Teacher: CORE ENG & SCI TECH
Year: 2012-13
Course: ENG & SCI TECH
Month: All Months

September

Design a Cell phone Holder

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
How do people use a given technology? How are technologies redesigned to meet people's needs? What is a mock-up and how does it help the design process? How is mathematics used to determine cost and feasibility? What do industrial designers, engineers, and scientists do?	To engage each student in a short version of the engineering process by redesigning a cell phone holder. They will build a mock-up, use mathematics to determine cost, and learn about the work of industrial designers, engineers and scientisits.		Engineer's Notebook 9/30/2012	Duscussion	Explain how everyday products are designed. Summarize the engineering design process. Construct a mock-up. Estimate the wholesale and retail cost of an item. Describe similarities and differences in the work of industrial designers, engineers, and scientists.	STE.17.01.01-Identify and explain the steps of the engineering design process, i.e., identify the problem, research the problem, develop possible solutions, select the best possible solution(s), construct a prototype, test and evaluate, communicate the solution(s), and redesign.

Engineering Drawing

Essential	Content	Skills	Assessments	Lessons	Learning	Standards

Questions					Benchmarks	
What is the best way to communicate your ideas in drawings?	Discussion of chapter 4. Drafting pre-test. Introduction to by drafting vs.describing an object. Introduction of orthographic projection, isometric, oblique, and prospective drawing. Introduction to scaling at a 1/4 inch. Method of isometric drawing.	Know the proper layout of views for an orthographic drawing.	Drafting 9/30/2012 Drafting 9/30/2012 Drafting 9/30/2012 Drafting 9/30/2012	Tools Methods Drawings	Able to explain why engineers use precise drawing methods. Recognize the difference between isometric and orthographic drawings. Make orthographic (front, side and top view) and isometric drawing of simple objects.	STE.17.01.02- Demonstrate knowledge of pictorial and multi-view drawings (e.g., orthographic projection, isometric, oblique, perspective) using proper techniques. STE.17.01.03- Demonstrate the use of drafting techniques with paper and pencil or computer-aided design (CAD) systems when available. STE.17.01.04- Apply scale and proportion to drawings, e.g., 1/4Â² = 1'0".

What is Engineering?

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards

	How and why do industrial designers work in diverse teams? How do industrial designers improve current technologies?	Introduce students to the technological world, and the people who create it. Video-Deep Dive Reading- Welcome to the Designed World/Amy Smith	Identify 25 different technologies.	Identification 9/30/2012	Video discussion	Identify some processes designers use to meet people's needs. Explain why teamwork is valuable in solving problems. Define "technology" broadly as all of the ways that people have modified the natural world to meet human needs or desires.	STE.17.01.01- Identify and explain the steps of the engineering design process, i.e., identify the problem, research the problem, develop possible solutions, select the best possible solution(s), construct a prototype, test and evaluate, communicate the solution(s), and redesign.
October	Define The Problem						
	Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
	How can we reengineer a product?	Pre-test. Review of the engineering process. knowledge of the product (organizer). Product importance.	Differentiate between criteria and constriants. Able to clearly define the problem. know a mass market and a niche market.	Reengineering 10/31/2012	Explor Problem	Able to namy many of the technologies that surround us and describe how they are organized. Explain how the engineer design proess learned	STE.17.01.01- Identify and explain the steps of the engineering design process, i.e., identify the problem, research the problem,

		The "Problem". Criteria and constraints Read- chapter 5; The Art of Engineering/ Robert Hartmann				from the textbook might apply to this new challenge. Develop preliminary ideas for the marketing study.	develop possible solutions, select the best possible solution(s), construct a prototype, test and evaluate, communicate the solution(s), and redesign.
November	Research ~ Market research.						
Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards	
What kinds of organizers do people use? How would they like their organizers to be improved? What new kinds of organizers would they like to buy? What is our competition doing?	Introduction to research Focus on market research. Mass markets and niche markets. Generate survey questions. Redefine the problem.	Understand market research and mass and niche markets.	Questions and responses 11/30/2012	Survey Redefining the problem.	Students are able to : Explain what is meant by market research, and why it is important. Give examples on how human decisions have driven changes in technology Give examples of how new technologies have effected people's lives. Value their own teammate's	STE.17.01.01- Identify and explain the steps of the engineering design process, i.e., identify the problem, research the problem, develop possible solutions, select the best possible solution(s), construct a prototype, test and evaluate, communicate the solution(s), and	

					diverse skills and talent.	redesign.

Best Solution ~ Process to create the "best solution."

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
What's the best solution?	Introduce Pugh chart Pugh Chart example Meaning of Pugh Chart Team Pugh Chart Individual and Group Work Teams Reports	Create a Pugh Chart to rate the alternative organizer designs based on the criteria and constraints of the problem. Able to select the best choice and to refine further.	Pugh Chart 11/30/2012	Pugh Chart Pugh Chart Pugh Chart Pugh Chart	Students are able to: Demostrate how to select a design based on an organized thought process	STE.17.01.01- Identify and explain the steps of the engineering design process, i.e., identify the problem, research the problem, develop possible solutions, select the best possible solution(s), construct a prototype, test and evaluate, communicate the solution(s), and redesign.

Developing Mock-ups

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
How can we save our company	Explore the first step of the	Able to properly define the	Performance 11/30/2012	Exploration Organizer content	Students are able to:	STE.17.01.01- Identify and

through engineering?	engineering design process in more depth: to define the problem in terms of criteria and constraints. Students are to outline the strengths of their team and focus on teamwork to complete the project.	engineering problem with proper criteria and constraints.		Criteria and Constaints Reading	Name many of the technologies that surround us and describe how they are organized. Explain how the engineering design process learned from the textbook might apply to this new challenge. Develop preliminary ideas for the marketing study.	explain the steps of the engineering design process, i.e., identify the problem, research the problem, develop possible solutions, select the best possible solution(s), construct a prototype, test and evaluate, communicate the solution(s), and redesign.

Development of Possible Solutions ~ The third step.

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
How do we come up with great ideas?			Brainstorming papers 11/30/2012	Brainstroming Brainstorming	Students are able to: Use various methods to generate creative solutions on their own. Engage in effective group brainstroming and sythesis.	STE.17.01.01- Identify and explain the steps of the engineering design process, i.e., identify the problem, research the problem, develop possible solutions, select

					Work with teammates to identify the best solutions.	the best possible solution(s), construct a prototype, test and evaluate, communicate the solution(s), and redesign.

Prototype ~ All students should construct scale models.

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
Why is it helpful to make engineering drawings, scale models, and parts lists before fabricating a prototype? What safety rules and emergency procedure should I know about before using tools?	Introduce three kinds of models Compare - mock-up, scale model, and prototype. Orthgraphic drawing Part lists Build scale models	Students will learn to draw orthographic projection and part lists. Students will learn to create scale models.	Prototype 11/30/2012	Prototype	Students will be able to : Explain why engineering drawings, scal e model and part lists are helpful in the engineering design process. Identify proper safety rules and emergency procedures.	STE.17.01.01- Identify and explain the steps of the engineering design process, i.e., identify the problem, research the problem, develop possible solutions, select the best possible solution(s), construct a prototype, test and evaluate, communicate the solution(s), and redesign.