

FREEHOLD REGIONAL HIGH SCHOOL DISTRICT

OFFICE OF CURRICULUM AND INSTRUCTION

TECHNOLOGY EDUCATION DEPARTMENT

TECHNOLOGY DESIGN LABORATORY 1

Grade Level: 9-12

Credits: 5

BOARD OF EDUCATION ADOPTION DATE:

AUGUST 30, 2010

[SUPPORTING RESOURCES AVAILABLE IN DISTRICT RESOURCE SHARING](#)

APPENDIX A: ACCOMMODATIONS AND MODIFICATIONS

APPENDIX B: ASSESSMENT EVIDENCE

APPENDIX C: INTERDISCIPLINARY CONNECTIONS

Course Philosophy

Because of the growing role that technology plays in everyday life and in the shaping of our society, educators and business people must now realize that our schools must prepare students to respond to the demands of a technological society.

This course is designed to help the students develop interpersonal skills, learn to manage and use resources, be able to acquire, evaluate and process information, and gain an understanding of social, organizational and technological systems.

This course will provide all students with a multitude of problem solving applications that can be accomplished through the integration of various components. It also provides the essential life skills necessary to function effectively and competitively in today's technological age.

Course Description

Technology Design Laboratory I is a one year, 5 credit course open to students in grades 9 through 12. During this course the students will acquire and use technological knowledge to solve technological problems using the engineering design process.

This course will prepare the students to become a technological thinker and innovator through practical applications of math, science and technology. It provides students with essential core strategies for acquiring and using technological knowledge.

The students will learn these concepts and techniques through real-world problem based learned scenarios from each of the seven areas of technology: (*Construction Technologies, Manufacturing Technologies, Medical Technology, Agriculture and Biotechnology, Transportation Technologies, Communication and Information Technologies, and Power and Energy Technologies*).

**Freehold Regional High School District
Curriculum Map**

Technology Design Laboratory I

Relevant Standards 1	Enduring Understandings	Essential Questions	Assessments		
			Diagnostic (before)	Formative (during)	Summative (after)
8.2.F.1 9.1.F.2	Following safety procedures and using personal protection equipment will reduce the risk of injury.	What are the safety concerns to be considered when working in a lab setting in school or on the job? What protection can be used in a laboratory environment?	Pretest Student Survey Oral Questions/ Discussion Anticipatory Set Questions	Quizzes Written Assignments	Portfolios Projects Based Learning – Rubric Assessment Performance Assessment Mid Terms Final Exam
5.1.D.1 8.1.C.1 8.1.E.1 9.1.F.2 9.1.F.3	Working with others is an important skill for life and the workplace.	What characteristics are essential to a functional team? What are the benefits of working in a team environment as opposed to individually? Why is personal responsibility a crucial element of a team member?	Do Now Ice Breaker Oral Questions/ Discussion Anticipatory Set Questions	Journals Written Assignments Observations Role Play Assignments Interviews	Portfolios Projects Based Learning – Rubric Assessment Self and Peer Assessment Performance Assessment Mid Terms Final Exam
1.3.D.1 1.4.B.1 8.2.B.1-3 8.2.D.1 8.2.G.1	Technology is the study of the human designed world.	How does technology differ from science? How do humans rely on technology in today's society? How has technology evolved throughout human history? How has technology helped to extent human capabilities throughout history?	Do Now Pretest Student Survey Oral Questions/ Discussion Anticipatory Set Questions	Quizzes Written Assignments Oral Presentations Role Play Research Assignments	Portfolios Projects Based Learning – Rubric Assessment Self and Peer Assessment Performance Assessment Mid Terms Final Exam
8.2.C.1 8.2.G.1	Technological development utilizes systems to produce either a product or a more advanced system.	What are the basic components of a technological system? Why is feedback so important in a technological system? What are the crucial technological systems that help societies function on a daily basis?	Do Now Pretest Student Survey Oral Questions/ Discussion Anticipatory Set Questions	Journals Quizzes Written Assignments Oral Presentations Observations Participatory Rubrics Research Assignments	Portfolios Projects Based Learning – Rubric Assessment Performance Assessment Mid Terms Final Exam
6.1.C.16.A	Technology has strong connections to all subject areas, especially science and math.	How do science and math play a role in the various fields of technology? What impact does technology have on other subject areas?	Do Now Pretest Student Survey Oral Questions/ Discussion Anticipatory Set Questions	Journals Quizzes Written Assignments Oral Presentations Observations Participatory Rubrics Research Assignments Interviews	Portfolios Projects Based Learning – Rubric Assessment Self and Peer Assessment Performance Assessment Mid Terms Final Exam

Relevant Standards 1	Enduring Understandings	Essential Questions	Assessments		
			Diagnostic (before)	Formative (during)	Summative (after)
8.2.B.1-3	The design process is a series of steps taken in order to create a product or solve a problem.	<p>What are the major steps of the design process?</p> <p>How does the design process help to produce more successful technologies?</p> <p>What are some methods used to share design ideas?</p> <p>What is the difference between a model and a prototype?</p> <p>How have computers become useful in the evaluation and testing of a prototype?</p>	<p>Do Now</p> <p>Pretest</p> <p>Student Survey</p> <p>Oral Questions/ Discussion</p> <p>Anticipatory Set</p> <p>Questions</p>	<p>Journals</p> <p>Quizzes</p> <p>Written Assignments</p> <p>Oral Presentations</p> <p>Observations</p> <p>Participatory Rubrics</p> <p>Research Assignments</p>	<p>Portfolios</p> <p>Projects Based Learning – Rubric Assessment</p> <p>Self and Peer Assessment</p> <p>Performance Assessment</p> <p>Mid Terms</p> <p>Final Exam</p>
<p>1.3.D.1</p> <p>1.4.B.1</p> <p>4.5 A.1-2</p> <p>4.5 F.1</p> <p>5.1.B.2 (models with mathematic tools)</p> <p>5.3.A.5-6 (medical tech)</p> <p>5.3.B.4-5(biotech)</p> <p>5.4.E.1-2(renewable energy)</p> <p>5.4.G.2-7(energy and biotech)</p> <p>8.2.B.1-3</p> <p>8.2.D.1</p> <p>8.2.G.1</p>	The designed world consists of seven unique areas of technology.	<p>What are the seven areas of technology?</p> <p>What areas of technology are closely related to one another?</p> <p>What characteristics help to delineate the various areas of technology?</p> <p>How can technological products or systems reside within multiple areas?</p> <p>How has material science impacted construction techniques and material selection?</p> <p>How do the various manufacturing methods differ from one another?</p> <p>What makes one media message more effective than another?</p> <p>How has the field of biology been combined with traditional agricultural methods to create new technologies?</p> <p>What is the importance of medical technology on the lives of humans?</p> <p>How has transportation made our world seem smaller?</p> <p>What is it important to develop and implement new power and energy technologies across the world?</p>	<p>Do Now</p> <p>Pretest</p> <p>Student Survey</p> <p>Oral Questions/ Discussion</p> <p>Anticipatory Set</p> <p>Questions</p>	<p>Journals</p> <p>Quizzes</p> <p>Written Assignments</p> <p>Oral Presentations</p> <p>Participatory Rubrics</p> <p>Role Play</p> <p>Research Assignments</p>	<p>Portfolios</p> <p>Projects Based Learning – Rubric Assessment</p> <p>Self and Peer Assessment</p> <p>Performance Assessment</p> <p>Mid Terms</p> <p>Final Exam</p>

Relevant Standards 1	Enduring Understandings	Essential Questions	Assessments		
			Diagnostic (before)	Formative (during)	Summative (after)
6.1.C.16.A 8.2.C.1-3	Technology has social, economical and environmental impacts on our lives.	<p>How have original technologies developed into alternative products “spin-offs”?</p> <p>Why do certain technologies affect cultures more than others?</p> <p>How has society tried to fix the environmental impacts technology has had on the planet?</p> <p>How does capital influence the final design of a product or system?</p>	<p>Do Now</p> <p>Pretest</p> <p>Student Survey</p> <p>Oral Questions/ Discussion</p> <p>Anticipatory Set</p> <p>Questions</p>	<p>Journals</p> <p>Quizzes</p> <p>Written Assignments</p> <p>Oral Presentations</p> <p>Observations</p> <p>Participatory Rubrics</p> <p>Role Play</p> <p>Research Assignments</p> <p>Interviews</p>	<p>Portfolios</p> <p>Projects Based Learning – Rubric Assessment</p> <p>Self and Peer Assessment</p> <p>Performance Assessment</p> <p>Mid Terms</p> <p>Final Exam</p>
6.1.C.16.A 8.2.C.1-3	There are four possible impacts that a technological product or system has on our lives.	<p>What are the four possible impacts that a technological system of product can have on society?</p> <p>Why is it important to take these impacts into account before designing a technological product or system?</p> <p>What are some examples of historical unexpected outcomes in technology?</p>	<p>Do Now</p> <p>Pretest</p> <p>Student Survey</p> <p>Oral Questions/ Discussion</p> <p>Anticipatory Set</p> <p>Questions</p>	<p>Journals</p> <p>Quizzes</p> <p>Written Assignments</p> <p>Oral Presentations</p> <p>Observations</p> <p>Participatory Rubrics</p> <p>Role Play</p> <p>Research Assignments</p>	<p>Portfolios</p> <p>Projects Based Learning – Rubric Assessment</p> <p>Self and Peer Assessment</p> <p>Performance Assessment</p> <p>Mid Terms</p> <p>Final Exam</p>
8.1.D.1-4 8.1.E.1-2 8.2.D.1	Information gathering and synthesis is crucial in the development of technology.	<p>What is the importance of technical research in the development of new technological products and systems?</p> <p>How do activities such as “reverse engineering,” aid in the development of new technological products and systems?</p> <p>What are the legal and ethical consequences of claiming someone ideas or designs?</p>	<p>Do Now</p> <p>Pretest</p> <p>Student Survey</p> <p>Oral Questions/ Discussion</p> <p>Anticipatory Set</p> <p>Questions</p>	<p>Journals</p> <p>Quizzes</p> <p>Chapter Test</p> <p>Written Assignments</p> <p>Oral Presentations</p> <p>Observations</p> <p>Participatory Rubrics</p> <p>Role Play</p> <p>Research Assignments</p> <p>Interviews</p>	<p>Portfolios</p> <p>Projects Based Learning – Rubric Assessment</p> <p>Self and Peer Assessment</p> <p>Performance Assessment</p> <p>Mid Terms</p> <p>Final Exam</p>

**Freehold Regional High School District
Course Proficiencies and Pacing**

Technology Design Laboratory I

Unit Title	Unit Understandings and Goals	Recommended Duration
Unit #1: Introduction to Technological Systems	<p>Technological development utilizes systems to produce either a product or a more advanced system. Technology has strong connections to all subject areas, especially science and math. There are four possible impacts that a technological product or system has on our lives. Technology has social, economical and environmental impacts on our lives.</p> <p>The students will be able to explain the three primary parts to a technological system (<i>Input, Process and Output</i>) The students will be able to describe the importance of feedback in a technological system. The students will be able to describe the interdependency of technological systems. The students will be able to list and explain the four impacts that technological products or systems have on society.</p>	2-3 weeks
Unit #2: Design Engineering Process	<p>Technology is the study of the human designed world. The design process is a series of steps taken in order to create a product or solve a problem. Technology has social, economical and environmental impacts on our lives. Information gathering and synthesis is crucial in the development of technology.</p> <p>The students will be able to list and explain the various steps of the engineering design process. The students will be able to explain and demonstrate the various sketching techniques that can be used in the engineering design process. The students will be able to reverse engineer a real world product and analyze it for design elements and flaws. The students will be able to describe the impact of the design engineering process on a product or system.</p>	3-4 weeks
Unit #3: Technological Resources and Safety	<p>Following safety procedures and using personal protection equipment will reduce the risk of injury. Working with others is an important skill for life and the workplace.</p> <p>The students will be able to identify and implement proper safety in a work environment. The students will understand the importance of collaboration and effective teamwork skills. The students will be able to utilize technological tools and equipment safely to create products and systems.</p>	2-3 weeks
Unit #4: Structures and Mechanisms	<p>Technology has strong connections to all subject areas, especially science and math. The designed world consists of seven unique areas of technology.</p> <p>The students will be able to identify and describe the use of structures in everyday life. The students will be able to describe and demonstrate structural forces and how they act on a structure. The students will be able to create models of simple machines. The students will be able to describe how simple machines are combined to form complex mechanisms.</p>	2-5 weeks

Unit Title	Unit Understandings and Goals	Recommended Duration
Unit #5: Information and Communication Technologies	<p>The designed world consists of seven unique areas of technology. Information gathering and synthesis is crucial in the development of technology. Technology has social, economical and environmental impacts on our lives.</p> <p>The students will be able to identify the basic elements of design and how they are used in areas such as: graphic design, product design and architecture. The students will be able to utilize various information and communication technologies to collaborate and share ideas in the classroom. The students will be able to create a Web 2.0 document that communicates a technological idea or theme.</p>	3-5 weeks
Unit #6: Construction Technology	<p>Technology has strong connections to all subject areas, especially science and math. The designed world consists of seven unique areas of technology. Technology has social, economical and environmental impacts on our lives.</p> <p>The students will be able to identify and describe the resources that are specific to construction technology. The students will be able to build and evaluate a scaled structure using technical drawing and modeling materials. The students will be able to utilize mathematical and scientific theories in the design and evaluation of their structures. The students will be able to list and explain the characteristics of the four families of materials used in construction.</p>	4-6 weeks
Unit #7: Manufacturing Technology	<p>Following safety procedures and using personal protection equipment will reduce the risk of injury. Technological development utilizes systems to produce either a product or a more advanced system. The designed world consists of seven unique areas of technology. Information gathering and synthesis is crucial in the development of technology. Technology has social, economical and environmental impacts on our lives.</p> <p>The students will be able to identify the various methods in the manufacturing of a product or system. The students will be able to create a manufacturing flowchart for a chosen product or system. The students will be able to list and explain the various material processing techniques used in manufacturing. The students will be able to describe and identify the importance of product research and testing in manufacturing.</p>	4-6 weeks
Unit #8: Power and Energy Technologies	<p>Technology has strong connections to all subject areas, especially science and math. The designed world consists of seven unique areas of technology. Technological development utilizes systems to produce either a product or a more advanced system.</p> <p>The students will be able to describe the importance of renewable resources and clean energy. The students will be able to describe the various methods of generating electricity. The students will be able to explain the steps taken to move electricity from a production source to an end user. The students will be able to describe and model the basic components of a simple electrical circuit. The students will be able to understand and explain the impact that growing energy need has on society.</p>	2-3 weeks

Unit Title	Unit Understandings and Goals	Recommended Duration
Unit #9: Transportation Technology	<p>Technology has strong connections to all subject areas, especially science and math. The designed world consists of seven unique areas of technology. Technology has social, economical and environmental impacts on our lives. There are four possible impacts that a technological product or system has on our lives.</p> <p>The students will be able to list and explain the various modes of transportation throughout history. The students will be able to identify and describe transportation infrastructure and its impact society. The students will be able to describe and model energy efficient transportation vehicles. The students will be able to utilize mathematical and scientific theories in the design and evaluation of their vehicles.</p>	4-6 weeks
Unit #10: Biotechnology and Agriculture	<p>Technology has strong connections to all subject areas, especially science and math. The designed world consists of seven unique areas of technology. Technological development utilizes systems to produce either a product or a more advanced system. Technology has social, economical and environmental impacts on our lives.</p> <p>The students will be able to explain the various methods of food production throughout history. The students will be able to describe the advancements in agricultural technologies throughout history. The students will be able to create a model of a biotechnical or agricultural system. The students will be able to apply scientific theories in the design and evaluation of their models.</p>	2-3 weeks
Unit #11: Medical Technology	<p>Technology has strong connections to all subject areas, especially science and math. The designed world consists of seven unique areas of technology. Technology has social, economical and environmental impacts on our lives.</p> <p>The students will be able to explain the various methods of medicine production throughout history. The students will be able to describe how advancements in medical technologies throughout history have impacted the lifespan of human beings. The students will be able to create a model of a medical system. The students will be able to apply scientific theories in the design and evaluation of their models.</p>	2-3 weeks
Unit #12: Careers in Technology	<p>Following safety procedures and using personal protection equipment will reduce the risk of injury. Working with others is an important skill for life and the workplace. Information gathering and synthesis is crucial in the development of technology.</p> <p>The students will be able to list and explain the various technological career fields that are available to them. The students will be able to research and identify the requirements and prerequisites for a career of their choice. The students will be able to research identify tertiary school and institutions that offer programs of study in their career of chose. The students will be able to interview and gather information about a career of their choice from an individual in that industry.</p>	1-2 weeks

**Freehold Regional High School District
Technology Design Laboratory I
Unit #1: Introduction to Technological Systems**

Enduring Understandings: Technological development utilizes systems to produce either a product or a more advanced system.
Technology has strong connections to all subject areas, especially science and math.
There are four possible impacts that a technological product or system has on our lives.
Technology has social, economical and environmental impacts on our lives.

Essential Questions: How do humans rely on technology in today’s society? How has technology evolved throughout human history?
What are the basic components of a technological system? Why is feedback so important in a technological system?
What are the crucial technological systems that help society function on a daily basis?

Unit Goals: The students will be able to explain the three primary parts to a technological system (*Input, Process and Output*).
The students will be able to describe the importance of feedback in a technological system.
The students will be able to describe the interdependency of technological systems.
The students will be able to list and explain the four impacts that technological products or systems have on society.

Duration of Unit: 2-3 weeks

NJCCCS: 1.3.D.1, 1.4.B.1, 8.2.B.1-3, 8.2.D.1, 8.2.C.1, 8.2.G.1

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
Why does technology sometimes have both positive and negative on society?	Understand and explain impacts: <i>positive-expected, negative-expected, positive-unexpected and negative-unexpected.</i>	Classroom supplies for technological learning activities (ILA) Current textbook and resource binder PowerPoint/SMART Notebook Presentation Internet Optional Textbooks: <i>Engineering Design: An Introduction</i> , ISBN: 1418062413 <i>Design and Problem Solving in Technology</i> , ISBN: 0827352468 Example Online Resources: Impacts of Technology http://www.technologystudent.com/culture1/culindex1.htm Systems: http://www.technologystudent.com/elec1/consys2.htm Example Worksheets:	Video clip about an unexpected negative impacts Students will complete “Impacts Worksheet” using unit content. Discussion of impacts and how they are caused.	Open Notes Quiz Modeling Activity Worksheets Technological System Design Activity Class Discussions

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>What are the major components of any technological system?</p> <p>How to technological systems interact with other systems?</p>	<p>Define and explain inputs, process, feedback and outputs.</p> <p>Understand the connection between multiple technological systems.</p>	<p>http://www.technologystudent.com/pdfs/closdsys1.pdf http://www.technologystudent.com/pdfs/closdsys2.pdf http://www.technologystudent.com/pdfs/closdsys3.pdf</p> <p>Example Video Clip: http://www.youtube.com/watch?v=j-zczJXSxnw</p> <p>Individuals/Guest speakers from industry</p>	<p>Technological System Discussion</p> <p>Create a model of a real-life technological system.</p> <p>Be able to discuss the impacts different technological systems have on society and what causes those impacts.</p> <p>Students will create a flowchart of a technological system using unit content.</p> <p>Design a technological system that follows certain specifications and constraints.</p>	<p>Open Notes Quiz</p> <p>Modeling</p> <p>Activity</p> <p>Worksheets</p> <p>Technological System Design Activity</p> <p>Class Discussions</p>

Suggestions on how to differentiate in this unit:

- A hands-on approach to assignments and projects is recommended as the most effective method of learning. Teacher should always adjust learning environment based on reluctant learners or special education needs.
- Students with individual learning styles can be assisted through adjustments in assessment standards, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods
- A wide variety of assessments and strategies complement the individual learning experience.

Freehold Regional High School District
Technology Design Laboratory I
Unit #2: Design Engineering Process

Enduring Understandings: Technology is the study of the human designed world.
 The design process is a series of steps taken in order to create a product or solve a problem.
 Technology has social, economical and environmental impacts on our lives.
 Information gathering and synthesis is crucial in the development of technology.

Essential Questions: What are the major steps of the design process? How does the design process help to produce more successful technologies?
 What is the importance of technical research in the development of new technological products and systems?
 How do activities such as “reverse engineering,” aid in the development of new technological products and systems?
 What are the legal and ethical consequences of claiming someone ideas or designs?

Unit Goals: The students will be able to list and explain the various steps of the engineering design process.
 The students will be able to explain and demonstrate the various sketching techniques that can be used in the engineering design process.
 The students will be able to reverse engineer a real world product and analyze it for design elements and flaws.
 The students will be able to describe the impact of the design engineering process on a product or system.

Duration of Unit: 3-4 weeks

NJCCCS: 8.1.D.1-4, 8.1.E.1-2, 8.2.D.1, 8.2.G.1

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>How does brainstorming help to open up new ideas for products and future technologies?</p> <p>What are some possible brainstorming methods that can be used when designing?</p>	<p>Understand and be able to explain the different steps of the design process: <i>Investigation and Research, Brainstorming, Create Solutions, Choose the Best Solution, Develop the Chosen Solution, Testing and Evaluation and Redesign.</i></p>	<p>Classroom supplies for technological learning activities (TLA)</p> <p>Current textbook and resource binder</p> <p>PowerPoint/SMART Notebook Presentation</p> <p>Internet</p> <p>Optional Textbooks: <i>Engineering Design: An Introduction</i>, ISBN: 1418062413 <i>Design and Problem Solving in Technology</i>, ISBN: 0827352468</p> <p>Example Online Resources: Design Loop http://www.technologystudent.com/designpro/despro1.htm http://www.technologystudent.com/despro_flash/desprocon1.html http://www.technologystudent.com/designpro/drawtec1.htm</p> <p>Technical Drawings Oblique Drawing- http://www.technologystudent.com/pdfs/oblique2A.pdf Isometric Drawing- http://technologystudent.com/PDF3/isomet1.pdf Perspective Drawing- http://www.technologystudent.com/pdfs/twpers1.pdf Orthographic Drawing- http://technologystudent.com/pdfs/ph_ortho1.pdf Shading- http://www.technologystudent.com/pdfs/haired1.pdf</p> <p>Example Worksheets: Design Loop http://www.technologystudent.com/PDF4/despro_concise1.pdf</p> <p>Individuals/Guest speakers from industry</p>	<p>Design Loop Drawing</p> <p>Utilize mapping and webs to brainstorm new designs.</p> <p>Problem Solving Challenges (<i>ex: Egg Drop, Golf Ball Tower and Marshmallow Launcher</i>)</p>	<p>Written tests and quizzes</p> <p>Worksheets</p> <p>Project assessments</p> <p>Article summaries</p> <p>Notebook assessments</p> <p>Responses to discussion questions</p> <p>Journal assessments</p> <p>Threaded Discussion Groups</p> <p>Self and Peer assessments</p> <p>TSA Rubrics</p> <p>Midterm/Final Exam</p>

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>What are some methods if illustrating your design ideas?</p> <p>How do basic sketches turn into finished plans?</p> <p>How do designers make their sketches more realistic looking?</p>	<p>Be proficient with the following sketching techniques: <i>Oblique, Isometric, Perspective and Orthographic.</i></p>	<p>Classroom supplies for technological learning activities (TLA)</p> <p>Current textbook and resource binder</p> <p>PowerPoint/SMART Notebook Presentation</p> <p>Internet</p> <p>Optional Textbooks: <i>Engineering Design: An Introduction</i>, ISBN: 1418062413 <i>Design and Problem Solving in Technology</i>, ISBN: 0827352468</p> <p>Example Online Resources: Design Loop http://www.technologystudent.com/designpro/despro1.htm http://www.technologystudent.com/despro_flesh/desprocon1.html http://www.technologystudent.com/designpro/drawtec1.htm</p> <p>Technical Drawings Oblique Drawing- http://www.technologystudent.com/pdfs/oblique2A.pdf Isometric Drawing- http://technologystudent.com/PDF3/isomet1.pdf Perspective Drawing- http://www.technologystudent.com/pdfs/twpers1.pdf Orthographic Drawing- http://technologystudent.com/pdfs/ph_ortho1.pdf Shading- http://www.technologystudent.com/pdfs/haired1.pdf</p> <p>Example Worksheets: Design Loop http://www.technologystudent.com/PDF4/despro_concise1.pdf</p> <p>Individuals/Guest speakers from industry</p>	<p>Create technical sketches using a variety of drawing methods: <i>Oblique, Isometric, Perspective and Orthographic.</i></p> <p>Properly dimension an orthographic sketch.</p> <p>Utilize shading to add texture and material rendering to a sketch.</p>	<p>Written tests and quizzes</p> <p>Worksheets</p> <p>Project assessments</p> <p>Article summaries</p> <p>Notebook assessments</p> <p>Responses to discussion questions</p> <p>Journal assessments</p> <p>Threaded Discussion Groups</p> <p>Self and Peer assessments</p> <p>TSA Rubrics</p> <p>Midterm/Final Exam</p>

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>Why can taking apart an existing technology help us to better understand how it works and what thinking was used in its design?</p> <p>What is a technological “spin-off” and typically how are they discovered?</p>	<p>Explain the importance of “reverse engineering” and how it plays a role in the design process.</p>	<p>Classroom supplies for technological learning activities (TLA)</p> <p>Current textbook and resource binder</p> <p>PowerPoint/SMART Notebook Presentation</p> <p>Internet</p> <p>Optional Textbooks: <i>Engineering Design: An Introduction</i>, ISBN: 1418062413 <i>Design and Problem Solving in Technology</i>, ISBN: 0827352468</p> <p>Example Video Clips: http://www.youtube.com/watch?v=SCR0qq3zyyQ</p> <p>Real Worlds Examples: NASA “Spin-Off” Technology- http://www.sti.nasa.gov/tto/</p> <p>Individuals/Guest speakers from industry</p>	<p>Video clip of reverse engineering techniques and examples.</p> <p>Identify products that were created as “spin-offs” from another design.</p> <p>Students will complete “Reverse Engineering Worksheets” using unit content.</p> <p>Student Online Research of “Spin-Offs”</p>	<p>Written tests and quizzes</p> <p>Worksheets</p> <p>Project assessments</p> <p>Article summaries</p> <p>Notebook assessments</p> <p>Responses to discussion questions</p> <p>Journal assessments</p> <p>Threaded Discussion Groups</p> <p>Self and Peer assessments</p>
<p>Why must designers give credit to those whom they borrow or utilize ideas from?</p> <p>If a designer steals another designer’s ideas, is it the same as plagiarism from one author to another?</p>	<p>Explain the differences between a <i>trademark</i>, <i>copyright</i> and <i>patent</i>.</p> <p>Understand the design patent process.</p>	<p>Classroom supplies for technological learning activities (TLA)</p> <p>Current textbook and resource binder</p> <p>PowerPoint/SMART Notebook Presentation</p> <p>Internet</p> <p>Optional Textbooks: <i>Engineering Design: An Introduction</i>, ISBN: 1418062413 <i>Design and Problem Solving in Technology</i>, ISBN: 0827352468</p> <p>Example Online Resources: http://www.uspto.gov http://www.technologystudent.com/prddes1/copyrt1.html http://www.technologystudent.com/prddes1/patent1.html http://www.technologystudent.com/prddes1/trade1.html</p> <p>Example Articles: http://www.nytimes.com/2003/10/04/arts/are-more-people-cheating-despite-ample-accounts-dishonesty-moral-decline-hard.html http://www.bllaw.co.uk/PDF/Plagiarism%20and%20the%20law.pdf</p> <p>Example Worksheets: http://www.technologystudent.com/PDF3/copyr1.pdf http://www.technologystudent.com/PDF3/patent1.pdf http://www.technologystudent.com/PDF3/trademk1.pdf</p> <p>Individuals/Guest speakers from industry: Graphic Designers Advertisement Directors</p>	<p>Copyright, Patent and Trademark identification using Power Point Presentation.</p> <p>List and explain the legal ramifications of stealing someone’s intellectual property.</p> <p>Students will complete “Patent Research Activity” using unit content</p> <p>Read and summarize related articles</p>	<p>TSA Rubrics</p> <p>Midterm/Final Exam</p>

Suggestions on how to differentiate in this unit:

- A hands-on approach to assignments and projects is recommended as the most effective method of learning. Teacher should always adjust learning environment based on reluctant learners or special education needs.
- Students with individual learning styles can be assisted through adjustments in assessment standards, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods
- A wide variety of assessments and strategies complement the individual learning experience.

Freehold Regional High School District
Technology Design Laboratory I
Unit #3: Technological Resources and Safety

Enduring Understandings: Following safety procedures and using personal protection equipment will reduce the risk of injury.
 Working with others is an important skill for life and the workplace.

Essential Questions: What are the safety concerns to be considered when working in a lab setting in school or on the job?
 What protection can be used in a laboratory environment? What characteristics are essential to a functional team?
 What are the benefits of working in a team environment as opposed to individually?

Unit Goals: Students will be able to identify and implement proper safety in a work environment.
 Students will understand the importance of collaboration and effective teamwork skills.
 Students will be able to utilize technological tools and equipment safely to create products and systems.

Duration of Unit: 2-3 weeks

NJCCCS: 8.2.F.1, 8.1.C.1, 8.1.E.1, 9.1.F.2, 9.1.F.3

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>Why should safety be the first concern while working in a technology laboratory?</p> <p>How do we protect ourselves around dangerous equipment, tools and chemicals?</p>	<p>Understand and be able to follow the required safety rules for the equipment and tools in the laboratory.</p>	<p>Lab Safety Rules (will change based on resources available): http://agedweb.org/courses/aget120/Shop%20Safety.doc</p> <p>Classroom supplies for technological learning activities (TLA)</p> <p>Current textbook and resource binder</p> <p>PowerPoint/SMART Notebook Presentation</p> <p>Internet</p> <p>Optional Textbooks: <i>Engineering Design: An Introduction</i>, ISBN: 1418062413 <i>Design and Problem Solving in Technology</i>, ISBN: 0827352468</p> <p>Example Online Resources: Safety Rules and Regulations http://osha.gov/ http://www.osha.gov/SLTC/personalprotectiveequipment/ http://www.osha.gov/SLTC/bloodbornepathogens/index.html http://www.technologystudent.com/health1/ed1.htm Teamwork http://changingminds.org/explanations/preferences/belbin.htm http://www.goer.state.ny.us/Training_Development/Online_Learning/FTMS/200s1.html</p>	<p>Overview of all classroom equipment and safety guidelines.</p> <p>Define PPE (personal protective equipment) and list the various forms it comes in.</p> <p>Explain the role of OSHA (<i>Occupation Safety and Hazard Administration</i>) in the development of new safety guidelines.</p> <p>Students will complete Safety Worksheets individually using unit content.</p> <p>Students will design Safety Posters based on one of the machines they were tested on.</p> <p>Complete practical activities for all equipment as demonstration of proper operation.</p>	<p>Written tests and quizzes</p> <p>Worksheets</p> <p>Project assessments</p> <p>Article summaries</p> <p>Notebook assessments</p> <p>Responses to discussion questions</p> <p>Journal assessments</p> <p>Threaded Discussion Groups</p> <p>Safety quizzes</p> <p>Practical Assessments for all equipment</p>
<p>What are some successful elements of a good team?</p> <p>What are the</p>	<p>Describe the role that communication plays on a team.</p> <p>List and explain the various roles of each individual within a</p>	<p>http://www.teamtechnology.co.uk/workingoutyourteamrole.htm</p> <p>Example Worksheets: Safety and Regulations http://www.technologystudent.com/saftyflsh/safety4.html http://www.technologystudent.com/saftyflsh/poster1.html</p>	<p>Icebreaker Activity</p> <p>Complete Teamwork building activities</p> <p>Overview of what makes a team successful.</p>	<p>Self and Peer assessments</p> <p>TSA Rubrics</p> <p>Midterm/Final Exam</p>

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>most common roles that must be filled in a successful team?</p>	<p>team.</p>	<p>http://www.technologystudent.com/health1/stest1.htm http://www.technologystudent.com/saftyflsh/safety2.html http://www.technologystudent.com/saftyflsh/safety3.html Teamwork http://www.technologystudent.com/pse1/listen1.htm http://www.technologystudent.com/pse1/hlp1.htm http://www.technologystudent.com/pse1/honesty1.htm Example Team work building Exercises: http://wilderdom.com/games/TeamBuildingExercisesWebsites.html</p> <p>Instructor Developed Safety Quizzes (must be passed to 100% by the students)</p> <p>Individuals/Guest speakers from industry: PEOSHA Health/Safety Inspectors</p>	<p>Students will complete “Team Role Worksheet” using unit content</p> <p>Students will complete “Effective Listening Worksheet” using unit content</p> <p>Students will complete “Honesty Worksheet” using unit content</p> <p>Successfully form and function as a team throughout the year.</p> <p>Work as a team during design challenges as well as teamwork building activities</p>	

Suggestions on how to differentiate in this unit:

- A hands-on approach to assignments and projects is recommended as the most effective method of learning. Teacher should always adjust learning environment based on reluctant learners or special education needs.
- Students with individual learning styles can be assisted through adjustments in assessment standards, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods
- A wide variety of assessments and strategies complement the individual learning experience.

**Freehold Regional High School District
Technology Design Laboratory I
Unit #4: Structures and Mechanisms**

Enduring Understandings: Technology has strong connections to all subject areas, especially science and math.
The designed world is broken down into seven areas of technology.
Information gathering and synthesis is crucial in the development of technology.
Technology has social, economical and environmental impacts on our lives.

Essential Questions: How do science and math play a role in the various fields of technology? How can technological products or systems reside within multiple areas? What areas of technology are closely related to one another? What is the importance of technical research in the development of new technological products and systems? What are the legal and ethical consequences of claiming someone ideas or designs?

Unit Goals: The students will be able to identify and describe the use of structures in everyday life.
The students will be able to describe and demonstrate structural forces and how they act on a structure.
The students will be able to create models of simple machines.
The students will be able to describe how simple machines are combined to form complex mechanisms.

Duration of Unit: 2-5 weeks

NJCCCS: 1.3.D.1, 1.4.B.1, 4.5 A.1-2, 4.5 F., 5.1.B.2, 6.1.C.16.A, 8.1.D.1-4, 8.1.E.1-2, 8.2.B.1-3, 8.2.D.1, 8.2.C.1, 8.2.F.1, 8.2.G.1, 8.2.D.1, 8.2.C.1-3, 9.1.F.2

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>How is math utilized in the design of structures and mechanical systems?</p> <p>How does a structural engineer test how a structure will react to loads and stresses before it is built?</p>	<p>Define the terms <i>dynamic and static load</i> and be able to give examples of each.</p> <p>Understand that mathematics and physics relate to structural engineering.</p> <p>Describe the various forces that act on a structure including: <i>tension, torsion, compression and shear.</i></p>	<p>Classroom supplies for technological learning activities (TLA)</p> <p>Current textbook and resource binder</p> <p>PowerPoint/SMART Notebook Presentation</p> <p>Internet</p> <p>Optional Textbooks: <i>Engineering Design: An Introduction</i>, ISBN: 1418062413 <i>Design and Problem Solving in Technology</i>, ISBN: 0827352468</p> <p>Example Online Resources: http://www.technologystudent.com/forcmom/force1.htm http://www.technologystudent.com/struct1/strut1.htm http://www.technologystudent.com/forcmom/dkforce1.htm http://www.technologystudent.com/forcmom/dkforce2.htm</p> <p>Recommended Software: West Point Bridge Builder- http://bridgecontest.usma.edu/download.htm</p> <p>Example Worksheets: http://www.technologystudent.com/pdfs/forces1.pdf http://www.technologystudent.com/pdfs/strut1.pdf</p> <p>Example Video Clips: http://www.planet-scicast.com/view_clip.cfm?cit_id=2713</p> <p>Individuals/Guest speakers from industry</p>	<p>Show the students a video clip regarding structural engineering.</p> <p>Discuss how math and science are needed in structural engineering.</p> <p>Students will complete “Forces Worksheet” using unit content</p> <p>Students will complete “Struts and Ties Worksheet” using unit content</p> <p>West Point Bridge Building Contest</p>	<p>Written tests and quizzes</p> <p>Worksheets</p> <p>Project assessments</p> <p>Article summaries</p> <p>Notebook assessments</p> <p>Responses to discussion questions</p> <p>Journal assessments</p> <p>Threaded Discussion Groups</p> <p>Self and Peer assessments</p> <p>TSA Rubrics</p> <p>Midterm/Final Exam</p>

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>What is the difference between a structure and a mechanism?</p> <p>What are simple machines and where are some places where you will see them utilized?</p> <p>How can simple machines be used to form complex mechanism?</p>	<p>Define the terms <i>structure and mechanism</i> and give examples of each.</p>	<p>Example Online Resources: http://www.technologystudent.com/cams/mecstr1.htm http://www.technologystudent.com/cams/cam1.htm http://www.technologystudent.com/cams/link1.htm http://www.technologystudent.com/cams/springs.html http://www.technologystudent.com/cams/crkslid1.htm http://automata.co.uk/</p> <p>Example Worksheets: http://www.technologystudent.com/pdfs/mech1.pdf http://www.technologystudent.com/pdfs/mech3.pdf http://www.technologystudent.com/pdfs/mech20.pdf http://www.technologystudent.com/cams/mecq1.htm http://www.technologystudent.com/pdfs/mech22.pdf</p> <p>Structural Engineering Calculator (optional): http://www.calculatoredge.com/</p> <p>Individuals/Guest speakers from industry</p>	<p>Complete Simple Machine Identification Activity.</p> <p>Complete Mechanism Design Challenge (<i>ex: Mouse Trap Car, Trebuchet, Mechanical Baseball Player and/or Automata Design</i>)</p> <p>2D and 3D Lever Design Activity</p> <p>Students will complete “Cam Worksheet” using unit content</p> <p>Students will complete “Lever Worksheet” using unit content</p> <p>Calculate the mechanical advantage and velocity ratio of various mechanisms.</p> <p>Combine multiple simple machines to form complex mechanisms.</p> <p>Identify the simple machines that were used throughout history in various forms of technology</p>	

Suggestions on how to differentiate in this unit:

- A hands-on approach to assignments and projects is recommended as the most effective method of learning. Teacher should always adjust learning environment based on reluctant learners or special education needs.
- Students with individual learning styles can be assisted through adjustments in assessment standards, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods
- A wide variety of assessments and strategies complement the individual learning experience.

Freehold Regional High School District
Technology Design Laboratory I
Unit #5: Information and Communication Technologies

Enduring Understandings: The designed world consists of seven unique areas of technology.
Information gathering and synthesis is crucial in the development of technology.
Technology has social, economical and environmental impacts on our lives.

Essential Questions: What makes one media message more effective than another? What are some methods used to share design ideas?
What is the importance of technical research in the development of new technological products and systems?
What are the legal and ethical consequences of claiming someone ideas or designs?

Unit Goals: The students will be able to identify the basic elements of design and how they are used in areas such as: graphic design, product design and architecture.
The students will be able to utilize various information and communication technologies to collaborate and share ideas in the classroom.
The students will be able to create a Web 2.0 document that communicates a technological idea or theme.

Duration of Unit: 3-5 weeks

NJCCCS: 6.1.C.16.A; 8.2.B.1-3; 8.2.C.1-3

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>What elements of an advertisement cause someone to like it or dislike it?</p> <p>Where else can graphic design be utilized besides just in advertising?</p>	<p>List and explain the following design terms: (<i>Color, Line, Shape/Form, Space, Texture, Balance, Rhythm, Proportion, Dominance, Unity</i>)</p> <p>Design can also be seen in architecture and product development.</p>	<p>Classroom supplies for technological learning activities (TLA)</p> <p>Current textbook and resource binder</p> <p>PowerPoint/SMART Notebook Presentation</p> <p>Internet</p> <p>Optional Textbooks: <i>Engineering Design: An Introduction</i>, ISBN: 1418062413 <i>Design and Problem Solving in Technology</i>, ISBN: 0827352468</p> <p>Example Online Resources: Elements and Principles of Design http://www.digital-web.com/articles/principles_of_design/ http://www.wiu.edu/art/courses/design/elements.htm http://ficml.org/jemimap/style/color/wheel.html http://www.greatbuildings.com/types.html</p> <p>Social Networking</p>	<p>Overview of graphic design and its role in product design and architecture.</p> <p>Students will complete “Design Element Worksheet” using unit content</p> <p>Students will complete “Design Principles Worksheet” using unit content</p> <p>Complete Color Wheel Activity</p> <p>Architectural Style Research Report</p>	<p>Written tests and quizzes</p> <p>Worksheets</p> <p>Architecture Style Research Report</p> <p>Project assessments</p> <p>Article summaries</p> <p>Notebook assessments</p> <p>Responses to discussion questions</p> <p>Journal assessments</p>

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>How have networking technologies like <i>Myspace</i> and <i>Facebook</i> changed the way we communicate our ideas to one another?</p> <p>What are some of the benefits and drawbacks of these types of networking interfaces?</p>	<p>Explain the impacts that networking technologies like <i>Myspace</i> and <i>Facebook</i> have had on society?</p> <p>Be aware of the security risks that go along with posting information on the internet.</p>	<p>http://computer.howstuffworks.com/internet/social-networking/information/pros-cons-social-networking.htm Web2.0 http://www.jingproject.com/ http://www.youtube.com/ http://www.vimeo.com/ http://www.blip.tv/</p> <p>Example Worksheets: http://www.mtsd.k12.nj.us/6459125928111841/lib/6459125928111841/Color_wheel_worksheet.doc http://technologystudent.com/PDF3/artdec2.pdf http://technologystudent.com/PDF3/artdec3.pdf</p> <p>Individuals/Guest speakers from industry</p>	<p>Create and maintain a website using web design software or through traditional HTML “hand-coding”</p> <p>Start a blog or wiki and discuss a topic regarding internet security and safety.</p>	<p>Threaded Discussion Groups</p> <p>Self and Peer assessments</p> <p>TSA Rubrics</p> <p>Midterm/Final Exam</p>
<p>What advances in networking technology have made Web 2.0 resources possible?</p> <p>What are some methods to both create and post Web 2.0 resources for others to access?</p>	<p>Explain how Web 2.0 resources were developed and give examples of places where they can be seen on the internet</p>		<p>Embed a Web 2.0 resource on a website, blog or wiki that focuses on technological content.</p> <p>Create an original Web 2.0 resource using <i>Moodle</i>.</p>	

Suggestions on how to differentiate in this unit:

- A hands-on approach to assignments and projects is recommended as the most effective method of learning. Teacher should always adjust learning environment based on reluctant learners or special education needs.
- Students with individual learning styles can be assisted through adjustments in assessment standards, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods.
- A wide variety of assessments and strategies complement the individual learning experience.

Freehold Regional High School District
Technology Design Laboratory I
Unit #6: Construction Technology

Enduring Understandings: Technology has strong connections to all subject areas, especially science and math.
 The designed world consists of seven unique areas of technology.
 Technology has social, economical and environmental impacts on our lives.

Essential Questions: How do humans rely on technology in today’s society? How has technology evolved throughout human history?
 How do science and math play a role in the various fields of technology? What impact does technology have on other subject areas?
 Why is it important to take these impacts into account before designing a technological product or system?
 How has material science impacted construction techniques and material selection?

Unit Goals: The students will be able to identify and describe the resources that are specific to construction technology.
 The students will be able to build and evaluate a scaled structure using technical drawing and modeling materials.
 The students will be able to utilize mathematical and scientific theories in the design and evaluation of their structures.
 The students will be able to list and explain the characteristics of the four families of materials used in construction.

Duration of Unit: 4-6 weeks

NJCCCS: 1.3.D.1, 1.4.B.1, 4.5 A.1-2, 4.5 F., 5.1.B.2, 6.1.C.16.A, 8.1.D.1-4, 8.1.E.1-2, 8.2.B.1-3, 8.2.D.1, 8.2.C.1, 8.2.F.1, 8.2.G.1, 8.2.D.1, 8.2.C.1-3, 9.1.F.2

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
What are some important resources to consider before constructing a design? Why do resources change based on the type of construction project being done?	Define and explain the following terms: <i>People, Information, Knowledge, Time, Tools and Machines, Materials and Capital.</i>	Classroom supplies for technological learning activities (TLA) Current textbook and resource binder PowerPoint/SMART Notebook Presentation Internet Optional Textbooks: <i>Engineering Design: An Introduction</i> , ISBN: 1418062413 <i>Design and Problem Solving in Technology</i> , ISBN: 0827352468 Example Online Resources: http://www.cdli.ca/depted/g7/tech_res.htm Structural Forces http://www.technologystudent.com/PDF3/struck13.pdf http://www.technologystudent.com/struct1/frame1.htm http://www.technologystudent.com/struct1/beam1.htm http://www.technologystudent.com/struct1/strut1.htm	Explanation of technological resources through an open discussion and real life examples. Design activities which challenge students to describe the resources needed to complete the task. Evaluation of select products used on a daily basis and which resources were used in their development. Video clips illustrating a construction process from start to finish.	Written tests and quizzes Worksheets Project assessments Article summaries Notebook assessments Responses to discussion questions Journal assessments Threaded Discussion Groups
What methods must architects take before a building can be constructed? How do math and science play a role in the design of	Describe the process of architectural design from start to finish. Understand mathematical and scientific equations	Materials http://www.technologystudent.com/pdfs/MATERL1.pdf http://www.technologystudent.com/joints/joindex.htm http://www.technologystudent.com/joints/matprop1.htm	Discussion on scale, layout, elevations and dimensions for architectural plans. Calculation worksheets for wind loads for various	Self and Peer assessments TSA Rubrics Midterm/Final Exam

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
buildings?	relating to construction. Analyze the pros and cons of certain construction projects.	http://www.technologystudent.com/joints/matprop2.htm http://www.iccsafe.org/Pages/default.aspx# Example Worksheets: Materials: http://www.technologystudent.com/pdfs/MATERL3.pdf http://www.technologystudent.com/PDF3/plasticcs1.pdf http://www.technologystudent.com/pdfs/MATERL4.pdf	sample buildings. Develop architectural plans from a set of rough designs.	
How are building materials classified and in which ways are they used? What methods can be used to test various building materials? Why are their regulations that control what kinds of materials are can be used for certain construction projects?	Classify materials into the four categories: <i>Woods, Plastics, Metals, Ceramics and Composites</i> Demonstrate the following materials tests: <i>Tension, Torsion, Shear and Compression</i> Select materials appropriate for a specific construction job following ICC (International Code Commission) regulations.	Individuals/Guest speakers from industry Carpenter Architect Civil Engineer Building Inspector	Material classification activity using real life samples. Comparison chart worksheets for each family of material. Stress testing of sample materials for all forms of forces. Construction challenge and documentation (ex: Balsa Tower) Building code research project	

Suggestions on how to differentiate in this unit:

- A hands-on approach to assignments and projects is recommended as the most effective method of learning. Teacher should always adjust learning environment based on reluctant learners or special education needs.
- Students with individual learning styles can be assisted through adjustments in assessment standards, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods
- A wide variety of assessments and strategies complement the individual learning experience.

**Freehold Regional High School District
Technology Design Laboratory I
Unit #7: Manufacturing Technology**

Enduring Understandings: Following safety procedures and using personal protection equipment will reduce the risk of injury.
Technological development utilizes systems to produce either a product or a more advanced system.
The designed world consists of seven unique areas of technology.
Information gathering and synthesis is crucial in the development of technology.
Technology has social, economical and environmental impacts on our lives.

Essential Questions: What are the safety concerns to be considered when working in a lab setting in school or on the job?
Why is feedback so important in a technological system? What are the crucial technological systems that help society function on a daily basis?
What areas of technology are closely related to one another? How can technological products or systems reside within multiple areas?
How has material science impacted construction techniques and material selection? How do the various manufacturing methods differ from one another? What is the importance of technical research in the development of new technological products and systems?
How do activities such as “reverse engineering,” aid in the development of new technological products and systems?
How has original technologies developed into alternative products “spin-offs”? How has society tried to fix the environmental impacts technology has had on the planet? How does capital influence the final design of a product or system?

Unit Goals: The students will be able to identify the various methods in the manufacturing of a product or system.
The students will be able to create a manufacturing flowchart for a chosen product or system.
The students will be able to list and explain the various material processing techniques used in manufacturing.
The students will be able to describe and identify the importance of product research and testing in manufacturing.

Duration of Unit: 4 weeks

NJCCCS: 1.3.D.1, 1.4.B.1, 4.5 A.1-2, 4.5 F., 5.1.B.2, 6.1.C.16.A, 8.1.D.1-4, 8.1.E.1-2, 8.2.B.1-3, 8.2.D.1, 8.2.C.1, 8.2.F.1, 8.2.G.1, 8.2.D.1, 8.2.C.1-3, 9.1.F.2

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>How are products made today?</p> <p>How do the production methods vary?</p>	<p>Content: Production methodology Custom Batch Mass / Continuous Scalability Quality Control</p> <p>Skills: describe the benefits and trade-offs in regards to cost, time, quality, and waste</p>	<p>Classroom supplies for technological learning activities (TLA)</p> <p>Current textbook and resource binder</p> <p>PowerPoint/SMART Notebook Presentation</p> <p>Internet</p> <p>Product literature from manufactures.</p> <p>Sample products from manufactures, or classroom activities</p> <p>Optional Textbooks: <i>Engineering Design: An Introduction</i>, ISBN: 1418062413 <i>Design and Problem Solving in Technology</i>, ISBN: 0827352468</p> <p>Example Online Resources: Production Methods http://www.technologystudent.com/prddes1/prddex1.html http://technologystudent.com/equip1/equipex1.htm</p> <p>Flowcharts http://en.wikipedia.org/wiki/Flowchart</p> <p>Reverse Engineering http://www.ciese.org/curriculum/seproject/index.html http://gicl.cs.drexel.edu/wiki/Virtual_Dissection_BD_1 http://www-adl.stanford.edu/</p>	<p>Presentation methods that are utilized in modern manufacturing process Custom, Batch and Mass/Continuous. Students complete guided notes.</p> <p>Video clips on production of modern products such as cell phones, automobiles, and household furniture. The various benefits and tradeoffs of the manufacturing process are discussed.</p> <p>Students brainstorm various products they use on a daily basis and how they are created. Include possible methods of production such as hand tools, power tools, machines, or computer operated equipment.</p>	<p>Written tests and quizzes</p> <p>Worksheets</p> <p>Project assessments</p> <p>Article summaries</p> <p>Notebook assessments</p> <p>Responses to discussion questions</p> <p>Journal assessments</p> <p>Threaded Discussion Groups</p>
<p>How is the manufacturing or a product or system planned?</p>	<p>Content: Production planning techniques Flowchart Start and End Arrows Process Decisions Input/Output</p>	<p>http://www.technologystudent.com/prddes1/prddex1.html http://technologystudent.com/equip1/equipex1.htm</p> <p>Flowcharts http://en.wikipedia.org/wiki/Flowchart</p> <p>Reverse Engineering http://www.ciese.org/curriculum/seproject/index.html http://gicl.cs.drexel.edu/wiki/Virtual_Dissection_BD_1 http://www-adl.stanford.edu/</p>	<p>Presentation on the various production diagrams such as flowcharts. Engage students by asking them what purpose each serves and what it may symbolize.</p> <p>Students participate in a design activity in which they must produce a flowchart for the creation of a custom deli sandwich such as a ham</p>	<p>Self and Peer assessments</p> <p>TSA Rubrics</p> <p>Midterm/Final Exam</p>

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
	Skills: vocabulary for creating a flowchart	Sample Worksheets: http://technologystudent.com/equip1/equipex1.htm http://technologystudent.com/pdf2/vern1.pdf	and cheese with lettuce, tomato, oil, vinegar, and oregano.	
What are the various material processing techniques? What tools and machines are used in production?	Content: material processing techniques tools machines jigs fixtures safety procedures combining separating forming finishing measuring Skills: Appropriate tools and machines in the processing of materials.	Video: How its made. http://www.youtube.com/watch?v=zxJ_LGfOxAs Individuals/Guest speakers from industry: Production Engineer Production Line Worker	Presentation on the various processing techniques such as combining, separating, forming, finishing and measuring. Students participate in an activity in which they must match the material process with the appropriate tool or machines. Students demonstrate their knowledge of processing techniques by designing a simple product that is then created in a production run (batch).	
What role does reverse engineering play in product development and innovation? Why is quality control and product testing important?	Content: product development reverse engineering quality control techniques end of Life Skills: Product development and quality control techniques such as reverse engineering.		Students read articles related to Reverse Engineering and post reflections on Moodle Forum Students participate in a reverse engineering activity in which they disassemble a common product such as a mechanical pencil. Students complete and post project assessment. Engage students in a discussion about the various production techniques and fastening techniques and end of product life cycle.	

Suggestions on how to differentiate in this unit:

- A hands-on approach to assignments and projects is recommended as the most effective method of learning. Teacher should always adjust learning environment based on reluctant learners or special education needs.
- Students with individual learning styles can be assisted through adjustments in assessment standards, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods
- A wide variety of assessments and strategies complement the individual learning experience.

Freehold Regional High School District
Technology Design Laboratory I
Unit #8: Power and Energy Technologies

Enduring Understandings: Technology has strong connections to all subject areas, especially science and math.
 The designed world consists of seven unique areas of technology.
 Technological development utilizes systems to produce either a product or a more advanced system.

Essential Questions: How do science and math play a role in the various fields of technology? What impact does technology have on other subject areas?
 What areas of technology are closely related to one another? How can technological products or systems reside within multiple areas?
 What are the basic components of a technological system? Why is feedback so important in a technological system?
 What are the crucial technological systems that help society function on a daily basis?

Unit Goals: The students will be able to describe the importance of renewable resources and clean energy.
 The students will be able to describe the various methods of generating electricity.
 The students will be able to explain the steps taken to move electricity from a production source to an end user.
 The students will be able to describe and model the basic components of a simple electrical circuit. The students will be able to understand and explain the impact that growing energy need has on society.

Duration of Unit: 4 weeks

NJCCCS: 1.3.D.1, 1.4.B.1, 4.5 A.1-2, 4.5 F.1, 5.4.E.1-2, 5.4.G.2-7, 6.1.C.16.A, 8.2.B.1-3, 8.2.D.1, 8.2.C.1, 8.2.G.1

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>What are some sources of energy found on our planet?</p> <p>What is the difference of renewable and non-renewable energy?</p>	<p>Define and give examples of various categories and energy source. Identify various benefits and tradeoffs of using each source.</p> <p>Non-Renewable Coal Gas Oil Chemical Nuclear Renewable Solar Wind Water Geo-Thermal Biofuel</p> <p>Identify appropriate energy sources and their use.</p>	<p>Classroom supplies for technological learning activities (TLA)</p> <p>Current textbook and resource binder</p> <p>PowerPoint/SMART Notebook Presentation</p> <p>Internet</p> <p>Optional Textbooks: <i>Engineering Design: An Introduction</i>, ISBN: 1418062413 <i>Design and Problem Solving in Technology</i>, ISBN: 0827352468</p> <p>Online Resources: http://en.wikipedia.org/wiki/Electricity_generation http://science.howstuffworks.com/energy-channel.htm http://www.technologystudent.com/energy1/engex.htm http://technologystudent.com/elec1/elecex.htm http://technologystudent.com/energy1/less1.htm</p>	<p>Do Now: List the various sources of electricity and energy that are necessary for your average day.</p> <p>Presentation on the various energy sources within renewable and non renewable categories.</p> <p>Comparison worksheet for the various forms of energy.</p>	<p>Written tests and quizzes</p> <p>Worksheets</p> <p>Project assessments</p> <p>Article summaries</p> <p>Notebook assessments</p> <p>Responses to discussion questions</p> <p>Journal assessments</p>
<p>How is energy produced?</p> <p>How electricity is made available to a user at home or at work?</p>	<p>Content: Examples of energy production: Water Turbine Steam Turbine Diesel Engine Gas Turbine Forms of Energy</p> <ul style="list-style-type: none"> ▪ Mechanical ▪ Electrical ▪ Chemical ▪ Thermal ▪ Light ▪ Nuclear 	<p>Sample Worksheets:</p> <p>Energy Production http://technologystudent.com/PDF3/windy1.pdf</p> <p>Electronic Circuits http://technologystudent.com/pdfs/elec1.pdf http://technologystudent.com/PDF3/struck19.pdf</p> <p>Individuals/Guest speakers from industry Electricians Electrical Engineering Building Inspectors</p>	<p>Presentation on the various ways in which electricity is produced and how that energy is processed from one form to another to produce electricity.</p> <p>Research energy production within the state and create a graph or chart detailing the percentage of electricity produced through the various forms.</p> <p>Worksheet on the power distribution and grid network. Students detail the path electricity takes from production to the end user.</p>	<p>Threaded Discussion Groups</p> <p>Self and Peer assessments</p> <p>TSA Rubrics</p> <p>Midterm/Final Exam</p>

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
	Vocabulary Related to generation of energy and power: <ul style="list-style-type: none"> ▪ Watt ▪ Volt ▪ Amp ▪ Resistance Skill: Identify production, distribution and usage of electricity.			
How is electricity used to power simple products and systems? What is the relationship between a system model and a simple circuit?	Content: Components of a Simple Circuit Series Parallel Component Resistor LED Light Power source Ohm's Law		Presentation on basic electrical circuits and identification of various components such as LED, resistors. Students will be engaged in presentation by being asked to mathematically calculate voltage, amperage and resistance using Ohm's Law. Students will complete worksheet identifying arrangements components needed to create a simple circuit. They will also identify of parallel and series circuits.	
<p>Suggestions on how to differentiate in this unit:</p> <ul style="list-style-type: none"> • A hands-on approach to assignments and projects is recommended as the most effective method of learning. Teacher should always adjust learning environment based on reluctant learners or special education needs. • Students with individual learning styles can be assisted through adjustments in assessment standards, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods • A wide variety of assessments and strategies complement the individual learning experience. 				

Freehold Regional High School District
Technology Design Laboratory I
Unit #9: Transportation Technology

Enduring Understandings: Technology has strong connections to all subject areas, especially science and math.
 The designed world consists of seven unique areas of technology.
 Technology has social, economical and environmental impacts on our lives.
 There are four possible impacts that a technological product or system has on our lives.

Essential Questions: How has transportation made our world seem smaller? How do humans rely on technology in today's society?
 How has technology evolved throughout human history? How has technology helped to extent human capabilities throughout history?
 What are the four possible impacts that a technological system of product can have on society? Why is it important to take these impacts into account before designing a technological product or system? What are some examples of historical unexpected outcomes in technology?

Unit Goals: The students will be able to list and explain the various modes of transportation throughout history.
 The students will be able to identify and describe transportation infrastructure and its impact society.
 The students will be able to describe and model energy efficient transportation vehicles.
 The students will be able to utilize mathematical and scientific theories in the design and evaluation of their vehicles.

Duration of Unit: 4-6 weeks

NJCCCS: 6.1.C.16.A, 1.3.D.1, 1.4.B.1, 4.5 A.1-2, 4.5 F.1, 5.1.B.2, 5.4.E.1-2, 5.4.G.2-7, 8.2.B.1-3, 8.2.C.1-3, 8.2.D.1, 8.2.G.1

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>What modes of transportation are used by our society?</p> <p>How do they affect our daily lives, society, and economy?</p>	<p>Content: Intermodal Transportation Land Air Sea Rail</p> <p>Skill: Identify the various forms of intermodal transportation and impacts on society</p>	<p>Classroom supplies for technological learning activities (TLA)</p> <p>Current textbook and resource binder</p> <p>PowerPoint/SMART Notebook Presentation</p> <p>Internet</p> <p>Community resources</p> <p>Wind tunnel</p>	<p>Do now: Identify the various forms of technology that you use in a given day.</p> <p>Presentation: Transportation systems and their related components. Engage students by having them identify the purpose of various systems of transportation.</p> <p>Students participate in a activity in which they identify various subsystems and match them to the appropriate transportation category.</p>	<p>Written tests and quizzes</p> <p>Worksheets</p> <p>Project assessments</p> <p>Article summaries</p> <p>Notebook assessments</p>
<p>How does infrastructure affect the quality of transportation?</p> <p>How does regulation impact the effectiveness of transportation</p>	<p>Content: Mass Transit Infrastructure Regulating Bodies Highway Waterways Railways Airspace</p> <p>Skill: Describe the role of infrastructure and governing bodies on transportation</p>	<p>Optional Textbooks: <i>Engineering Design: An Introduction</i>, ISBN: 1418062413 <i>Design and Problem Solving in Technology</i>, ISBN: 0827352468</p> <p>Online Resources: http://technologystudent.com/energy1/hydrone1.htm http://en.wikipedia.org/wiki/Public_transport</p> <p>Sample Worksheets:</p>	<p>Presentation on the importance of infrastructure systems on how they affect the effectiveness of transportation as a whole.</p> <p>Research the impact of a given mode transportation on society during the time period it was introduced. I.e. the automobile allowed for suburban growth and decrease of people in urban areas.</p> <p>Create comparative graphs of transportation sectors in foreign countries to the United States. Describe possible impacts and outcomes on the society, economy, and environment.</p>	<p>Responses to discussion questions</p> <p>Journal assessments</p> <p>Threaded Discussion Groups</p> <p>Self and Peer assessments</p> <p>TSA Rubrics</p>

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
What forms of energy are used in transportation?	Non-Renewable Renewable	Alternate Vehicles: http://technologystudent.com/PDF3/hydro1.pdf	Presentation on the growing trend for energy efficient and alternate fuel transportation.	Midterm/Final Exam
How do science and mathematics play a role in transportation technology?	Content: Alternate Fuels Alternate Transportation Emission Standards Fuel Standards	Individuals/Guest speakers from industry Professional Drivers Motor Vehicle Inspectors FAA Officials Maritime Sailors	Students participate in an activity in which they need to design and create a vehicle that uses a given energy source to: travel a set distance in the shortest amount of time or travel the longest distance. Worksheet on calculating gear ratios of transmission systems in vehicles. Assessments on the variables that affect a vehicles mileage due to aerodynamic effects and weight.	
<p>Suggestions on how to differentiate in this unit:</p> <ul style="list-style-type: none"> • A hands-on approach to assignments and projects is recommended as the most effective method of learning. Teacher should always adjust learning environment based on reluctant learners or special education needs. • Students with individual learning styles can be assisted through adjustments in assessment standards, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods • A wide variety of assessments and strategies complement the individual learning experience. 				

Freehold Regional High School District
Technology Design Laboratory I
Unit #10: Biotechnology and Agriculture

Enduring Understandings: Technology has strong connections to all subject areas, especially science and math.
The designed world consists of seven unique areas of technology.
Technological development utilizes systems to produce either a product or a more advanced system.
Technology has social, economical and environmental impacts on our lives.

Essential Questions: How do science and math play a role in the various fields of technology? What impact does technology have on other subject areas?
How has the field of biology been combined with traditional agricultural methods to create new technologies?
What are the basic components of a technological system? Why is feedback so important in a technological system?
What are the crucial technological systems that help society function on a daily basis? How do humans rely on technology in today's society? How has technology helped to extent human capabilities throughout history?

Unit Goals: The students will be able to explain the various methods of food production throughout history.
The students will be able to describe the advancements in agricultural technologies throughout history.
The students will be able to create a model of a biotechnical or agricultural system.
The students will be able to apply scientific theories in the design and evaluation of their models.

Duration of Unit: 2-3 weeks

NJCCCS: 1.3.D.1, 1.4.B.1, 4.5 A.1-2, 4.5 F.1, 5.3.B.4-5, 5.4.E.1-2, 5.4.G.2-7, 6.1.C.16.A, 8.2.B.1-3, 8.2.C.1-3, 8.2.D.1, 8.2.G.1

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
How has food production changed during human history?	Content: agriculture biotechnology mechanization irrigation fertilization controlled ecosystems food preservation hydroponics aquaculture	Classroom supplies for technological learning activities (TLA) Current textbook and resource binder PowerPoint/SMART Notebook Presentation Internet Community resources:	Do Now: Have students identify the foods they eat in a given day and describe where they think it comes from and how it is produced. Presentation on the production of food from a historical perspective to modern times, as the use of live organisms in technology.	Written tests and quizzes Worksheets Project assessments Article summaries
How has technology played a role in the increase of food production?	Control: Mechanization GPS technology Pasteurization Controlled Environment Agriculture	Local Farms Rutgers Agricultural Centers Optional Textbooks: <i>Engineering Design: An Introduction</i> , ISBN: 1418062413 <i>Design and Problem Solving in Technology</i> , ISBN: 0827352468 Online Resources: http://www.ciese.org/curriculum/aquaponic/index.html http://www.growingedge.com/magazine/back_issues/view_article.php3?AID=190350	Research and describe the effects of various innovation and inventions of farm equipment and the effect it has had on food production, and the decrease in participation in agriculture. Students produce small scale agricultural systems to better understand the influence of technology, science, and math in agriculture. I.e. hydroponics systems.	Notebook assessments Responses to discussion questions Journal assessments Threaded Discussion Groups
How do engineers and scientist develop new and innovative food production techniques?	Content:	Video Sources: Food Inc. http://www.youtube.com/watch?v=acmysuOkG0Q	Presentation on the increase in GMO (Genetically Modified Organisms) through the use of various clips from the film <i>Fast Food Nation</i> Students reflect on the information provided in video clips and write an essay in favor of	Self and Peer assessments TSA Rubrics

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
		Individuals/Guest speakers from industry Farmer Biotechnology Engineers Nutritionist	or against GMO foods.	Midterm/Final Exam
<p>Suggestions on how to differentiate in this unit:</p> <ul style="list-style-type: none"> • A hands-on approach to assignments and projects is recommended as the most effective method of learning. Teacher should always adjust learning environment based on reluctant learners or special education needs. • Students with individual learning styles can be assisted through adjustments in assessment standards, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods • A wide variety of assessments and strategies complement the individual learning experience. 				

**Freehold Regional High School District
Technology Design Laboratory I
Unit #11: Medical Technology**

Enduring Understandings: Technology has strong connections to all subject areas, especially science and math.
The designed world consists of seven unique areas of technology.
Technology has social, economical and environmental impacts on our lives.

Essential Questions: How do science and math play a role in the various fields of technology? What impact does technology have on other subject areas?
What is the importance of medical technology on the lives of humans? How do humans rely on technology in today's society?
How has technology helped to extent human capabilities throughout history?

Unit Goals: The students will be able to explain the various methods of medicine production throughout history.
The students will be able to describe how advancements in medical technologies throughout history have impacted the lifespan of human beings.
The students will be able to create a model of a medical system.

Duration of Unit: 2-3 weeks

NJCCCS: 1.3.D.1, 1.4.B.1, 4.5 A.1-2, 4.5 F.1, 5.3.A.5-6 (medical tech), 6.1.C.16.A, 8.2.B.1-3, 8.2.C.1-3, 8.2.D.1, 8.2.G.1

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
How has medicine changed throughout human history?	Content: <ul style="list-style-type: none"> • early medical treatment and remedy • prevention • rehabilitation • vaccines • pharmaceuticals • surgical procedures • genetic engineering • protective and preventive systems 	Classroom supplies for technological learning activities (TLA) Current textbook and resource binder PowerPoint/SMART Notebook Presentation Internet Community resources Local hospitals and clinics Medical Manufacturing company	Presentation on the various aspects of medical technology from vaccine production, to artificial components, to genetic engineering. Discuss some of the impacts and tradeoff of the advancements.	Written tests and quizzes Worksheets Project assessments Article summaries Notebook assessments
What effect has the advancement in medical technology had on human life?	Content: <ul style="list-style-type: none"> • telemedicine • prosthetics • genetic engineering Skill: Identify impact of medical systems on society	Optional Textbooks: <i>Engineering Design: An Introduction</i> , ISBN: 1418062413 <i>Design and Problem Solving in Technology</i> , ISBN: 0827352468 Individuals/Guest speakers from industry: Gene Therphy Physicians Biomedical Engineers	Presentation on the various impacts of advanced medicine on society and economy. Research and identify the impact of various medical innovations, Describe what led to their development, how they were used, and the impacts they had on people and the greater society.	Responses to discussion questions Journal assessments Threaded Discussion Groups
What are some future possible advancements in medical technology?	Content: <ul style="list-style-type: none"> • telemedicine • prosthetics • genetic engineering Skill: Demonstrate knowledge of medical systems by modeling possible advancements.		Students participate in design activity that creates a model/prototype for an innovation or invention in medical systems. Examples include portable IV drug pumps, prosthetic limbs, mobility devices for physically handicapped.	Self and Peer assessments TSA Rubrics Midterm/Final Exam

Suggestions on how to differentiate in this unit:

- A hands-on approach to assignments and projects is recommended as the most effective method of learning. Teacher should always adjust learning environment based on reluctant learners or special education needs.
- Students with individual learning styles can be assisted through adjustments in assessment standards, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods
- A wide variety of assessments and strategies complement the individual learning experience.

Freehold Regional High School District
Technology Design Laboratory I
Unit #12: Careers in Technology

Enduring Understandings: Following safety procedures and using personal protection equipment will reduce the risk of injury.

Working with others is an important skill for life and the workplace.

Information gathering and synthesis is crucial in the development of technology.

Essential Questions: What are the safety concerns to be considered when working in a lab setting in school or on the job? What protection can be used in a laboratory environment? What characteristics are essential to a functional team? What are the benefits of working in a team environment as opposed to individually? Why is personal responsibility a crucial element of a team member? What is the importance of technical research in the development of new technological products and systems? How do activities such as “reverse engineering,” aid in the development of new technological products and systems? What are the legal and ethical consequences of claiming someone ideas or designs?

Unit Goals: The students will be able to list and explain the various technological career fields that are available to them.

The students will be able to research and identify the requirements and prerequisites for a career of their choice.

The students will be able to research identify tertiary school and institutions that offer programs of study in their career of chose.

The students will be able to interview and gather information about a career of their choice from an individual in that industry.

Duration of Unit: 1-2 weeks

NJCCCS: 5.1.D.1, 8.1.C.1, 8.1.D.1-4, 8.1.E.1-2, 8.2.D.18.2.F.1, 9.1.F.2, 9.1.F.3

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
What career exists in design, technology and engineering?	Content: careers regional location employment outlook earnings and benefits requirements for employment Skills: research professional career opportunities	Classroom supplies for technological learning activities (TLA) Current textbook and resource binder PowerPoint/SMART Notebook Presentation Internet Community resources Optional Textbooks: <i>Engineering Design: An Introduction</i> , ISBN: 1418062413 <i>Design and Problem Solving in Technology</i> , ISBN: 0827352468 Online Resources: http://www.bls.gov/oco/ http://careerbuilder.com/JobSeeker/Resources/CareerResources.aspx?sc_cmp2=JS_Nav_AdvRes	Presentation on the various areas of design, technology and engineering that exist in the professional world. Engage students by having them identify additional careers and professional opportunities. Students participate in an activity in which they must identify their top three choices for careers in design, technology and engineering. Each occupation will need details as to employment outlook, earnings and benefits as well as employee characteristics and responsibilities.	Written tests and quizzes Worksheets Project assessments Article summaries Notebook assessments
What type of preparation is required for a profession in design, technology, and engineering?	Content: post-secondary institutions vocational schools degrees certifications Skills: Identify appropriate educational avenues and application processes.	Individuals/Guest speakers from industry Career Counselor Guidance Counsler	Students will research educational avenues in which they would need to participate in order to pursue a career in design, technology and engineering. They will then compile the information in a presentation or online document.	Responses to discussion questions Journal assessments Threaded Discussion Groups
What are the expectations of the employee as a professional?	Content: Attention to detail Neatness Organization Personal Responsibility		Presentation on the various expectations of potential employees that business and industry look for. Students will participate in mock interviews in which they will take turns as acting as the potential employee and the employer. Students will be asked to utilize information and knowledge gained from the previous activities.	Self and Peer assessments TSA Rubrics Midterm/Final Exam

Suggestions on how to differentiate in this unit:

- A hands-on approach to assignments and projects is recommended as the most effective method of learning. Teacher should always adjust learning environment based on reluctant learners or special education needs.
- Students with individual learning styles can be assisted through adjustments in assessment standards, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods
- A wide variety of assessments and strategies complement the individual learning experience.