Engineering and Product Development	Scope and Sequence
Unit Lesson	**Objectives**
INTRODUCTION TO ENGINEERING AND PRODUCT DEVELOPMENT	
Introduction to Engineering	
	Explain concisely what engineering is.
	Identify the major types of engineering and describe the industries in which they are used.
Fundamentals of Product Development	
	Explain what product development is.
	Explain each stage of product development life cycle management and explain the role of engineering in it.
	Apply the product development life cycle to the design and development of a product.
Project: Analyze Product Engineering	
Identifying and Testing Product Concepts	
	Describe the steps for developing and testing a product concept.
	Explain how engineers adapt the concept development process to different types of products.
	Create a concept development and testing plan for a specific product.
Project: Product Development Process	
Requirements in Engineering, Design and Developing a Prototype	
	Write engineering requirements.
	Use the steps in the engineering design phase to develop and test a product prototype.
	Use a prototype to create a design for manufacturing.
Project: Write Engineering Requirements for Your Product	
Testing the Product	

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	Explain how product testing is important to the development of a successful product.
	Describe test engineering.
	Describe the general steps of the product testing process.
	Create a plan for testing your product to ensure it meets customer needs, is competitive in the market place, and is profitable.
Deploying Products to Market	
	Describe the software deployment process.
	Identify the roles and responsibilities of the software deployment team.
	List the steps of the software deployment process.
	Create a basic plan for deploying a software product of your own.
Project: Software Deployment Plan	
Test	
PROJECT CHARTER AND REQUIREMENTS (PDLC PHASES)	
What is a Project Charter?	
	Describe the importance of the project charter.
	Identify examples of the project charter using industry terms.
	Describe career paths that focus on engineering and the development of products and processes.
Writing Project Charters and Understanding Requirements	
	Describe the form and function of the project charter and discuss how it can guide the development process.
	Formulate project requirements for a student project.
	Understand the steps and criteria for developing a school project charter.
	Describe something of the career of software engineer or developer.

Engineering and Product Development	Scope and Sequence
Unit Lesson	**Objectives**
Project: Write a Project Charter	
Analyzing Project Charters	
	Analyze characteristics of a project charter.
	Compare two project charters, identifying both strengths and weaknesses in each.
	Propose remedies for a failed project charter.
Project: Write a Charter for a Recycling Project	
What Are Requirements?	
	Describe the requirements engineering process.
	Analyze sample requirements for a product.
	Construct project requirements for a product.
Defining and Writing Requirements	
	Analyze the requirements engineering process.
	Determine the requirements necessary to move a product from idea to working model or prototype.
	Construct project requirements for a product.
Project: Competing with the Best	
Writing Product Requirements	
	Provide three examples of specific requirements in a given project.
	Analyze the requirements engineering process.
	Analyze requirements for a product.
Project: Reverse Engineering	
Test	
DESIGN AND 3-D MODELING	

Engineering and Product Development	Scope and Sequence
Unit Lesson	Objectives
Design Engineering	
	Analyze how requirements contribute to the design process.
	Identify the steps in the design process.
	Identify tools used during the design process including prototyping and modeling.
Project: Student Engineer Needed: Houseplant Watering System	
Analyze Problems and Potential Solutions in Design Engineering	
	Analyze the requirements engineering process and apply them to a sample product.
	Analyze problems during the design process.
	Identify tools used during the design process including prototyping and modeling.
	Explain some of the requirements for preparing for a career as an electrical or computer science engineer.
Analyze Design Plans	
	Analyze the requirements engineering process and apply them to a sample product.
	Analyze problems during the design process.
	Discuss the interest areas, native abilities, and educational requirements connected with a career in chemical engineering.
Project: Design a Running Shoe	
Engineering Modeling Tools	
	Apply engineering skills.
	Analyze technology to acquire, manipulate, analyze and report data.
	Identify STEM concepts and processes used to solve problems involving design and/or production.
	Identify tools used during the design process including prototyping and modeling
Practice Using Engineering Modeling Tools	

Engineering and Product Development	Scope and Sequence
Unit Lesson	**Objectives**
	Apply engineering skills.
	Analyze technology to acquire, manipulate, analyze and report data.
	Identify STEM concepts and processes used to solve problems involving design and/or production.
	Explain the concept of engineering modeling tools.
	Discuss the nature and effects of basic animation.
Project: Design a Part in 3D	
Evaluate Engineering Tools and Careers	
	Understand the role of engineering modeling tools in the design process.
	Compare modeling tools in order to understand how they relate to the types of products designed.
	Compare and contrast aerospace, civil, structural, computer, and software engineering as careers.
	Evaluate modeling tools by downloading a freeware modeling tool and practicing a design.
Project: Evaluate 3D Modeling Tools	
Test	
PRODUCT LAUNCH (IMPLEMENTATION)	
The Implementation Stage	
	Understand the implementation phase.
	Identify steps in an implementation plan.
	Critique the process for implementation in the product development cycle.
	Understand something of the tasks and responsibilities of a computer programmer.
Analyze an Implementation Plan	
	Analyze an implementation plan in the product development life cycle.
	Identify components of an implementation phase.

Engineering and Product Development		Scope and Sequence
Unit	**Lesson**	**Objectives**
		Critique an implementation plan.
		Describe the career of a systems analyst.
	Project: Write an Implementation Plan	
	PLM, Implementation, and Industry Concepts	
		Analyze product life cycle management.
		Identify components of an implementation phase.
		Critique industry concepts.
		Identify industry terms.
	Project: Prepare a Presentation about Engineering Contests	
	Implementation Plan and Product Launch	
		Identify details in an implementation plan.
		Identify components of an implementation plan.
		Critique a product launch.
	Implementation Plan and Product Life Cycle	
		Compare and contrast details in an implementation plan.
		Identify components of an implementation plan for a specific product.
		Analyze components in an implementation plan for a specific product.
	Project: Timeline, Market, Budget	
	Marketing, Engineering, and Implementation	
		Discuss the implications of developing new products for marketing.
		Describe the integration of marketing, design, engineering, and implementation.

Engineering and Product Development	Scope and Sequence
Unit Lesson	**Objectives**
	Explain the importance of developing a core competency of understanding the customer.
Project: Reverse Engineer a Marketing Plan	
Test	
REVIEW FULL PRODUCT DEVELOPMENT LIFE CYCLE	
Reviewing the Product Development Life Cycle and Key Strategies	
	Explain the meaning of the many acronyms used in the Product Development Life Cycle.
	Describe the steps in the Product Life Cycle.
	Describe the best practices for a company using the Product Development Life Cycle.
	Explain the native skills and educational requirements for a person interested in a career in engineering.
Project: Write a Project Plan	
Assembling a Successful Project Plan	
	Sequentially describe the critical steps in an effective project plan.
	Explain how to put the parts of a project plan into action.
	Describe four challenges video game designers might encounter as they move from project planning to development.
Planning, Structure, and Thinking Behind Project Plans	
	Explain three benefits of using templates during the design process.
	Describe how a Gantt chart provides more information about a project than a simple timeline.
	Explain examples of template-based project plans.
	Discuss some of the academic preparation that strengthens an aspiring engineer's knowledge and expertise.
Project: Write Part of a Project Plan Chart	

Engineering and Product Development	Scope and Sequence
Unit **Lesson**	**Objectives**
Compare and Contrast Project Plans	
	Discuss how engineering is both an art and a science.
	Understand why project delays can become expensive and describe some of the safeguards engineers take during the design process to prevent later delays.
	Provide examples of the roles accountants and risk managers play in the engineering and design of new products.
Assembling Project Plans and Engineering for the Twenty-First Century	
	Discuss how technology is changing the design process in engineering.
	Explain three of the major differences between a project charter and an implementation plan; summarize the purpose of each document.
	Describe the parts of a well-conceived project development plan.
Project: Develop a 3-D Video Game Project Plan and Sample Game	
How to Evaluate Project Plans	
	Explain the importance of evaluating proposed project plans before the product enters the design/build stage.
	Discuss three of the differences in the roles and responsibilities of a project manager and a staff engineer working on a project.
	Discuss why it is essential for engineers to fully understand potential and anticipated constraints before beginning a new project and describe three common constraints.
Project: Write a Project Brief and Evaluate It	
Test	
COURSE PROJECT, REVIEW AND EXAM	
Review	
Exam	