

SWALLOW SCHOOL DISTRICT CURRICULUM GUIDE

Curriculum Area: **PLTW Design and Modeling**

Course Length: Semester

Grade: **7th**

Date Last Approved: June 2015

Stage 1: Desired Results

Course Description and Purpose:

This course introduces and explores the design process to solve problems and understand the influence of creativity and innovation in their lives. This course is “activity oriented” to further develop student knowledge of engineering and the design process to solve everyday problems. Students use industry standard 3D modeling software to create virtual images of their designs. This course will prepare students for future high school PLTW engineering courses.

Enduring Understanding(s):

1. Engineering and design are a part of every area of our lives because at their core engineers solve the problems and challenges we all face.
2. The Design Process is a logical and systematic tool that engineers use to solve problems.
3. Technological systems and products are an important part of today’s engineering process.
4. The role of troubleshooting, research and development, invention and innovation, and experimentation is an important part of the design process and problem solving.

Essential Question(s):

1. What are the skills of an engineer and why are they in such high demand in our modern technological world?
2. Why is it beneficial to understand how the design process works and how can it help me when solving complex problems?
3. What is the need for accurate and precision measurement and how can you determine the best method and tool when making measurements.
4. What is the importance of a design notebook and why will being able to convey ideas and communicate through sketching important in my life?
5. What are the advantages to 3D modeling and how can using a 3D modeling software enhance and support the design process?

Learning Targets:

1. Students can describe engineering and explain how engineers participate in or contribute to the invention and innovation of products (knowledge)
2. Students can apply the design process to formulate design solutions to solve a technical problem. (skill)
3. Students can describe and illustrate proper measurement and dimensioning techniques using a variety of tools. (skill)
4. Students can communicate ideas for a design using various sketching methods, dimensioning, notes, and drafting views. (knowledge/skill)
5. Students can describe and illustrate 3-D modeling and integrate reverse engineering concepts into design products. (reasoning/skill)

Stage 2: Learning Plan

I. What is Engineering?

- A. Introduction to Engineering
- B. STEM Investigation
- C. Engineering Careers

Standards:

Standards for Technological Literacy: 1.6-8.F, 1.6-8.G, 1.6-8.H, 3.6-8.D, 3.6-8.F, 4.6-8.D, 4.6-8.F, 4.6-8.G, 6.6-8.D, 6.6-8.E

Learning Targets Addressed:

Target 1

Assessment Map:

Type	Level	Assessment Detail
Practice	Knowledge Skill	In class activities
Formative	Knowledge Skill	Written response
Summative		

II. Design Process

- A. Design process
- B. Design Elements
- C. Hobby Organizer Design

Standards:

Standards for Technological Literacy: 8.6-8.E, 8.6-8.F, 8.6-8.G, 9.6-8.F, 9.6-8.G, 11.6-8.H, 11.6-8.I

Learning Targets Addressed:

Target 1
Target 2

Assessment Map:

Type	Level	Assessment Detail
Practice	Knowledge Skill	In class activities
Formative	Knowledge Skill	Written response
Summative		

III. Measurement

- A. Standard and metric measuring
- B. Precision Measuring
- C. Measurement Lab - Skimmer

Standards:

Standards for Technological Literacy: 6.6-8.D, 6.6-8.E, 7.6-8-D, 7.6-8-E, 12.6-8.H, 13.6-8.F

Learning Targets Addressed:

Target 3

Assessment Map:

Type	Level	Assessment Detail

Practice	Knowledge Skill	In class activities
Formative	Knowledge Skill	Written response
Summative		

IV. Sketching and Dimensioning

- A. Sketching Techniques
- B. Sketching Practice
- C. Orthographic Projection
- D. Dimensioning

Standards:

Standards for Technological Literacy: 11.6-8.J, 17.6-8.K

Learning Targets Addressed:

- Target 3
- Target 4

Assessment Map:

Type	Level	Assessment Detail
Practice	Knowledge Skill	In class activities
Formative	Knowledge Skill	Written response
Summative		

IV. Designing for Production

- A. Computer modeling fundamentals
 - I. Teach Me 3D
- B. Peg Board Toy
- C. Individual design

Standards:

Standards for Technological Literacy: 8.6-8.G, 9.6-8.F, 9.6-8.G, 9.6-8.H, 10.6-8.F, 10.6-8.G, 10.6-8.H, 11.6-8.H, 11.6-8.I, 11.6-8.J, 11.6-8.K, 11.6-8.L, 12.6-8.H, 12.6-8.J, 17.6-8.H, 17.6-8.K

Learning Targets Addressed:

- Target 1
- Target 2
- Target 3
- Target 4
- Target 5

Assessment Map:

Type	Level	Assessment Detail
Practice	Knowledge Skill	In class activities
Formative	Knowledge Skill	Written response
Summative		