**Design and Technology 2**

Course Description

This is the second course in a two semester sequence of courses that provides opportunities for students to explore technology. In Design and Technology II, students cover information on the following systems: structural, mechanical, fluid, and alternative energy. Students analyze applications of technology through a process of investigation and exploration in these fields which create and produce manufactured goods, products, structures, and services in our society.

Grade 9 - 12

Prerequisite: Design and Technology 1 or Consent of Instructor

Course Number: 107132

Course Expectations

Rationale: Design and Technology 2 introduces the student to the world of structural design, mechanical system usage, fluid power concepts, and alternative energy forms.

Time Frame: 1 semester

Standards Alignment

Missouri Standards: Content Strands (opens in a new window)

-Reading--Writing--Listening and Speaking--Information Literacy--Number and Operations--Algebraic Relationships--Geometric and Spatial Relationships--Measurement--Force and Motion--Inquiry--Science, Tech & Activity--Tools of Inquiry-

National Standards (opens in a new window)

National Educational Technology Standards for Students (NETS\*S)

Course Goals and Objectives

The students will develop skills in understanding and applying the design process to a wide variety of structural, mechanical, fluid, and alternative energy situations.

Enduring Understandings

The design process is applicable in all situations thoughout life. It impacts every facet of our daily life and is easily see. The design process is a very specific, systematic approach to solving problems but is applicable to solving a wide variety of structural problems. The proper selection and use of tools and materials needed for fabrication of structural components in a structure ensures design integrity. Working drawings or sketches are used to define the structural components and their function. Structural design understandings will help students be better consumers of manufactured products. The design process is a specific, systematic approach that often incorporates mechanical systems when solving a wide variety of problems. When we understand mechanical advantage and its application to a problem, it reduces the effort needed to manipulate or control our environment. Continued use of non-renewable energy resources may have long term negative consequences. Alternative energy resources must be explored and incorporated into our daily energy usage.

Essential Questions

How do the steps in the design process impact a products outcome? How is the design process a non-linear movement? What are the possible societial and environmental impacts from the design process? How are the steps in the design process related to the production or manufacture of the final product? How is the design process incorporated into structural systems encountered in our daily lives? How are sketches and working drawings incorporated into the design of structural systems? How are the six simple machines incorporated into mechanical systems encountered in our daily lives? How are sketches and working drawings incorporated into the construction of mechanical systems? How is the power of fluid systems incorporated into products we encounter in our daily lives? How are sketches and working drawings incorporated into the construction of fluid systems? What are the different types of renewable energy resources? What are the emerging renewable energy sources? Why is conserving energy important? What does it mean to be safe? What is the relationship between organization and success? How does being safe increase productivity in the workplace? In what ways can safety enhance performance?

Essential Vocabulary

Problem Identification

Brainstorming

Design Brief

Criteria

Working Drawings

Production Planning

Presentation

Beams

Span

Live Load

Dead Load

Deflection

Compression

Wheel and axle

levers

inclined plane

screw

wedge

pulley

complex machines

mechanical advantage

Bernuilli's Law

Gay-Lussac's Law

Charle's Law

Boyle's Law

Work

Schematics

Potential Energy

Kinetic Energy

Conservation

Course Materials: Representative Texts, Films and Resources

AutoDesk CAD and/or Inventor

FisherTech

Shop Consumables

**Units of Instruction**

1. Structural Systems

We use objects that are manufactured everyday. How is it all created? This unit focuses on the structural aspect of the design process and it's use in the creation of products.

2. Mechanical Systems

We use objects that incorporate mechanical systems everyday. How is it all created? This unit focuses on the mechanical systems aspect of the design process and it's use in the creation of products .

3. Fluid Systems

We use devices and tools that incorporate fluid systems. This unit focuses on the fluid systems and their impact on the design process and the products created.

4. Alternative Energy

As a society, we observe and use alternative energy systems whenever possible. The demand for alternative energy sources is increasing due to high energy costs. This unit focuses on alternative energy systems and the long term effects of reducing our dependence on a non-renewable energy sources.