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# Park Hill School District

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Building Successful Futures • Each Student • Every Day

## High School PLTW Civil Engineering and Architecture Curriculum

**Course Description:** This course involves a long-term project that develops a local property site. As students learn the various aspects of civil engineering and architecture, they apply what they learn to the design and development of this property. It gives all students a variety of experiences that provide an overview of both fields. Students work in teams, exploring hands-on projects and activities to learn the characteristics of civil engineering and architecture. © 2014 Project Lead The Way

### Scope and Sequence:

Unit
Overview of Civil Engineering and Architecture
Residential Design
Commercial Applications
Commercial Building Systems

## Unit 1: Overview of Civil Engineering and Architecture

**Subject:** PLTW Civil Engineering and Architecture

**Grade:** 10 - 12

**Name of Unit:** Overview of Civil Engineering and Architecture

**Overview of Unit:** Unit 1 provides an introduction and overview to the past accomplishments within the fields of civil engineering and architecture as well as a brief introduction to the wide variety of careers within the fields of civil engineering and architecture.

### Topic 1: Overview of Civil Engineering and Architecture

Activity	Title
Lesson 1.1	History of Civil Engineering and Architecture
Lesson 1.2	Careers in Civil Engineering and Architecture

## Unit 2: Residential Design

**Subject:** PLTW Civil Engineering and Architecture

**Grade:** 10 - 12

**Name of Unit:** Residential Design

**Overview of Unit:** This unit of study introduces students to standard practice in the design of single family homes and provides an opportunity for students to develop a small single family home design that incorporates sustainable design practices as well as universal design features. Students will be introduced to building codes and their impact on design as well as common wood-framed residential construction techniques and practices. Students also will investigate the cost of construction and the significant impact of the choice of construction materials and practices on the ongoing cost of energy for heating and cooling. They will apply this knowledge to the design of a small, affordable home.

### Topic 1: Residential Design

Activity	Title
Lesson 2.1	Building Design and Construction
Lesson 2.2	Cost and Efficiency Analysis
Lesson 2.3	Residential Design

## Unit 3: Commercial Applications

**Subject:** PLTW Civil Engineering and Architecture

**Grade:** 10 - 12

**Name of Unit:** Commercial Applications

**Overview of Unit:** This unit will provide students with an opportunity to discover the diversity and complexity of commercial building design as they design a renovation to a commercial facility. The design of commercial facilities includes multiple building systems and involves a wide range of engineering and architectural considerations. In this unit students will learn about site considerations important to the function of the building. Students will learn about common built-up systems that provide the building envelope such as wall and roofs. They will learn about the utilities and services that supply power, water, and communication services to the building. In addition students will learn about common structural systems employed to support all of the building components. Applying the knowledge they gain from this unit of study, students will design a renovation to a commercial facility and document that design using 3D architectural software.

### Topic 1: Commercial Applications

Activity	Title
Lesson 3.1	Commercial Building Systems
Lesson 3.2	Structures
Lesson 3.3	Services and Utilities
Lesson 3.4	Site Considerations

## Unit 4: Commercial Building Design Problem

**Subject:** PLTW Civil Engineering and Architecture

**Grade:** 10 - 12

**Name of Unit:** Commercial Building Design Problem

**Overview of Unit:** This unit will allow students to collaborate on the design and documentation of a small commercial facility within a project design team. They will identify a need within their community, investigate a potential site, develop a preliminary design, and document the design of the facility as a team. They will also present their design concept to a panel that will critique their design and offer feedback to the team related to their design and presentation.

### Topic 1: Commercial Building Design Problem

Activity	Title
Lesson 4.1	Commercial Building Design Problem
Lesson 4.2	Commercial Building Design Presentation