: **2 weeks**
Status: **Published**

Summary

Students will develop drafting skills and create a floor plan, with section and elevation of a one-story building with a basement. Students will use drawing boards and classic tools to develop an understanding of how the three drawings are interrelated and form a detailed whole. Students will become familiar with common sizes of windows, doors, walls, and structural elements. Students will use established techniques and organization methods to create the drawings. These drafting strategies and building elements will be used when students make the same building on the computer in the next unit. Climate change and its effects on building design are introduced.

Revision Date: July 2024

Essential Questions/Enduring Understandings

Essential Questions

Why are technical drawings made?

Why is it important to develop technical drawing skills?

Why is it important to know the sizes of elements in a building?

Enduring Understandings

Knowing the conventional sizes of elements and systems takes away the guesswork, leaving time to pursue other design considerations.

Drawings are used in industry to communicate technical content with clients, builders, and town officials.

Drawing conventions are a universal technical visual language of communication.

Successful drawings effectively communicate information to different audiences.

Objectives

Students Will Know:

key terms and vocabulary including but not limited to scale, line type: construction line, object line, plan, section, elevation, pencil hardness (i.e. H, HB, 2H, #2, #3, #4), architect’s scale.

traditional drafting skills including but not limited to the use of t-squares, triangles, pencils, erasers, and templates.

how to form block letters.

how plans, sections, and elevation drawings are interrelated.

successful drawings communicate effectively to their intended audience.

the intended audience for the drawings in class is a client.

that plans are used as a geometric basis for generation of sections and elevations.

how to use an architect's scale.

a code compliant layout for a bathroom-a mechanical system.

the conventions of technical drawing including but not limited to: walls, windows, doors, thresholds, and lettering

that dimensions reflect the priorities of a design.

some design elements have fixed and minimum sizes while others are flexible.

buildings are designed to respond to the environment.

Students will be Skilled at:

making plans, sections, and elevations of a building.

using an architect's scale.

drawing building elements using established conventions.

Learning Plan

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

Provide students with INTERNET resources that illustrate skills: how to use a scale, how drawings relate to one another.

Demonstration and student practice of proper use drafting equipment, including, pencils, t-square, circle templates, triangles, drawing boards, erasing shields etc.

Suggested activity: using traditional materials, students draw to-scale, a plan, section and elevation of a house.

Teacher will provide formative and summative assessments throughout the process.

Demonstration and student practice of use of an architect's (or other) scale.

Demonstration and practice of how plan drawings and other types of drawing are made when topical.

Text book for reference: Architecture, residential drawing and design by Kicklighter.

Assessment

Formative Assessment:

Demonstrate knowledge and understanding of vocabulary through correct usage through class and individual discussion and check ins.

Demonstrate knowledge of sizes of elements and systems in a building during class and individual check-ins

Participation in class discussion

Exit Tickets

Sketch book

Summative assessment:

Create to-scale plan, section and elevation drawings that use traditional drafting techniques.

Answer the essential questions.

Be able to demonstrate the relationship between different drawing types

Create to-scale plan, section and elevation drawings from a single sketch.

Complete writing prompts: Example: Drawings communicate many things. List what is communicated and prioritize which are the most and least important.

Test: Explain how the information in a plan drawing is used in a section and elevation drawing. Explain what information is contained in plans, sections and elevations. Describe what scale is and how it is used. Explain what a convention is and why it is used in drawing.

Benchmark assessment:

Final exam.

Alternate Assessment:

Presentation on drafting equipment

Materials

Drawing boards

Triangles

Scales

T-squares

Templates

Erasing shields

Pencils of varying hardness

Erasers

Masking tape

Paper for drafting

core book list

Standards

ELA.K-12.1	Developing Responsibility for Learning: Cultivating independence, self-reflection, and responsibility for one's own learning.
ELA.K-12.5	Leveraging Technology: Employing technology and digital media thoughtfully, strategically and capably to enhance reading, writing, speaking, listening, and language use.
MATH.9-12.A.REI	Reasoning with Equations and Inequalities
MATH.9-12.A.REI.A	Understand solving equations as a process of reasoning and explain the reasoning
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.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.EC	Ethics & Culture
CS.9-12.ED	Engineering Design
SCI.HS.ETS1.A	Delimiting Engineering Problems

SCI.HS-ESS3-5	Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.
SCI.HS-ETS1	Engineering Design
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.
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.
WRK.9.2.12.CAP.8	Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.
TECH.9.4.12.CI	Creativity and Innovation
TECH.9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
TECH.9.4.12.CI.2	Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).
TECH.9.4.12.CI.3	Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).
TECH.9.4.12.CT	Critical Thinking and Problem-solving
TECH.9.4.12.CT.1	Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).
TECH.9.4.12.CT.2	Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).
TECH.9.4.12.CT.3	Enlist input from a variety of stakeholders (e.g., community members, experts in the field) to design a service learning activity that addresses a local or global issue (e.g., environmental justice).
TECH.9.4.12.TL	Technology Literacy
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.
	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.
	Analyzing and Interpreting Data
	With a growth mindset, failure is an important part of success.
	Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed.
	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.
	Constructing Explanations and Designing Solutions
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	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.
	Constructing explanations and designing solutions in 9–12 builds on K–8 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.
	Collaborative digital tools can be used to access, record and share different viewpoints and to collect and tabulate the views of groups of people.
	An individual’s income and benefit needs and financial plan can change over time.
	Key Ideas and Details
	The ability to ethically integrate new technologies requires deciding whether to introduce a technology, taking into consideration local resources and the role of culture in acceptance. Consequences of technological use may be different for different groups of people and may change over time. Since technological decisions can have ethical implications, it is essential that individuals analyze issues by gathering evidence from multiple perspectives and conceiving of alternative possibilities before proposing solutions.
	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.
	Innovative ideas or innovation can lead to career opportunities.
	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.

Integrated Accommodation and Modifications

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