Course Title – Woodworking 3

Implement start year – 2015-2016

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Unit #3 – The Production Process

Transfer Goal –

Students will be able to independently use their learning to produce a fully completed project.

Stage 1 – Desired Results

Established Goals

2009 NJCCC Standard(s), Strand(s)/CPI #
(http://www.nj.gov/education/cccs/2009/final.htm)

Common Core Curriculum Standards for Math and English
(http://www.corestandards.org/)

8.2 Technology Education, Engineering, and Design
All Students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world, as they relate to the individual, global society, and the environment.

A. The Nature of Technology: Technology products and systems impact every aspect of the world in which we live.

- 8.2.12.A.1 Design and create a technology product or system that improves the quality of life and identify trade-offs, risks, and benefits.

21st Century Themes
(www.21stcenturyskills.org)

___ Global Awareness
___Financial, Economic, Business and Entrepreneurial Literacy
___Civic Literacy
___Health Literacy
___Environmental Literacy

21st Century Skills

Learning and Innovation Skills:
_x__Creativity and Innovation
_x__Critical Thinking and Problem Solving
_x__Communication and Collaboration

Information, Media and Technology Skills:
_x__Information Literacy
_x__Media Literacy
_x__ICT (Information, Communications and Technology) Literacy

B. Design: Critical Thinking, Problem Solving, and Decision making: The design process is a systematic approach to solving problems. • 8.2.12.B.1 Design and create a product that maximizes conservation and sustainability of a scarce resource, using the design process and entrepreneurial skills throughout the design process. • 8.2.12.B.2 Design and create a prototype for solving a global problem, documenting how the proposed design features affect the feasibility of the prototype through the use of engineering, drawing, and other technical methods of illustration. • 8.2.12.B.3 Analyze the full costs, benefits, trade-offs, and risks related to the use of technologies in a potential career path. C. Technological Citizenship, Ethics and Society: Knowledge and understanding of human, cultural, and societal values are fundamental when designing technology systems and products in the global society. • 8.2.12.C.1 Analyze the ethical impact of a product, system, or environment, worldwide, and report findings in a web-based publication that elicits further comment and analysis. • 8.2.12.C.2 Evaluate ethical considerations regarding the sustainability of resources that are used for the design, creation, and maintenance of a chosen product. • 8.2.12.C.3 Evaluate the positive and negative impacts in a design by providing a digital overview of a chosen product and suggest potential modifications to address the negative impacts.	*Life and Career Skills:* _x__Flexibility and Adaptability _x__Initiative and Self-Direction _x__Social and Cross-Cultural Skills _x__Productivity and Accountability _x__Leadership and Responsibility

D. Research and Information Fluency: Information-literacy skills, research, data analysis, and prediction provide the basis for the effective design of technology systems • 8.2.12.D.1 Reverse-engineer a product to assist in designing a more eco-friendly version, using an analysis of trends and data about renewable and sustainable materials to guide your work. E. Communication and Collaboration: Digital tools facilitate local and global communication and collaboration in designing products and systems. • 8.2.12.E.1 Use the design process to devise a technological product or system that addresses a global issue, and provide documentation through drawings, data, and materials, taking the relevant cultural perspectives into account throughout the design and development process. F. Resources for a technological world: Technological products and systems are created through the application and appropriate use of technological resources. • 8.2.12.F.1 Determine and use the appropriate application of resources in the design, development, and creation of a technological product or system. • 8.2.12.F.2 Explain how material science impacts the quality of products. • 8.2.12.F.3 Select and utilize resources that have been modified by digital tools (e.g., CNC equipment, CAD software) in the creation of a technological product or system. G. The Designed World: The designed world is the product of a design process that provides the means to convert resources into	

products and systems. 8.2.12.G.1 Analyze the interactions among various technologies and collaborate to create a product or system demonstrating their interactivity. CCSS.ELA-LITERACY.RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. CCSS.ELA-LITERACY.WHST.9-10.2.F Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic). 9.1 21st-Century Life & Career Skills All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures. 9.1.12.A.1 Apply critical thinking and problem-solving strategies during structured learning experiences.	
Enduring Understandings: *Students will understand that . . .* *EU 1* • selecting the proper tools and appropriate joints based on the product and material is essential to successful project construction. *EU 2* • jigs and accessories increase the convenience of machines.	**Essential Questions:** *EU 1* • How does joint and grain direction affect the project strength? • How is material selection dictated by the application? • How does one decide which material is best for the job? • How do you determine the estimated stress levels of individual joints? *EU 2* • How do jigs and fixture increase the accuracy and stability of a

EU 3 • selecting the proper applications and appropriate materials for turning on the lathe is essential to successful project construction.	machine? • How could the use of jigs and fixtures benefit (or maybe enhance) a project? How can they be a disadvantage to a project? *EU 3* • What are the appropriate materials one should consider when turning on the lathe? • Which applications would a woodworker use for turning on centers and turning using a faceplate? • How does a woodworker prepare stock for gluing a bowl?
Knowledge: *Students will know . . .* *EU 1* • direction of grain and joint strength. • plywood, particle board and fiber boards are used for frame construction. • solid woods are used for face frames, foot moldings, and crown moldings. • stress levels of particular wood joints. *EU 2* • table saw extensions help support awkward stock. • taper jigs are used to cut angles for legs of a table. • miter jigs can be used instead of miter gauge to make crosscutting applications. • drilling attachments are used to increase the accuracy of a portable drill. *EU 3* • the appropriate material for turnings. • the applications for turning on centers and faceplate tuning. • how to work with turning tools to create various shapes. • how to center stock to begin turning.	**Skills:** *Students will be able to . . .* *EU 1* • determine grain direction by looking at the front, side and end grain. • build cabinet frame using plywood. • construct face, foot and crown for projects. • test stress levels of individual joints in a press. *EU 2* • use jigs safely and effectively to complete their projects. • use the jig to make multiple parts. • decrease operator error by creating a fixture. • increase structural integrity of work pieces. *EU 3* • select appropriate material and thickness. • center stock on lathe. • construct a turned project (ex- knob, legs, bowl). • sand and finish project on the lathe.

Stage 2 – Assessment Evidence

Recommended Performance Tasks:

Other Recommended Evidence: *Tests, Quizzes, Prompts, Self-assessment, Observations, Dialogues, etc.*

- Quizzes on jigs and lathe components
- Self-Assessment of projects using project rubric
- Weekly journal entries
- Jig practice exercises and lathe practice components
- Observation of specific techniques during construction
- Final project
- Group discussion on fixtures

Stage 3 – Learning Plan

Suggested Learning Activities to Include Differentiated Instruction and Interdisciplinary Connections: *Each learning activity listed must be accompanied by a learning goal of A= Acquiring basic knowledge and skills, M= Making meaning and/or a T= Transfer.*

- Teacher demonstrations on lathe and fixture techniques (A)
- Teacher will model steps to sanding on lathe (A)
- Students will work in groups to select appropriate project features (A,M)
- Student practice activities on lathe and jigs (M,T)
- Peer critiques as a form of critical assessment and reflection. (T)
- Students design self-evaluation rubrics (T)
- Student journaling and self reflection (T)