

Course Title – Woodworking I

Implement start year – 2015-2016

Revision Committee Members, email, extension – Daniel DiNatale ddinatale@lrhsd.org x 8987 Michael Johnston mjohnston1@lrhsd.org x8565 Alan Mills amills@lrhsd.org x8684 Chuck DiVincenzo cdivincenzo@lrhsd.org x6622

Unit #2 – Methods and Materials

Transfer Goal –

Students will be able to independently use their learning to research, plan, and construct the individual parts of a project to desired specifications.

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:

- Creativity and Innovation
- Critical Thinking and Problem Solving
- Communication and Collaboration

Information, Media and Technology Skills:

- Information Literacy
- Media Literacy
- 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:

- Flexibility and Adaptability
- Initiative and Self-Direction
- Social and Cross-Cultural Skills
- Productivity and Accountability
- 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

<p>products and systems.</p> <ul style="list-style-type: none"> 8.2.12.G.1 Analyze the interactions among various <u>technologies</u> and collaborate to create a product or system demonstrating their interactivity. <p><u>CCSS.ELA-LITERACY.RST.9-10.3</u> 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.</p> <p><u>CCSS.ELA-LITERACY.WHST.9-10.2.F</u> 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).</p> <p><u>9.1 21st-Century Life & Career Skills</u> 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.</p> <p>9.1.12.A.1</p> <p>Apply critical thinking and problem-solving strategies during structured learning experiences.</p>	
<p><u>Enduring Understandings:</u> <i>Students will understand that . . .</i></p> <p><i>EU 1</i> thorough research will affect the outcome of a project.</p> <p><i>EU 2</i> reading and interpreting plans is an important part of the design process.</p> <p><i>EU 3</i></p>	<p><u>Essential Questions:</u></p> <p><i>EU 1</i></p> <ul style="list-style-type: none"> Why is research important? <p><i>EU 2</i></p> <ul style="list-style-type: none"> What is the value of being able to interpret plans and procedures? <p><i>EU 3</i></p> <ul style="list-style-type: none"> Why is accuracy important?

<p>accuracy will affect the outcome of a project.</p> <p><i>EU 4</i></p> <p>there are a variety of tools and techniques a woodworker can use to create a desired product.</p>	<p><i>EU 4</i></p> <ul style="list-style-type: none"> • What are the best choices of basic tools, materials and techniques woodworkers use to get a desired result? • How do woodworkers choose tools, techniques, and materials to express their ideas?
<p><u>Knowledge:</u> <i>Students will know . . .</i></p> <p><i>EU 1</i></p> <ul style="list-style-type: none"> • a variety of research techniques. (internet, nature walks, books, etc.) • the properties of different types of wood. • the steps through which trees become usable lumber. • parts of a board. <p><i>EU 2</i></p> <ul style="list-style-type: none"> • how to read and interpret project plans. <p><i>EU 3</i></p> <ul style="list-style-type: none"> • the process laying out a project. • measurement. • how geometry is used to determine the method by which wood is cut. <p><i>EU 4</i></p> <ul style="list-style-type: none"> • the most effective tool and technique for the desired application. • hand tools vs. power tools. • crosscutting / rip cutting. • fasteners. • wood joints. 	<p><u>Skills:</u> <i>Students will be able to . . .</i></p> <p><i>EU 1</i></p> <ul style="list-style-type: none"> • describe properties of lumber. • research project designs. <p><i>EU 2</i></p> <ul style="list-style-type: none"> • interpret a project plan to complete a desired project. • interpret a bill of materials. • follow a given procedure. • interpret working drawings. <p><i>EU 3</i></p> <ul style="list-style-type: none"> • read and use a ruler accurately. • gather necessary materials. • accurately lay out a project design. • marking up lumber according to project specifications. • manipulating fractions. <p><i>EU 4</i></p> <ul style="list-style-type: none"> • select the proper tool for the job. • choose the proper technique to achieve the desired outcome. • operate hand tools safely and effectively. • operate power tools safely and effectively. • squaring a board.

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Stage 2 – Assessment Evidence

Recommended Performance Tasks:

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

- Measurement quizzes and activities
- Hand tool practice exercises (ex. Wood joints)
- Power tool practice exercises (ex. Machine cutting sequence)
- Observation of hand/power tool operation
- Group discussions on tool selection and usage

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 will model how the elements of design will impact project development (A)
- Teacher demonstrations on plan reading, fasteners, and cutting processes (A)
- Use of supplemental materials such as nature walks and presentations used as examples to enhance instruction (A)
- Students will work in groups to identify the similarities and differences of various wood properties (A,M)
- Teacher led discussions on the different types of fasteners and the parts of a plan (A,M)
- Students will analyze selected woodworking projects to identify elements and principles of design (M)
- Student journaling (M,T)
- Peer critiques as a form of critical assessment (T)
- Students design self-evaluation rubrics (T)