Unit 02: Conventions in Drawing

Content Area: **Applied Technology**
Course(s):
Time Period: **Marking Period 1**
Length: **4 Weeks**
Status: **Published**

Summary

Students will expand and explore conventions in drawings and drawing standards. Plans, sections, and elevations of a 2 story house will be prepared to demonstrate knowledge of dimensioning, titles, and symbols. The drawings will be included in a digital portfolio. Topics from Introduction to Computer Aided Design will be reviewed and reinforced including standard sizes of building building materials and organization.

Revision Date: July 2023

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

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.

Objectives

Students Will Know:

key terms and vocabulary including but not limited to: scale, line type: construction line, object line, plan, section, elevation.

how to form block letters.

how plans, sections and elevation drawings are interrelated.

successful drawings communicate effectively to their intended audience.

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

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

standards for the design of stairs.

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

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

Students will be Skilled at:

making plans, sections and elevations of a building.

drawing building elements using established conventions.

Assessment

Formative Assessment:

Students are to complete a 'sketch project' and the teacher is to evaluate the work with a rubric.

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 discussions.

Exit Tickets.

Sketchbook

Summative assessment:

Create a to-scale plan, section, and elevation drawings that effectively use conventions.

Answer the essential questions.

Be able to demonstrate the relationship between different drawing types

Create a 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.

Assess presentation in a digital portfolio with a rubric.

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:

Midterm exam/Final exam.

Alternate Assessment:

Presentation

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.ED	Engineering Design
LA.RST.9-10	Reading Science and Technical Subjects
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.9-10.10	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.ESS2.C	The Roles of Water in Earth's Surface Processes
SCI.HS.ESS3.C	Human Impacts on Earth Systems
SCI.HS.ESS3.D	Global Climate Change
SCI.HS.ETS1.A	Delimiting Engineering Problems
SCI.HS.ETS1.B	Developing Possible Solutions
SCI.HS.ETS1.B	Developing Possible Solutions
SCI.HS.ETS1.C	Optimizing the Design Solution
SCI.HS-ESS3-4	Evaluate or refine a technological solution that reduces impacts of human activities on climate change and other natural systems.
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.
SCI.HS-ETS1	Engineering Design
WRK.9.2.12.CAP	Career Awareness and Planning
TECH.K-12.1.1	Empowered Learner
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
	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.
	Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.
	Analyze complex real-world problems by specifying criteria and constraints for successful solutions.
	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.
	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

Integration of Knowledge and Ideas

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 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.

Emphasis is on the conservation, recycling, and reuse of resources (such as minerals and metals) where possible, and on minimizing impacts where it is not. Examples include developing best practices for agricultural soil use, mining (for coal, tar sands, and oil shales), and pumping (for petroleum and natural gas). Science knowledge indicates what can happen in natural systems—not what should happen.

Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.

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.

Craft and Structure

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 knowledge, principles, and theories.

Key Ideas and Details

Range of Reading and Level of Text Complexity

Through computer simulations and other studies, important discoveries are still being made about how the ocean, the atmosphere, and the biosphere interact and are modified in response to human activities.

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Design or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.

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.

Constructing Explanations and Designing Solutions

Constructing Explanations and Designing Solutions

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