

Blackhawk School District

CURRICULUM

Course Title:	Engineering Materials and Product Design
Course Number:	1022
Grade Level(s):	10-12
Periods Per Week:	5
Length of Course:	1 year
Credits:	1
Faculty Author(s):	Tim Linkenheimer
Date:	January 2010

COURSE DESCRIPTION:

This laboratory-based course is an introduction to material properties and product design. Design engineering requires knowledge of the selection, properties, uses, and impacts of materials choices and processing methods. A process of research, design, creation, use and assessment of products will be used. The lab activities of the course will focus on the safe and efficient processing of polymer materials. This full year course will consist of two major projects that will determine the student's overall grade. The first project, one semester in length, will be a mass production activity where students will design, market and manufacture a product, and sell it for a profit. All profits will serve as a fundraiser for Blackhawk's Technology Student Association. The second project, one semester in length, will be a material processing assignment. This project will require each student to design and produce their own individual project. **In order to be eligible, students must have a minimum of a "C" in Wood Material Processing or Metal Material Processing.**

COURSE OUTLINE	OBJECTIVES (PA standard)	PROPOSED TIME / ACTUAL TIME	RESOURCES	LESSON REFLECTION (for future revisions)
1. Class Orientation	3.4.12.A2.	2 days	Syllabus	
2. Introduction to Technology	Describe how management is the process of planning, organizing, and controlling work. 3.4.10.B2.	3 days	Instructor Designed Power Point	
3. Measuring	Demonstrate how humans devise technologies to reduce the negative consequences of other technologies. 3.4.10.B3. Compare and contrast how a number of different factors, such as advertising, the strength of the economy, the goals of a company and the latest fads, contribute to shaping the design of and demand for various technologies. 3.4.12.B1.	3 days	Instructor Designed Handouts, Worksheets & Quizzes	
4. Machine Safety	Analyze ethical, social, economic, and cultural considerations as related to the development, selection, and use of technologies.	10 days	PA Technology Education Safety Guide	
5. Manufacturing Enterprise Activity (Market Research)	3.4.12.B2. Illustrate how, with the aid of technology, various aspects of the environment can be monitored to provide information for decision making. 3.4.10.C2.	10 days	Computer Lab Facility, Microsoft Office (School Fusion)	
6. Manufacturing Enterprise Activity (Prototyping & Design)	Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments. 3.4.12.C2.	15 days	Material Processing Classroom tools, machines & materials.	
7. Manufacturing Enterprise Activity (Mass Production)	Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly. 3.4.12.C3. Apply the concept that many technological problems require a multi-disciplinary approach.	35 days	Material Processing Classroom tools, machines & materials.	
8. EMPD Mid Term	3.4.10.D1. Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of a final	2 days	Instructor Designed Study Guide & Mid-	

<p>9. PATSA Material Processing Individual Event project (Research & Design Phase)</p>	<p>product. 3.4.12.D2. Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly. 3.4.10.D3. Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and the environment.</p>	<p>15 days</p>	<p>Term Computer Lab Facility, Microsoft Office, CADD Design Software (School Fusion)</p>	
<p>10. PATSA Material Processing Individual Event project (Production Phase)</p>	<p>3.4.12.E6. Compare and contrast the importance of science, technology, engineering and math (STEM) as it pertains to the manufactured world.</p>	<p>45 days</p>	<p>Material Processing Classroom tools, machines & materials.</p>	
<p>11. PATSA Material Processing Individual Event project (Documentation Phase)</p>		<p>10 days</p>	<p>Computer Lab Facility, Microsoft Office, CADD Design Software (School Fusion)</p>	
<p>12. Classroom Maintenance Projects</p>		<p>8 days</p>	<p>Material Processing Classroom tools, machines & materials.</p>	
<p>13. EMPD Final</p>		<p>2 days</p>	<p>Instructor Designed Study Guide & Mid-Term</p>	