

Course Syllabus

Project Lead the Way: Design and Modeling—Grade 6, 7 and 8

Teacher: Zitlalpilli Luna

School: Lathrop Intermediate School

Year: 2022-2023

This syllabus includes the following information:

Outline and Project Lead the Way Performance Objectives

Methods of Assessment

Class Procedures and Rules

Course Rationale

Project Lead the Way is an inquiry-based program that enhances technological literacy and prepares students for life in the 21st century.

Course Prerequisites and Academic Essential Functions

The student must be able to read independently and follow directions.

Resources

Project Lead the Way (PLTW) Curriculum and Resources

Unit: *Design and Modeling*

PLTW: Design and Modeling (DM) Course Outline

In this unit, students begin to recognize the value of an engineering notebook to document and capture their ideas. They are introduced to and use the Engineering design process to solve problems and understand the influence that creative and innovative design has on our lives. Students use industry standard 3D modeling software to create a virtual image of their designs. Students will bring their virtual images to life by building and testing their prototypes in a real world setting.

Lesson 1.1 What is Engineering?

Performance Objectives

- Assemble an engineering notebook and a portfolio.
- Explain the relationship between science, technology, engineering and math.
- Distinguish between invention and innovation.
- Describe engineering.
- Explain how engineers participate in or contribute to the invention and innovation of products
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Lesson 1.2 Design Process

Performance Objectives

- Describe the design process and how it is used to aid in problem solving.
- Use the design process to solve a technical problem.
- Describe the purpose and importance of working in a team.
- Explain a design brief and apply the concept when using the design process.
- Describe the elements of design and apply this concept to the design process.
- Use a decision matrix to select the best solution to a design problem.

Lesson 1.3 Measurement

Performance Objectives

- Demonstrate the ability to measure accurately with different devices and scales.
- Measure using both the Standard and Metric systems

Lesson 1.4 Sketching and Dimensioning Techniques

Performance Objectives

- Use visualization, spatial reasoning, and geometrics to sketch multiple dimensional shapes.

- Recognize and create thumbnail, perspective, isometric, and orthographic sketches.
- Recognize and accurately interpret one and two point perspective drawings.
- Communicate ideas for a design using various sketching methods, notes, and drafting views.
- Dimension an orthographic sketch following the guidelines of dimensioning.

Lesson 1.5 Designing for Production

Performance Objectives

- Create a three-dimensional (3D) model of an object.
- Apply geometric and dimension constraints to design CAD-modeled parts.
- Assemble the product using the CAD modeling program.
- Demonstrate the ability to produce various annotated working drawings of a 3D model.
- Identify the difference between a prototype, a model and a mock-up.
- Brainstorm and sketch possible solutions to an existing design problem.
- Learn how to 3D print models (optional.)

Projects:

Sketchup Pro: Scooter Wheel, Rubik's Cube, Puzzle, Rocket, Playground
 Onshape CAD: Do-it-yourself machine, individual projects throughout the semester
 Air Skimmers
 Designing the STEM Lab

Suggested Materials:

Throughout the year we use a great deal of hot glue sticks, duct tape, masking tape, and electrical tape, cardboard, and manila folders. I will provide a limited amount to students to build their prototypes. If students bring their own, it will allow for less restrictions on materials. The Egg Capsule Project involves students bringing in all the materials to build their design. Most of the materials can be obtained for free. If students cannot bring in materials, please contact me so I can obtain materials for them.

Procedures for Make-up Assignments

Students will have one week to make up an assignment. I encourage students to obtain the contact information from their teammates if they are going to be absent. Students are encouraged to come into my class during ace or lunch to complete their make-up work.

Class Procedures

Students will: Log into Google Classroom immediately when entering class to check the daily assignments. All safety regulations should be followed with tools. If students cannot handle the responsibility of working outside, with sharp tools, power tools, they will be given an alternate book related assignment.

Contact Information:

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PLTW Design and Modeling Syllabus Signature Form

I have reviewed and understand the PLTW Design and Modeling Syllabus:

Student (print) _____ *(sign)* _____ *Date:* _____

I have reviewed the PLTW Design and Modeling Syllabus:

Parent/guardian (print) _____ *(sign)* _____ *Date:* _____