

Unit 3 Commercial Applications, Lesson 3.3 Services and Utilities Lesson Plan

COURSE:

Civil Engineering and Architecture (Honors)

TEACHER:

Jason D. Redd

DURATION:

8 Days

STANDARDS:

This course connects to standards in the following:

- Common Core State Standards for English Language Arts Anchor Standards
- Common Core Standards for Mathematics
- Common Core English Language Arts Standards
- Next Generation Science Standards
- Standards for Technological and Engineering Literacy

PLTW FRAMEWORK:

Provided by Project Lead the Way (PLTW), the PLTW Framework provides an overview of the levels of understanding that each student will build upon throughout the lesson/unit. It includes: Established Goals, Transfer, Understandings, Knowledge and Skills, and Essential Questions. The most fundamental level of learning is defined by course Knowledge and Skills statements. Each Knowledge and Skills statement reflects course content. Students apply Knowledge and Skills to achieve Learning Objectives, which are skills that directly relate to the workplace or applied academic settings.

Established Goals

It is expected that students will:

- Demonstrate an ability to identify, formulate, and solve engineering problems.
- Demonstrate an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- Demonstrate an ability to design and conduct experiments, analyze data, and draw conclusions.

- Understand the impact of engineering solutions in a global, economic, environmental, and societal context. In this unit, understand the economic and environmental consequences of energy consumption and energy efficiency of buildings.

Understandings

Students will understand that:

- When utilities are not available within a reasonable distance to be economically brought on site, substitutions must be designed and constructed.
- Utilities and systems must be properly sized to minimize cost and appropriately serve the project.
- Responsible designers anticipate the needs and requirements of the users.
- The design of mechanical systems impacts the architectural and structural design of a building.
- Energy codes are designed to conserve natural resources, reduce operating costs, protect the environment, and create healthier living and working spaces. They dictate the minimum requirements for the building envelope, lighting, mechanical systems, and service water heating for commercial facilities.
- The design of internal systems is documented with construction drawings specific to each system.

Knowledge and Skills

Knowledge: Students will:

- Identify typical utility services required for a commercial building, transmission/distribution methods for each utility, and methods for measuring usage.

Skills: Students will:

- Interpret and apply code requirements and constraints as they pertain to the installation of services and utilities.
- Apply criteria and constraints to size and locate the new utility service connections for a commercial facility.
- Modify system designs to incorporate energy conservation techniques.
- Read and understand HVAC construction drawings for a commercial project.

ESSENTIAL QUESTIONS:

Students will keep considering:

- How does the design of the utility systems for a building affect the overall design of the building?
- How does the International Energy Conservation Code (IECC) support the goal of green building and sustainable architecture?

EQUIPMENT / MATERIALS / RESOURCES:

Students will need or utilize:

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| ☒ Assignment Handouts / Instructions | ☒ Online Resources |
| ☒ CAD Software | ☒ Other Software |
| ☒ Classroom Materials / Equipment | ☒ Schoology |
| ☒ Computer / Device | ☒ Teacher Handouts |
| ☒ Internet Access | ☐ Other: |
| ☒ Microsoft Office Software | |

- ☒ Peer Evaluation / Reflection
- ☐ Performance-Based (Skills) Assessment
- ☒ Project / Presentation
- ☒ Student Reflection

- ☒ Teacher Observation
- ☒ Test / Quiz
- ☐ Other:

TEACHER REFLECTION / ADDITIONAL NOTES:
