Unit 2.1 Building Design & Construction

Content Area: **Science**
Course(s): **Civil Eng & Arc**
Time Period: **Semester 1**
Length: **3 weeks**
Status: **Published**

Standards

Key Ideas and Details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. (AS.R.1)

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone. (AS.R.4)

7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words. (AS.R.7)

10. Read and comprehend complex literary and informational texts independently and proficiently. (AS.R.10)

Text Types and Purposes

7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation. (AS.W.7)

9. Draw evidence from literary or informational texts to support analysis, reflection, and research. (AS.W.9)

Comprehension and Collaboration

2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally. (AS.SL.2)

Conventions of Standard English

6. Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression. (AS.L.6)

ED	Engineering Design 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.
8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback. Engineering design evaluation, a process for determining how well a solution meets requirements, involves systematic comparisons between requirements, specifications, and

	constraints.
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).
NT	Nature of Technology
	Engineers use science, mathematics, and other disciplines to improve technology. Increased collaboration among engineers, scientists, and mathematicians can improve their work and designs. Technology, product, or system redesign can be more difficult than the original design.
TEC.9-12.8.2.12	All students will develop an understanding of the nature and impact of technology, engineering, technological design and the designed world as they relate to the individual, global society, and the environment.
TEC.9-12.8.2.12.F.1	Determine and use the appropriate application of resources in the design, development, and creation of a technological product or system.
TEC.9-12.8.2.12.F.3	Select and utilize resources that have been modified by digital tools in the creation of a technological product or system (CNC equipment, CAD software).

Enduring Understandings

- Many residential structures are constructed with wood framing systems and are built using standard practices.
- A variety of roof shapes and materials are available for residential structures to address aesthetic preferences, carry design loads, and meet environmental challenges.
- Designers design, modify, and plan structures using 3D architectural software.
- Architects and engineers use a variety of views to document and detail a building project on construction drawings.

Essential Questions

- Why is wood so often used for residential buildings?
- What alternatives to wood frame construction are available and what are the advantages and disadvantages of each?
- How are trusses able to span large distances?
- What framing systems are used to support residential roofs?
- How are different roof styles and pitches related to different architectural styles?

Knowledge and Skills

- Identify typical components of a residential framing system.

- Recognize conventional residential roof designs.
- Model a common residential roof design and detail advantages and disadvantages of that style.
- Use 3D architectural software to design, model and document a small building.

Assessments

https://docs.google.com/document/d/1wR7bQF-8AQoRrt0g4C3hKja0yjwDjC9_BiAmONWbTcI/edit

Modifications

https://docs.google.com/document/d/1ODqaPP69YkcFiyG72fIT8XsUIe3K1VSG7nxuc4CpCec/edit

Resources

- KT BuildingDesignConstruction.doc
- WoodFrameSystems.doc
- WoodFrameSytems.ppt
- RoofSystems.doc
- ResidentialRoofTypes.ppt
- RoofSystemsRubric.doc
- UtlityShedDesign.doc
- UtlityShedDesign.doc
- UtilityShedRubric.doc
- ResidentialWallSystems.ppt
- UtilityShedConstructionExample.ppt