Audubon Public School District

APSD Creative Technology

Curriculum Guide

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Course Description

Creative Technology

This course is designed to give students the ability to use, manage, understand, and assess technology. Units of study include Engineering Design Process, Communication, Manufacturing, Construction, Bioengineering, and Transportation. This course will involve problem solving and engineering activities.

The current New Jersey standards do not include all the topics involved with this class. It has been decided to include the International Technology and Engineering Educators Association (ITTEA) standards. This set of international standards has a better fit for the Audubon technology classes.

Overview / Progressions

Overview	Standards / Performance Expectations	Unit Focus
Unit 1 The Engineering Design Process	• 8.2.8.ED.2 • 8.2.8.ED.4 • STEL-7Q	• Identify the steps of the Engineering Design Process • Utilize the Engineering Design Process by completing the spaghetti tower design challenge in a group • Review the importance of the Engineering Design Process in our society
Unit 2 Measurement	• ITEEA STL 17K • ITEEA STEL- 3G	• Uses of measurement • How to measure to 1/16th of an inch • Convert measurements • Identify needs for measurement
Unit 3 Simple Machines	• 8.2.8.A.5 • 8.2.8.C.1 • 8.2.8.C.7 • 8.2.8.D.1 • STEL-7Q • STEL-7U • STEL-7T • STEL-7V	• Use of the design process to design and build a catapult that uses simple machines • How simple machines are used in design • Work collaboratively with peers to discuss design • Introduce engineering drawing for possible solutions
Unit 4 Communication/3D Printing Design	• ITEEA 17.H. • ITEEA 17.I • ITEEA 17.J.	• Identify different forms of communication • Interpret communications from Skills for Living classes • Create 3D model of a cookie cutter

	• ITEEA 17.K. • 8.2.12.D.3 • STEL-7T • STEL-7U • STEL-7V	
Unit 5 Manufacturing	• 8.2.8.A.5 • 8.2.8.D.5 • 8.2.8.D.6 • 8.2.5.ED.3 • STEL-7Q • STEL-7T • STEL-7U • STEL-7V	• Understand the need for manufacturing. • Understand the differences between the two types of manufacturing. • Understand how to use tools safely for a purpose. • Identify any issues with their mousetrap cars and make needed adjustments. • Create a build plan (a step by step plan) for the construction of their mousetrap car.
Unit 6 Power and Energy	• ITEEA 8.2.8.ITH.2 • ITEEA 8.2.8.ITH.3	• Identify neutral and hot wires. • Explain the importance of electricity and energy. • Build a can lamp or engrave an ornament
Unit 7 Structures	• STEL-6G • STEL-7Q • STEL-7T • STEL-7U • STEL-7V • 8.2.8.ED.1 • 8.2.8.ED.6	• Identify different types of bridges • Explain the forces acting upon structures • How forces affect structures • How to use a handsaw safely • Understand what building codes are and why they are needed • Identify how civilization has evolved through the building of structures • Use the design process to create a bridge to be tested
Unit 8 Construction	• STEL -6G	• Use hand tools safely • Identify building codes in construction

	• STEL-7T • STEL-7U • STEL-7V • 8.2.8.ED.6 • 8.2.8.ED.1	• Build the framing of a bungalow • Build the roof of a bungalow • Identify parts of house framing
Unit 9 Transportation	• STEL -6G • STEL-7T • STEL-7U • STEL-7V • 8.2.8.ED.6 • 8.2.8.ED.1	• Transportation technologies are systems and devices that move goods and people from one place to another across or through land, air, water, or space. • Subsystems of transportation vehicles help guide, propel, suspend, control, and support • The forces that act on transportation vehicles are lift, drag, gravity, thrust, and friction

Subject: Creative Technology: Middle School	**Grade: 7-8**	**Unit 1: Engineering Design Process**	**1st Marking Period**
Standard / Performance Expectation	**Critical Knowledge & Skills & Associated Activity**		
• 8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem. • 8.2.8.ED.4: Investigate a malfunctioning system, identify its impact, and explain the step-by-step process used to troubleshoot, evaluate, and test options to repair the product in a collaborative team. • 8.2.8.A.2 Examine a system, consider how each part relates to other parts, and discuss	Concept(s): • The Engineering Design Process Students are able to: • Identify the steps in the Engineering Design Process • Work with a group to complete the design challenge • Follow instructions and specifications • Identify any issues with their design, troubleshoot, and repair the design as a team. Learning Goal 1: Identify the steps in the engineering design process and discuss how they used the process in their design challenge. Learning Goal 2: Students work collaboratively with their groups to utilize the design process in their design. Learning Goal 3: Identify issues in different areas of their design, determine how it relates to other areas and if changes can be made.		

a part to redesign to improve the system. ● 8.2.8.A.3 Investigate a malfunction in any part of a system and identify its impacts.	Learning Goal 4: Time management

Formative Assessments	**Summative Assessments**
● Student Participation ● Checks for Understanding ● Teacher's observation	● Quiz ● Completed project ● Daily Logs/Engineering Design Journal
Cross-Curricular Connections & 21st Century Skills	
● Daily Logs/Engineering Design Journal o NJSLSA.W4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. ● Science, Technology, Engineering, and Mathematics (STEM) Literacy ● Critical Thinking & Problem Solving ● Communication and Collaboration ● Life and Career Skills ● **Companion Standards:** o .ELA.RST.6-8.4 o .ELA.RST.6-8.10 Math..8-6.A.1 o .Math.8-6.A.2	
Essential Questions	**Enduring Understanding**
● How does the process work?	● Engineers use this process on their assignments

• What can I use the process for?	• The eight steps of the engineering design process is essential to engineering • This process can help with any problem • How engineers use the process • Why all eight steps are important • How they can use this process for the rest of Creative Technology

Differentiation		
504	• preferential seating • extended time on tests and assignments • reduced homework or classwork • verbal, visual, or technology aids	• modified textbooks or audio-video materials • behavior management support • adjusted class schedules or grading • verbal testing
Enrichment	• Utilize collaborative media tools • Provide differentiated feedback • Opportunities for reflection	• Encourage student voice and input • Model close reading • Distinguish long term and short term goals
IEP	• Utilize “skeleton notes” where some required information is already filled in for the student • Provide access to a variety of tools for responses • Provide opportunities to build familiarity and to practice with multiple media tools • Graphic organizers	• Leveled text and activities that adapt as students build skills • Provide multiple means of action and expression • Consider learning styles and interests • Provide differentiated mentors

ELLs	• Pre-teach new vocabulary and meaning of symbols • Embed glossaries or definitions • Provide translations • Connect new vocabulary to background knowledge	• Provide flash cards • Incorporate as many learning senses as possible • Portray structure, relationships, and associations through concept webs • Graphic organizers
At-risk	• Purposeful seating • Counselor involvement • Parent involvement	• Contracts • Alternate assessments • Hands-on learning
21st Century Skills		
• Creativity • Innovation • Critical Thinking		• Problem Solving • Communication • Collaboration
Integrating Technology		
• Chromebooks • Internet research • Online programs		• Virtual collaboration and projects • Presentations using presentation hardware and software

Subject: Creative Technology	**Grade: 7-8**	**Unit: 2 Measurement**	**1st Marking Period**
Content Standards	**Critical Knowledge & Skills**		
● ITEEA STL 17K The use of symbols, measurements, and drawings promotes a clear communication by providing a common language to express ideas. ● ITEEA STEL- 3G Explain how knowledge gained from other content areas affects the development of technological products and systems.	Concept(s): ● Measurement is vital in technology for creating accurate models, prototypes, blueprints, and plans. ● Measurements that contain fractions that contain fractions must be simplified. ● Measurements can be converted from feet to inches and inches to feet. ● Providing measurements promotes clear communication of ideas and is helpful in building a design. Students are able to: ● Measure to 1/16th of an inch ● Simplify measurements ● Complete measurements in different situations ● Convert measurements ● Explain the relationship between math and technology concepts such as measurement. Learning Goal 1: Identify different situations in which measurement must be used. Learning Goal 2: Identify when a measurement can be simplified Learning Goal 3: Convert feet and inches.		

Formative Assessments	Summative Assessments
● Student Participation ● Checks for Understanding ● Teacher's observation	● Quiz ● Completed worksheets and scavenger hunt ● Daily Logs/Engineering Design Journal
Cross-Curricular Connections & 21st Century Skills	
● Daily Logs/Engineering Design Journal o NJSLSA.W4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. ● Measurement Conversions o NJSLA 7.NS.A.2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. ● Science, Technology, Engineering, and Mathematics (STEM) Literacy ● Critical Thinking & Problem Solving ● Communication and Collaboration ● Life and Career Skills ● **Companion Standards:** o .ELA.RST.6-8.4 o .ELA.RST.6-8.10 Math..8-6.A.1 o .Math.8-6.A.2	
Essential Questions	**Enduring Understanding**
● Why is measurement important? ● How does measurement affect daily life? ● Why is it important to simplify any fractions in measurements? ● Why is the conversion of measurements important?	● Ability to use measurements throughout Creative Technology, other classes, and in life. ● How measurement is used in daily tasks. ● The need for measurements on blueprints. ● Conversions in measurement. ● Math and technology concepts are intertwined

Differentiation		
504	• preferential seating • extended time on tests and assignments • reduced homework or classwork • verbal, visual, or technology aids	• modified textbooks or audio-video materials • behavior management support • adjusted class schedules or grading • verbal testing
Enrichment	• Utilize collaborative media tools • Provide differentiated feedback • Opportunities for reflection • Opportunities for self-evaluation	• Encourage student voice and input • Model close reading • Distinguish long term and short term goals
IEP	• Utilize “skeleton notes” where some required information is already filled in for the student • Provide access to a variety of tools for responses • Provide opportunities to build familiarity and to practice with multiple media tools • Graphic organizers	• Leveled text and activities that adapt as students build skills • Provide multiple means of action and expression • Consider learning styles and interests • Provide differentiated mentors
ELLs	• Pre-teach new vocabulary and meaning of symbols • Embed glossaries or definitions • Provide translations • Connect new vocabulary to background knowledge	• Provide flash cards • Incorporate as many learning senses as possible • Portray structure, relationships, and associations through concept webs • Graphic organizers
At-risk	• Purposeful seating • Counselor involvement • Parent involvement	• Contracts • Alternate assessments • Hands-on learning

21st Century Skills	
• Creativity • Innovation • Critical Thinking	• Problem Solving • Communication • Collaboration
Integrating Technology	
• Chromebooks • Internet research • Online programs	• Virtual collaboration and projects • Presentations using presentation hardware and software

Subject: Creative Technology	**Grade: 7-8**	**Unit: 3 Simple Machines**	**1st Marking Period**
Content Standards	**Critical Knowledge & Skills**		
• 8.2.8.A.5 Describe how resources such as material, energy, information, time, tools, people, and capital contribute to a technological product or system.	Concept(s): • The six simple machines • How the simple machines work Students are able to: • Identify simple machines in daily life • Identify the three different types of levers		

• 8.2.8.C.1 Explain how different teams/groups can contribute to the overall design of a product. • 8.2.8.C.7 Collaborate with peers and experts in the field to research and develop a product using the design process, data analysis and trends, and maintain a design log with annotated sketches to record the developmental cycle. • 8.2.8.D.1 Design and create a product that addresses a real world problem using a design process under specific constraints.	• Use problem solving skills • Work collaboratively • Research • Work with material specifications (limited resources) Learning Goal 1: Utilize the engineering design process to research, design, and build a catapult. Learning Goal 2: Conduct research on previous designs to shape their own. Learning Goal 3: Identify simple machines within design. Learning Goal 4: Identify specifications for the design and use those specifications to develop possible solutions.

• STEL-7T Assess design quality based upon established principles and elements of design • STEL-7U Evaluate the strengths and weaknesses of different design solutions • STEL-7V Improve essential skills necessary to successfully design	

Formative Assessments	**Summative Assessments**
• Student Participation • Checks for Understanding • Teacher's observation	• Unit Review (Quiz) • Finished design and performance of catapult • Daily Logs/Engineering Design Journal
Cross-Curricular Connections & 21st Century Skills	
• Daily Logs/Engineering Design Journal	

- NJSLSA.W4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- Science, Technology, Engineering, and Mathematics (STEM) Literacy
- Critical Thinking & Problem Solving
- Communication and Collaboration
- Life and Career Skills
- **Companion Standards:**
  - .ELA.RST.6-8.4
  - .ELA.RST.6-8.10 Math..8-6.A.1
  - .Math.8-6.A.2

Essential Questions	**Enduring Understanding**
● What are simple machines? ● What is the difference between work input and work output? ● How is force measured? ● How is distance measured? ● How does an inclined plane work? ● How does a wedge work? ● How does a screw work? ● How does a lever work? ● What are the different classes of levers? ● How does a pulley work? ● How does a wheel and axle work? ● What is a fulcrum? ● What are compound machines? ● What is kinetic energy? ● What is potential energy? ● What is surface friction? ● What is fluid friction? ● What are lubricants?	● Simple machines are in almost everything we come in contact with in our everyday lives ● Simple machines make life easier ● Compound machines are two or more simple machines acting as one

Differentiation & Real World Connections		
504	• preferential seating • extended time on tests and assignments • reduced homework or classwork • verbal, visual, or technology aids	• modified textbooks or audio-video materials • behavior management support • adjusted class schedules or grading • verbal testing
Enrichment	• Utilize collaborative media tools • Provide differentiated feedback • Opportunities for reflection • Opportunities for self-evaluation	• Encourage student voice and input • Model close reading • Distinguish long term and short term goals
IEP	• Utilize “skeleton notes” where some required information is already filled in for the student • Provide access to a variety of tools for responses • Provide opportunities to build familiarity and to practice with multiple media tools • Graphic organizers	• Leveled text and activities that adapt as students build skills • Provide multiple means of action and expression • Consider learning styles and interests • Provide differentiated mentors
ELLs	• Pre-teach new vocabulary and meaning of symbols • Embed glossaries or definitions • Provide translations • Connect new vocabulary to background knowledge	• Provide flash cards • Incorporate as many learning senses as possible • Portray structure, relationships, and associations through concept webs • Graphic organizers
At-risk	• Purposeful seating • Counselor involvement • Parent involvement	• Contracts • Alternate assessments • Hands-on learning

21st Century Skills	
• Creativity • Innovation • Critical Thinking	• Problem Solving • Communication • Collaboration
Integrating Technology	
• Chromebooks • Internet research • Online programs	• Virtual collaboration and projects • Presentations using presentation hardware and software

Subject: Creative Technology	**Grade: 7-8**	**Unit: 4 Communication/3D Printing**	**1st Marking Period**
Content Standards	**Critical Knowledge & Skills**		
• ITEEA 17.H. - Information and communication systems allow information to be transferred from	Concept(s): • How to use communication • How print communication works • How to present information with symbols • How communication from others can be a valuable collaboration tool		

human to human, human to machine, and machine to human. ● ITEEA 17.I. - Communication systems are made up of a source, encoder, transmitter, receiver, decoder, and destination. ● ITEEA 17.J. - The design of a message is influenced by such factors as the intended audience, medium, purpose, and nature of the message. ● ITEEA 17.K. - The use of symbols,	● The use of 3D modeling software and 3D printers is helpful in producing prototypes and products Students are able to: ● Identify different forms of communication ● Identify the source, encoder, transmitter, receiver, decoder, and destination ● Create a cookie cutter design based on communication from the Skills for Living classes. ● Utilize Google Sketch up to create 3D models of the cookie cutters Learning Goal 1: Understand the importance of communication in society. Learning Goal 2: Be able to identify different forms of communication as well as their individual purpose. Learning Goal 3: Interpret communications from others to design a product based on their specifications and needs. Learning Goal 4: Learn the basics of Google Sketchup to create 3D models, download STLs, and print their models.

measurements, and drawings promotes clear communication by providing a common language to express ideas. ● STEL-7T Assess design quality based upon established principles and elements of design ● STEL-7U Evaluate the strengths and weaknesses of different design solutions ● STEL-7V Improve essential skills necessary to successfully design	

Formative Assessments	Summative Assessments
• Student Participation • Checks for Understanding • Teacher's observation	• Completed Cookie Cutter Model (Personal & Skills for Living) • Daily Logs/Engineering Design Journal

Cross-Curricular Connections & 21st Century Skills

- Daily Logs/Engineering Design Journal
  - NJSLSA.W4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- Science, Technology, Engineering, and Mathematics (STEM) Literacy
- Critical Thinking & Problem Solving
- Communication and Collaboration
- Life and Career Skills
- **Companion Standards:**
  - .ELA.RST.6-8.4
  - .ELA.RST.6-8.10 Math..8-6.A.1
  - .Math.8-6.A.2

Essential Questions	Enduring Understanding
• What is communication? • How does communication work? • What is the communication system? • What is a source? • What is an encoder? • What is a transmitter? • What is a receiver? • What is a decoder?	• Communication is a part of our lives every day in many different ways • Communication is an important part of our past, present and future • Communication has several different ways to say the same thing • The use of technologies such as 3D printing can be beneficial in design

• What is storage? • What is retrieval? • What is a destination? • What are the communication technologies? • What is audio? • What is visual? • What is printed? • What is mass communication? • How do symbols and icons communicate?	

Differentiation & Real World Connections		
504	• preferential seating • extended time on tests and assignments • reduced homework or classwork • verbal, visual, or technology aids	• modified textbooks or audio-video materials • behavior management support • adjusted class schedules or grading • verbal testing
Enrichment	• Utilize collaborative media tools • Provide differentiated feedback • Opportunities for reflection • Opportunities for self-evaluation	• Encourage student voice and input • Model close reading • Distinguish long term and short term goals
IEP	• Utilize “skeleton notes” where some required information is already filled in for the student • Provide access to a variety of tools for responses • Provide opportunities to build familiarity and to practice with multiple media tools • Graphic organizers	• Leveled text and activities that adapt as students build skills • Provide multiple means of action and expression • Consider learning styles and interests • Provide differentiated mentors

<table>
<tr><td>ELLs</td><td>Pre-teach new vocabulary and meaning of symbols
Embed glossaries or definitions
Provide translations
Connect new vocabulary to background knowledge</td><td>Provide flash cards
Incorporate as many learning senses as possible
Portray structure, relationships, and associations through concept webs
Graphic organizers</td></tr>
<tr><td>At-risk</td><td>Purposeful seating
Counselor involvement
Parent involvement</td><td>Contracts
Alternate assessments
Hands-on learning</td></tr>
<tr><td colspan="3">21st Century Skills</td></tr>
<tr><td colspan="2">Creativity
Innovation
Critical Thinking</td><td>Problem Solving
Communication
Collaboration</td></tr>
<tr><td colspan="3">Integrating Technology</td></tr>
<tr><td colspan="2">Chromebooks
Internet research
Online programs</td><td>Virtual collaboration and projects
Presentations using presentation hardware and software</td></tr>
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Subject: Creative Technology	**Grade: 7-8**	**Unit: 5 Manufacturing**	**2nd Marking Period**
Content Standards	**Critical Knowledge & Skills**		
• 8.2.8.A.5 Describe how resources such as material, energy, information, time, tools, people, and capital contribute to a technological product or system. • 8.2.8.D.5 Explain the impact of resource selection and the production process in the development of a common or technological	Concept(s): • How to use the tools safely • How to use the tools properly • The two different ways of manufacturing • The pros and cons of custom manufacturing • The pros and cons of mass production • How an assembly line works • How a mousetrap car works • How manufacturing is affected by materials • How the environment is affected by manufacturing Students are able to: • Use a coping saw safely • Use a vise to keep materials stationary • Identify the differences between the two types of manufacturing • Identify pros and cons in manufacturing • Explain how a mousetrap car works • Create a build plan • Use a ruler • Use a screwdriver		

product or system. ● 8.2.8.D.6 Identify and explain how the resources and processes used in the production of a current technological product can be modified to have a more positive impact on the environment ● 8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task. ● STEL-7T Assess design quality based upon established principles and	● Use pliers ● Use a hot glue gun Learning Goal 1: Understand the need for manufacturing. Learning Goal 2: Understand the differences between the two types of manufacturing. Learning Goal 3: Understand how to use tools safely for a purpose. Learning Goal 4: Identify any issues with their mousetrap cars and make needed adjustments. Learning Goal 5: Create a build plan (a step by step plan) for the construction of their mousetrap car.

elements of design • STEL-7U Evaluate the strengths and weaknesses of different design solutions • STEL-7V Improve essential skills necessary to successfully design	

Formative Assessments	**Summative Assessments**
• Student Participation • Checks for Understanding • Teacher's observation	• Safety Test • Build Plan • Unit Review (Quiz) • Completed Mousetrap Car and performance
Cross-Curricular Connections & 21st Century Skills	
• Daily Logs/Engineering Design Journal o NJSLSA.W4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. • Science, Technology, Engineering, and Mathematics (STEM) Literacy • Critical Thinking & Problem Solving	

- Communication and Collaboration
- Life and Career Skills
- **Companion Standards:**
  - .ELA.RST.6-8.4
  - .ELA.RST.6-8.10 Math..8-6.A.1
- .Math.8-6.A.2

Essential Questions	Enduring Understanding
• What is manufacturing? • What is mass production? • What things are mass produced? • What is custom manufacturing? • What things are custom manufactured? • What are interchangeable parts? • What is automation? • Why do we use robots in manufacturing? • What are the basic processes in manufacturing? • What is cutting? • What is shaping? • What is assembling? • What is joining? • What is finishing? • What is quality control? • What is safety? • What is an assembly line? • Who is Henry Ford?	• Manufacturing is the process of turning raw materials into physical goods • Most of the things we use today are mass produced • Custom manufacturing is slow but precise on what is wanted

Differentiation & Real World Connections		
504	• preferential seating • extended time on tests and assignments • reduced homework or classwork • verbal, visual, or technology aids	• modified textbooks or audio-video materials • behavior management support • adjusted class schedules or grading • verbal testing
Enrichment	• Utilize collaborative media tools • Provide differentiated feedback • Opportunities for reflection • Opportunities for self-evaluation	• Encourage student voice and input • Model close reading • Distinguish long term and short term goals
IEP	• Utilize “skeleton notes” where some required information is already filled in for the student • Provide access to a variety of tools for responses • Provide opportunities to build familiarity and to practice with multiple media tools • Graphic organizers	• Leveled text and activities that adapt as students build skills • Provide multiple means of action and expression • Consider learning styles and interests • Provide differentiated mentors
ELLs	• Pre-teach new vocabulary and meaning of symbols • Embed glossaries or definitions • Provide translations • Connect new vocabulary to background knowledge	• Provide flash cards • Incorporate as many learning senses as possible • Portray structure, relationships, and associations through concept webs • Graphic organizers
At-risk	• Purposeful seating • Counselor involvement • Parent involvement	• Contracts • Alternate assessments • Hands-on learning

21st Century Skills	
• Creativity • Innovation • Critical Thinking	• Problem Solving • Communication • Collaboration
Integrating Technology	
• Chromebooks • Internet research • Online programs	• Virtual collaboration and projects • Presentations using presentation hardware and software

Subject: Creative Technology	**Grade: 7-8**	**Unit: 6 Power and Energy**	**2nd Marking Period**
Content Standards	**Critical Knowledge & Skills**		
• 8.2.8.ITH.2: Compare how technologies have influenced society over time. • 8.2.8.ITH.3: Evaluate the impact of sustainability on the development of a designed product or system.	Concept(s): • Power and Energy Students are able to: • Identify a neutral and a hot wire • Use Adobe Illustrator to create an image trace • Create a file for the laser engraver		

	● Identify the need for electricity and power sources Learning Goal 1: Use electricity to make a can lamp or laser engraved ornament. Learning Goal 2: Understand the need for sustainable power and energy sources. Learning Goal 3: Understand how advancements in power and energy have shaped our society.

Formative Assessments	**Summative Assessments**
● Student Participation ● Checks for Understanding ● Teacher's observation	● Completed lamp or ornament ● Daily Logs/Engineering Design Journal
Cross-Curricular Connections & 21st Century Skills	
● Daily Logs/Engineering Design Journal o NJSLSA.W4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. ● Science, Technology, Engineering, and Mathematics (STEM) Literacy ● Critical Thinking & Problem Solving ● Communication and Collaboration ● Life and Career Skills ● **Companion Standards:** o .ELA.RST.6-8.4 o .ELA.RST.6-8.10 Math..8-6.A.1	

o .Math.8-6.A.2	
Essential Questions	**Enduring Understanding**
● How does power and energy affect our daily lives? ● How can you determine if a wire is hot or neutral? ● How does the engraver use power? ● How can power and energy be sustainable for the future?	● Identify neutral and hot wires. ● Power can be sustainable through a multitude of sources such as hydropower, solar power, and more. ● The need for power and energy is a part of most people's daily lives.

Differentiation & Real World Connections		
504	● preferential seating ● extended time on tests and assignments ● reduced homework or classwork ● verbal, visual, or technology aids	● modified textbooks or audio-video materials ● behavior management support ● adjusted class schedules or grading ● verbal testing
Enrichment	● Utilize collaborative media tools ● Provide differentiated feedback ● Opportunities for reflection ● Opportunities for self-evaluation	● Encourage student voice and input ● Model close reading ● Distinguish long term and short term goals
IEP	● Utilize "skeleton notes" where some required information is already filled in for the student ● Provide access to a variety of tools for responses ● Provide opportunities to build familiarity and to practice with multiple media tools ● Graphic organizers	● Leveled text and activities that adapt as students build skills ● Provide multiple means of action and expression ● Consider learning styles and interests ● Provide differentiated mentors

ELLs	• Pre-teach new vocabulary and meaning of symbols • Embed glossaries or definitions • Provide translations • Connect new vocabulary to background knowledge	• Provide flash cards • Incorporate as many learning senses as possible • Portray structure, relationships, and associations through concept webs • Graphic organizers
At-risk	• Purposeful seating • Counselor involvement • Parent involvement	• Contracts • Alternate assessments • Hands-on learning
21st Century Skills		
• Creativity • Innovation • Critical Thinking		• Problem Solving • Communication • Collaboration
Integrating Technology		
• Chromebooks • Internet research • Online programs		• Virtual collaboration and projects • Presentations using presentation hardware and software

Subject: Creative Technology	**Grade: 7-8**	**Unit: 7 Structures**	**3rd Marking Period**

Content Standards	**Critical Knowledge & Skills**
● STEL -6G Verify that the evolution of civilization has been directly affected by, and in turn affected, the development and use of tools, materials, and processes ● STEL-7T Assess design quality based upon established principles and elements of design ● STEL-7U Evaluate the strengths and weaknesses of different design solutions ● STEL-7V Improve essential skills necessary to successfully design ● 8.2.8.ED.6: Analyze how trade-offs can impact the design of a product. ● 8.2.8.ED.1: Evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer.	Concept(s): ● Structures ● Building codes ● Forces Students are able to: ● Identify different types of bridges ● Explain the forces acting upon structures ● Explain how forces affect structures ● Use a handsaw safely ● Understand what building codes are and why they are needed ● Identify how civilization has evolved through the building of structures ● Use the design process to build a bridge to be tested Learning Goal 1: Use hand tools safely Learning Goal 2: Understand and explain the forces that act on structures and how those forces affect design. Learning Goal 3: Use the design process to design and construct a model bridge to be tested.

Formative Assessments	Summative Assessments
● Student Participation ● Checks for Understanding ● Teacher's observation	● Completed Bridge and performance ● Unit Review (quiz) ● Daily Logs/Engineering Design Journal
Cross-Curricular Connections & 21st Century Skills	
● Daily Logs/Engineering Design Journal o NJSLSA.W4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. ● Science, Technology, Engineering, and Mathematics (STEM) Literacy ● Critical Thinking & Problem Solving ● Communication and Collaboration ● Life and Career Skills ● **Companion Standards:** o .ELA.RST.6-8.4 o .ELA.RST.6-8.10 Math..8-6.A.1 o .Math.8-6.A.2	
Essential Questions	**Enduring Understanding**

• What are the types of bridges? • What is an arch bridge? • What is a beam bridge? • What is a suspension bridge? • What is a site? • What is a span? • What is a load? • What is tension? • What is compression? • What is torsion? • What is bending?	• What is shearing?Bridges are chosen based on location and span • Forces act on structures and affect the design • Hand Tool Safety

Differentiation & Real World Connections		
504	• preferential seating • extended time on tests and assignments • reduced homework or classwork • verbal, visual, or technology aids	• modified textbooks or audio-video materials • behavior management support • adjusted class schedules or grading • verbal testing
Enrichment	• Utilize collaborative media tools • Provide differentiated feedback • Opportunities for reflection • Opportunities for self-evaluation	• Encourage student voice and input • Model close reading • Distinguish long term and short term goals

IEP	• Utilize “skeleton notes” where some required information is already filled in for the student • Provide access to a variety of tools for responses • Provide opportunities to build familiarity and to practice with multiple media tools • Graphic organizers	• Leveled text and activities that adapt as students build skills • Provide multiple means of action and expression • Consider learning styles and interests • Provide differentiated mentors
ELLs	• Pre-teach new vocabulary and meaning of symbols • Embed glossaries or definitions • Provide translations • Connect new vocabulary to background knowledge	• Provide flash cards • Incorporate as many learning senses as possible • Portray structure, relationships, and associations through concept webs • Graphic organizers
At-risk	• Purposeful seating • Counselor involvement • Parent involvement	• Contracts • Alternate assessments • Hands-on learning
21st Century Skills		
• Creativity • Innovation • Critical Thinking		• Problem Solving • Communication • Collaboration
Integrating Technology		
• Chromebooks • Internet research • Online programs		• Virtual collaboration and projects • Presentations using presentation hardware and software

Subject: Creative Technology	**Grade: 7-8**	**Unit: 8 Construction**	**3rd Marking Period**
Content Standards	**Critical Knowledge & Skills**		
• STEL -6G Verify that the evolution of civilization has been directly affected by, and in turn affected, the development and use of tools, materials, and processes • STEL-7T Assess design quality based upon established principles and elements of design • STEL-7U Evaluate the strengths and weaknesses of different design solutions • STEL-7V Improve essential skills necessary to successfully design • 8.2.8.ED.6: Analyze how trade-offs can impact the design of a product. • 8.2.8.ED.1: Evaluate the function, value, and	Concept(s): • Construction • Architecture • Building Codes Students are able to: • Use hand saw • Use balsa wood cutter • Use coping saw • Use hot glue gun • Build the framing of a bungalow • Build the roof of a bungalow • Identify parts of house framing Learning Goal 1: Use hand tools safely Learning Goal 2: Identify the different parts of house and roof framing.		

aesthetics of a technological product or system, from the perspective of the user and the producer.	Learning Goal 3: Work collaboratively to build a model bungalow's framing.

Formative Assessments	Summative Assessments
● Student Participation ● Checks for Understanding ● Teacher's observation	● Completed Bungalow Framing ● Unit Review (quiz) ● Daily Logs/Engineering Design Journal
Cross-Curricular Connections & 21st Century Skills	
● Daily Logs/Engineering Design Journal o NJSLSA.W4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. ● Science, Technology, Engineering, and Mathematics (STEM) Literacy ● Critical Thinking & Problem Solving ● Communication and Collaboration ● Life and Career Skills ● **Companion Standards:** o .ELA.RST.6-8.4 o .ELA.RST.6-8.10 Math..8-6.A.1 o .Math.8-6.A.2	
Essential Questions	**Enduring Understanding**
● What is construction? ● What are building codes? ● What is a foundation? ● What is flooring? ● What is decking?	● Construction technology involves building structures in order to contain, shelter, manufacture, transport, communicate, and provide recreation. ● The parts of a structure are essential to residential and commercial building

• What is a wall? • What are studs? • What are roofing systems?	

Differentiation & Real World Connections		
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Enrichment	• Utilize collaborative media tools • Provide differentiated feedback • Opportunities for reflection • Opportunities for self-evaluation	• Encourage student voice and input • Model close reading • Distinguish long term and short term goals
IEP	• Utilize “skeleton notes” where some required information is already filled in for the student • Provide access to a variety of tools for responses • Provide opportunities to build familiarity and to practice with multiple media tools • Graphic organizers	• Leveled text and activities that adapt as students build skills • Provide multiple means of action and expression • Consider learning styles and interests • Provide differentiated mentors
ELLs	• Pre-teach new vocabulary and meaning of symbols • Embed glossaries or definitions • Provide translations • Connect new vocabulary to background knowledge	• Provide flash cards • Incorporate as many learning senses as possible • Portray structure, relationships, and associations through concept webs • Graphic organizers

At-risk	• Purposeful seating • Counselor involvement • Parent involvement	• Contracts • Alternate assessments • Hands-on learning
21st Century Skills		
• Creativity • Innovation • Critical Thinking		• Problem Solving • Communication • Collaboration
Integrating Technology		
• Chromebooks • Internet research • Online programs		• Virtual collaboration and projects • Presentations using presentation hardware and software

Subject: Creative Technology	**Grade: 7-8**	**Unit: 9 Transportation**	**4th Marking Period**
Content Standards	**Critical Knowledge & Skills**		
• STEL -6G Verify that the evolution of civilization has been directly affected by, and in turn affected, the development and use of	Concept(s): • Transportation Students are able to:		

tools, materials, and processes ● STEL-7T Assess design quality based upon established principles and elements of design ● STEL-7U Evaluate the strengths and weaknesses of different design solutions ● STEL-7V Improve essential skills necessary to successfully design ● 8.2.8.ED.6: Analyze how trade-offs can impact the design of a product. ● 8.2.8.ED.1: Evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer.	● Use a Styrofoam cutter ● Use paint ● Use hot glue ● Use templates ● Use rulers ● Tie knots ● Use the drill press ● Use sand paper ● Use hammers ● Use drill bits ● Use CO2 canisters ● Use the engineering design process to construct different modes of transportation (Planes, cars, rockets) Learning Goal 1: Use hand tools safely Learning Goal 2: Identify the different types of transportation Learning Goal 3:Create individual designs to test. Learning Goal 4: Explain the need for transportation design.

Formative Assessments	Summative Assessments
● Student Participation ● Checks for Understanding ● Teacher's observation	● Completed projects and performance ● Unit Review (quiz) ● Daily Logs/Engineering Design Journal
Cross-Curricular Connections & 21st Century Skills	
● Daily Logs/Engineering Design Journal o NJSLSA.W4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. ● Science, Technology, Engineering, and Mathematics (STEM) Literacy ● Critical Thinking & Problem Solving ● Communication and Collaboration ● Life and Career Skills ● **Companion Standards:** o .ELA.RST.6-8.4 o .ELA.RST.6-8.10 Math..8-6.A.1 o .Math.8-6.A.2	
Essential Questions	**Enduring Understanding**
● What are the transportation systems? ● What is land transportation? ● What is water transportation? ● What is air transportation? ● What is space transportation? ● What is a subsystem in transportation? ● What is structural? ● What is propulsion? ● What is guidance? ● What is suspension?	● Transportation technologies are systems and devices that move goods and people from one place to another across or through land, air, water, or space. ● Subsystems of transportation vehicles help guide, propel, suspend, control, and support ● The forces that act on transportation vehicles are lift, drag, gravity, thrust, and friction

• What is control? • What is support? • What is lift? • What is drag? • What is gravity? • What is thrust? • What is friction? • What is a fire arrow? • What are Newton's laws of motion? • How does a propellant work? • Who was Dr. Robert Goddard? • What is Sputnik? • What is a parachute? • What are the parts of a parachute? • What is stabilized descent? • What is terminal velocity? • What is Bernoulli's principle? • How does an airfoil work? • What are the parts of an aircraft? • What is buoyancy? • What is density? • What are specifications? • What is rolling friction? • What is CO2?	

Differentiation & Real World Connections

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• Creativity		• Problem Solving

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Integrating Technology	
• Chromebooks • Internet research • Online programs	• Virtual collaboration and projects • Presentations using presentation hardware and software