Curriculum Outline

Course & Level: **Technology Design**

Department: **Technology Education**

Teacher: **Mr. Mower**

Grade level: **9-12**

Campbell High School
Character – Courage – Respect – Responsibility

Description of Course:
This course utilizes the engineering design process to problem-solve a variety of challenges where materials and processes are used to build solution. Challenges will be determined by student interest but some examples are: bridge building, catapults, transport challenges, solar energy driven devices, gears, flight, and the Rube Goldberg devices. This course can also satisfy computer education/technology credit. *

School – Wide Expectations:

The school-wide expectations are incorporated into all courses at Campbell High School. Underlined words in the following text illustrate this alignment between the school-wide expectations and the course

Academic
1. Read, write and speak effectively
2. Exhibit critical thinking and problem solving skills
3. Use resources to obtain information and facilitate learning

Civic/Social
1. Exhibit personal responsibility
2. Work cooperatively in an atmosphere of mutual respect
3. Contribute to the stewardship of the community

Core Competencies and alignment with State Standards:

Perform – Students will demonstrate an understanding of effective safety practices with tool and material usage in the lab.
A2. Exhibit the safe and proper selection, use and maintenance of technical equipment, materials, and processes.
D1. Design, develop, manage, and evaluate activities using identified problem-solving techniques.

Respond - Students will record and report steps taken in brainstorming and prototype development through design portfolios
A1. Select and use appropriate measuring tools to accurately gather, manipulate, and communicate information.
A3. Discover and develop talents, aptitudes, and interests of the individual related to technical pursuits.
A4. Demonstrate an awareness of career opportunities and requirements needed to make informed and meaningful choices in their education/employment in technical occupations.

Engage Students will engage in team activities as a team player/or in a leader position. The students will design, plan, and build a detailed prototype to a design challenge. Students will present a solution to a design challenge in terms of uniqueness, marketability, and societal impact.

B1. Design, schedule, manage, and assess technical processes and systems.
C1. Demonstrate those technical skills needed to find, use and communicate information effectively in a technological world.
E1. Exhibit an understanding of the relationship between academic concepts and practices to their applications in a technological setting.
F1. Evaluate the effects of technology's development on society through time.
F2. Evaluate examples of how technological systems and processes have developed to satisfy human needs and wants.
H1. Demonstrate an understanding of and an appreciation for the importance of accepting individual responsibility, developing a solid work ethic and learning to plan and work effectively.

Suggested Texts and Media (Software, A/V, etc.):

Internet research related to design challenges and teacher- developed handouts
Westpoint Bridge Design Contest software
SAE (Society of Automotive Engineers) World of Motion Curriculum materials

Research and Development
Problem Solving
Students are active participants in their own instruction. During problem presentation, a statement is presented as a design challenge. Students will then research, produce and design multiple solutions as a team, and then choose the solution to build. When materials are to be cut or shaped, the teacher provides individualized instruction as needed when use of a tool or machine is required.
Presentation
Students are expected to make a presentation to their peers concerning the value of their interpretation of the solution to the problem statement.
Redesign
As part of the instructional strategy of peer assessment and further brainstorming, teams are expected to respond with a redesign of their solution or use the concept of reverse engineering.
Student Activities in Connection with Instruction
(Depending on problem choices and student interest- not in any order)
1. 3-D Modeling w/ ProDesktop
2. Gears and Gear Ratios
3. Flight and prototype construction
4. Bridges and Towers w/ Truss Development
5. Rube Goldberg Mechanisms – Simple Machines
6. Board Game development, i.e. Monopoly, etc.
7. Trebuchets and Catapults
8. Robotics w/ hydraulics
9. Magnetic Levitation Devices
10. Power and transportation challenges

Suggested Assessment Strategies:
Students are given multiple opportunities to meet competencies through project based learning. Daily work in the shop is formative and project completion is summative.