

NEW MILFORD PUBLIC SCHOOLS
New Milford, Connecticut



Introductory Woodworking

October 2012

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November 13, 2012*

New Milford Board of Education

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New Milford's Mission Statement

The mission of the New Milford Public Schools, a collaborative partnership of students, educators, family and community, is to prepare each and every student to compete and excel in an ever-changing world, embrace challenges with vigor, respect and appreciate the worth of every human being, and contribute to society by providing effective instruction and dynamic curriculum, offering a wide range of valuable experiences, and inspiring students to pursue their dreams and aspirations.

Introductory Woodworking

This is a hands-on, project-oriented introductory course for students without previous experience in woodworking. Students will become acquainted with the woodworking craft through the study of technical nomenclature and raw materials. Through the creation of a project, students will be introduced to each phase of the design and fabrication process. Students will become proficient in identifying, using, and maintaining all hand tools used in woodworking. In this half-year course, students will acquire insight into the woodworking industry through the study of related career paths. Shop safety, personal protection, and the use and identification of quality craftsmanship with wood as the construction material are emphasized. Project design and planning and stressing the key elements of design are also highlighted.

Pacing Guide

Unit #	Title	Weeks	Pages
1	Safety	1.5	7-9
2	Designing and Drawing	2	10-12
3	Measuring and Layout	2.5	13-15
4	Wood Cutting and Shaping Using Hand Tools	6	16-19
5	Sanding and Abrasives	3	20-22
6	Assembly and Finishing	3	23-25

Connecticut Technology Education Standards Key
Revised May, 2011

EKS Essential Knowledge and Skills

WM Wood Technology

New Milford Public Schools

Committee Member: Jeff Teravainen Unit 1: Safety	Course/Subject: Introductory Woodworking Grade Levels: 9-12 # of Weeks: 1.5
Identify Desired Results	
Connecticut Technology Education Standards	
<ul style="list-style-type: none"> WM.02: Describe and demonstrate the procedures related to workplace and job-site safety including personal protective equipment, machine safety, and material handling practices. EKS.06: Implement personal and jobsite safety rules and regulations to maintain safe and healthful working conditions and environments. EKS.02.07: Use personal protective equipment according to manufacturer rules and regulations. 	
Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that ...)	Essential Questions Inquiry used to explore generalizations
<ul style="list-style-type: none"> Safety is an attitude and a state of mind. To work safely in a workshop, one must have training in potential hazards as well as personal and machine safety equipment. No one should ever operate a tool or machine without first having the proper training. 	<ul style="list-style-type: none"> What does it mean to have a safe attitude? What causes an “accident/injury” in a workplace? How can one acquire safety education and training on tool or machine? How should one react if an injury occurs?
Expected Performances What students should know and be able to do	
Students will know the following: <ul style="list-style-type: none"> What it means to have a safe attitude and to always work with safety first in mind Working in potentially hazardous environments demands the utmost alertness and respect The common potential hazards found in a woodshop The safety colors, what they mean, and examples of their use The general safety guidelines of a shop Types of fires, types of fire extinguishers, and how they are used Basic electricity information and safety Chemical safety and proper disposal What a Material Safety Data Sheet is and how it is used 	
Students will be able to do the following: <ul style="list-style-type: none"> Demonstrate a safe attitude and an alertness and respect for the work environment 	

- Select and wear the appropriate personal protective equipment in a workshop
- Recognize a potential hazard and act accordingly
- Set up a safe workshop with proper workflow and organization
- Work safely and cooperatively with classmates and instructor
- Adhere to school and woodshop safety dress code
- Adhere to school and classroom rules at all times
- React appropriately in an unexpected situation

Character Attributes

- Respect
- Responsibility

Technology Competencies

- Students demonstrate a sound understanding of technology concepts, systems, and operations.
- Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.

Develop Teaching and Learning Plan

Teaching Strategies:

- Teacher delivers presentation on safety in the workshop and working with a safe attitude.
- Teacher gives students an introduction to the woodshop, highlighting potential hazards and areas of aid.
- Teacher distributes student copy of woodshop rules and dress code.
- Teacher introduces students to the safety colors and their meanings.
- Teacher explains the general safety guidelines of the woodshop.
- Teacher discusses fire safety, electrical safety, and chemical safety.
- Teacher shows students a Material Safety Data Sheet and explains its purpose and how it is used in many workplaces.
- Teacher demonstrates the wearing of all personal protective equipment and provides explanation of how and when to use each item.
- Teacher provides safety quiz study guide and safety contract to be signed by student and guardian.

Learning Activities:

- Students will take notes on all safety presentations and explanations.
- Students will tour the woodshop and identify potential hazards and areas of aid.
- Students will learn safety colors and their meanings as well as general safety guidelines of the woodshop.
- Students will observe posters of classroom rules and dress code and receive a student copy.
- Students will try on personal protective equipment and practice adjusting it to fit properly.
- Students will view a material safety data sheet and learn how it is used
- Students will study the safety quiz study guide and prepare to take the safety quiz.
- Students will bring the safety contract home and sign it with their guardian.
- Students will take the safety quiz and make any necessary corrections after initial grade is recorded.

<ul style="list-style-type: none"> • Teacher administers safety quiz. 	
Assessments	
<p style="text-align: center;">Performance Task</p> <p>Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)</p>	<p style="text-align: center;">Other Evidence</p> <p>Application that is functional in a classroom context to evaluate student achievement of desired results</p>
	<ul style="list-style-type: none"> • Signed safety contract • Completed safety quiz • Proper use of personal protective equipment
Suggested Resources	
<ul style="list-style-type: none"> • Feirer, John and Feirer, Mark. <u>Wood Technology and Processes</u>. New York, New York: Glencoe McGraw-Hill, 2002. 	

New Milford Public Schools

Committee Member: Jeff Teravainen Unit 2: Designing and Drawing	Course/Subject: Introductory Woodworking Grade Levels: 9-12 # of Weeks: 2
Identify Desired Results	
Connecticut Technology Education Standards	
<ul style="list-style-type: none"> • WM.04.01: Describe and interpret technical drawings. • WM.04.02: Describe and prepare drawings and sketches. • WM.04.05: Explain and use fractional dimensions. • EKS.08: Identify and demonstrate positive work behaviors and personal qualities needed to be employable. 	
Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that ...)	Essential Questions Inquiry used to explore generalizations
<ul style="list-style-type: none"> • Every manufactured object, from a house to a pencil, is first designed and drawn out in detail. • The three key elements of any good design are function, appearance, and sound construction. • The basic principles of design are always considered in any design and help to ensure the success of the design. 	<ul style="list-style-type: none"> • How are objects designed? • What makes a design good? • How do the basic principles of design help to ensure the success of a product? • How are designs drawn out?
Expected Performances	
What students should know and be able to do	
<p>Students will know the following:</p> <ul style="list-style-type: none"> • The three key elements to good product design and their meanings • The basic principles of design and how they are used (proportion, balance, harmony, and emphasis) • How designers go about designing a product that meets a need • The different types of drawings that are used in design • The different types of lines that are used in drawing • The possible career paths that involve drawing and design <p>Students will be able to do the following:</p> <ul style="list-style-type: none"> • Evaluate a product design • Explain how the elements and principles of design influence the planning of a product • Apply design elements and principles to a product that they will be producing 	

<ul style="list-style-type: none"> • Identify isometric, oblique, perspective, exploded view, and working view drawings and explain when each of these drawings should be used • Produce the necessary drawings to dictate the manufacturing of a product • Utilize the correct line types when creating a drawing • Accurately scale a drawing 	
Character Attributes	
<ul style="list-style-type: none"> • Citizenship • Integrity 	
Technology Competencies	
<ul style="list-style-type: none"> • Students demonstrate a sound understanding of technology concepts, systems, and operations. • Students use critical thinking skills to plan and conduct research, to manage projects, to solve problems, and to make informed decisions using appropriate digital tools and resources. 	
Develop Teaching and Learning Plan	
<p>Teaching Strategies:</p> <ul style="list-style-type: none"> • Teacher exhibits an object to students, letting them see it/hold it/use it and then leads a discussion about the design of that object using thought provoking questions. • Teacher – via PowerPoint presentation and physical props – introduces the class to the three key elements of a good design and the basic design principles. • Teacher provides a sample product and asks students to evaluate its design, leading with explanation of the process. • Teacher exhibits and demonstrates the different types of drawings used in design, as well as the different types of lines used in those drawings. • Teacher demonstrates how to scale a drawing. • Teacher introduces students to the project that they will be drawing, planning, and ultimately manufacturing. • Teacher leads discussion of design elements and principles as they relate to the project. 	<p>Learning Activities:</p> <ul style="list-style-type: none"> • Students will interact with an object and discuss its design features. • Students will form and share a personal opinion of a product design, learning that not all designs will please all people. • Students will engage in presentation of design elements and principles, learning their meanings and observing how they apply to real-world objects. • Students will evaluate the design of a real-world product. • Students will view demonstrations and receive samples of the different types of drawings and line types used. • Students will practice creating different types of drawings. • Students will accurately scale a drawing. • Students will view and interact with a sample of the project that they will be drawing, planning, and manufacturing. • Students will discuss how the design elements and principles apply to the project.

<ul style="list-style-type: none"> Teacher guides students through the creation of a working view drawing of one of the parts of the project. 	<ul style="list-style-type: none"> Students will collaboratively create a working drawing of a project part under the guidance of their teacher and peers.
Assessments	
Performance Task Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	Other Evidence Application that is functional in a classroom context to evaluate student achievement of desired results
<p>Goal: To create a full set of working drawings that dictates the manufacture of the project</p> <p>Role: Designer</p> <p>Audience: Manufacturer who will need to use these drawings to produce the project</p> <p>Situation: You have a sample or “prototype” project in front of you. As the designer, you must create a set of usable working drawings for the manufacturer to follow.</p> <p>Product: Set of working drawings</p> <p>Standards for Success: Rubric, comparison to sample drawings, usability of drawings in subsequent manufacturing process</p>	<ul style="list-style-type: none"> Check for understanding of design principles during class discussion Observation of student practice drawings Collaboration of initial project drawing
Suggested Resources	
<ul style="list-style-type: none"> Feirer, John and Feirer, Mark. <u>Wood Technology and Processes</u>. New York, New York: Glencoe McGraw-Hill, 2002. 	

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Committee Member: Jeff Teravainen Unit 3: Measuring and Layout	Course/Subject: Introductory Woodworking Grade Levels: 9-12 # of Weeks: 2.5
Identify Desired Results	
Connecticut Technology Education Standards	
<ul style="list-style-type: none"> • WM.03.01: Identify, use, and maintain measuring layout and marking tools. • WM.04.05: Explain and use fractional dimensions. 	
Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that ...)	Essential Questions Inquiry used to explore generalizations
<ul style="list-style-type: none"> • Accurate measurement and layout is the foundation of a successful project. • Selecting the correct instrument for a task is essential to accurate layout. 	<ul style="list-style-type: none"> • What are the basic measuring and marking instruments and how are they used? • How does one select the proper measuring and marking instrument?
Expected Performances What students should know and be able to do	
<p>Students will know the following:</p> <ul style="list-style-type: none"> • The units of English measurement • The different measuring and marking instruments of the woodshop and how they are used: tape measure, ruler, pencil, depth gauge, compass, scribe, scratch awl, try square, framing square, combination square, rafter square, etc. • Why accurate measuring and marking is critical in woodworking <p>Students will be able to do the following:</p> <ul style="list-style-type: none"> • Accurately measure a piece of stock to within 1/32 of an inch • Accurately mark a piece of stock to within 1/32 of an inch • Identify and properly use the different measuring and marking instruments in the woodshop • Select the appropriate instruments for a specific measuring and marking task • Use appropriate measuring and marking devices to layout the student project on a piece of stock 	
Character Attributes	
<ul style="list-style-type: none"> • Courage • Perseverance 	

Technology Competencies

- Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.
- Students use digital media and environments to communicate and to work collaboratively, including at a distance, to support individual learning and to contribute to the learning of others.

Develop Teaching and Learning Plan

Teaching Strategies:

- Teacher shows class a real world example of a structure failure resulting from an engineering mistake, specifically an incorrectly dimensioned piece.
- Teacher explains importance of accurate measurement in the “real world.”
- Teacher connects point by exhibiting a completed project with some sort of gap or failure resulting from an incorrect dimension, explaining that accurate measuring and marking is the foundation of a successful project.
- Teacher introduces students to the various measuring and marking instruments of the woodshop and explains how and when each one is used.
- Teacher demonstrates proper use of measuring and marking instruments.
- Teacher guides students through practice using measuring and marking instruments on sample stock.
- Teacher gives each student pieces of stock that will be used to create the student project that was designed and drawn in the previous unit.

Learning Activities:

- Students will take notes on teacher presentation on the importance of accuracy in measurement.
- Students will ask questions about measurement and will share their own experiences of measurement.
- Students will observe completed project with measurement related defects and will evaluate/critique it.
- Students will observe and take notes on explanation and teacher demonstration of measuring and marking instruments of the woodshop.
- Students will ask questions about measuring and marking instruments and will discuss their use.
- Students will practice using measuring and marking instruments on sample pieces of stock.
- Under the guidance of the teacher, students will demonstrate proper and accurate use of measuring and marking instruments.
- Students will use all necessary measuring and marking devices to layout the project on their pieces of stock.

Assessments	
Performance Task	Other Evidence
Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	Application that is functional in a classroom context to evaluate student achievement of desired results
<p>Goal: To accurately layout a complete project on pieces of stock</p> <p>Role: Manufacturer/Woodworker</p> <p>Audience: Supervisor, coworkers, customer</p> <p>Situation: A complete set of detailed drawings of a project has been created. These drawings must now be followed exactly as layout is applied to the material from which the project will be made.</p> <p>Product or Performance: Pieces of stock with a complete layout applied</p> <p>Standards for Success: All layout lines checked for accuracy; usability of layout in subsequent manufacturing process</p>	<ul style="list-style-type: none"> • Teacher observation of student practice • Students' demonstration of proper use of measuring and marking instruments
Suggested Resources	
<ul style="list-style-type: none"> • Feirer, John and Feirer, Mark. <u>Wood Technology and Processes</u>. New York, New York: Glencoe McGraw-Hill, 2002. 	

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Committee Member: Jeff Teravainen Unit 4: Wood Cutting and Shaping Using Hand Tools	Course/Subject: Introductory Woodworking Grade Levels: 9-12 # of Weeks: 6
Identify Desired Results	
Connecticut Technology Education Standards	
<ul style="list-style-type: none"> • WM.03.05: Identify proper use and function of hand tools. • WM.04.06: Extrapolate information from a set of plans. • WM.04.08: Interpret a design to facilitate replication. 	
Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that ...)	Essential Questions Inquiry used to explore generalizations
<ul style="list-style-type: none"> • Historically, woodworking is a skilled craft, performed using hand tools. • The use of hand tools promotes proper technique and a deeper understanding of the woodworking craft. • Various hand tools for cutting and shaping a piece of stock must be used properly. • One's tools must be properly cared for and maintained. 	<ul style="list-style-type: none"> • What are the basic hand tools used in woodworking? • How does one select the appropriate hand tool for a particular task? • How does one properly use hand tools to cut and shape a piece of stock? • How does one properly care for and maintain one's tools?
Expected Performances What students should know and be able to do	
Students will know the following: <ul style="list-style-type: none"> • The basic hand tools used in woodworking (rip saws, back saw, crosscut saws, coping saw, keyhole saw, shaves, scrapers, jack plane, smooth plane, jointer plane, chisels, mallets, etc.) • The purpose of each tool • The characteristics of a rip cut • The characteristics of crosscut • What Kerf is and how it should be taken into consideration when making a cut • How the teeth per inch of a saw will affect characteristics of cut • How to identify the direction of a cutting stroke by observing the teeth of a saw • Why it is necessary to cut the waste side of a marked line • How to properly adjust a hand plane • How to properly hold a chisel and mallet and how to properly strike a chisel with a mallet 	

Students will be able to do the following:

- Take all necessary safety precautions when using cutting and shaping tools
- Identify and describe the basic hand tools used in woodworking (rip saws, back saw, crosscut saws, coping saw, keyhole saw, shaves, scrapers, jack plane, smooth plane, jointer plane, chisels, mallets, etc.)
- Measure the kerf of a given saw blade
- Identify the correct tool for a particular task
- Cut on the waste side of a marked line
- Properly setup and perform a rip cut
- Properly setup and perform a crosscut
- Identify the proper grain direction for planing and chiseling
- Select the correct type of hand plane for a particular task
- Properly setup a piece of stock to be planed
- Use a hand plane to true up a piece of stock
- Use a straight edge to check trueness of a piece of planed stock
- Select the proper chisel and mallet for a particular task
- Properly setup a piece of stock to be chiseled
- Use a chisel and mallet to remove material from a piece of stock
- Take proper care of hand tools to maximize their longevity
- Use appropriate hand tools to safely and accurately cut and shape all project parts according to layout marks

Character Attributes

- Compassion
- Cooperation

Technology Competencies

- Students demonstrate a sound understanding of technology concepts, systems, and operations.
- Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.

Develop Teaching and Learning Plan

Teaching Strategies:

- Teacher gives presentation about the history of woodworking with hand tools and explains some of the benefits of using hand tools.
- The following process is repeated for each tool being taught.
 - Teacher exhibits and introduce students to the tool.
 - Teacher gives an explanation of the tool, what its purpose is, and how it is used.
 - Teacher demonstrates the proper setup of a piece of stock for the specific tool.
 - Teacher demonstrates the proper use of the tool.
 - Teacher answers student questions about the tool and allows for discussion of students' past experiences/encounters with the tool.
 - Teacher guides students through practice using the tool on a sample piece of stock.
- Teacher demonstrates proper tool care and maintenance.
- Teacher demonstrates the use of each appropriate tool to cut and shape a piece of project stock according to layout marks for the student project.
- Teacher assigns students the task of using all appropriate hand tools to cut and shape their project stock into individual project parts according to layout marks.

Learning Activities:

- Students will observe and take notes on teacher's presentation about the history of woodworking with hand tools and explain some of the benefits of using hand tools.
- Students will observe and take notes on teacher's introduction of each hand tool.
- Students will observe and take notes on teacher's demonstration of stock setup for each tool.
- Students will observe and take notes on teacher's demonstration of the proper use of the tool.
- Students will ask questions about each tool and discuss their own past experiences/encounters with the tools.
- Students will practice proper tool care and maintenance.
- Under the guidance of the teacher, students will practice using use hand tools to cut and shape a piece of stock.
- Students will use all appropriate hand tools to cut and shape their pieces of project stock into individual project parts according to the layout marks that were applied in the previous unit.

Assessments	
Performance Task	Other Evidence
<p>Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)</p>	<p>Application that is functional in a classroom context to evaluate student achievement of desired results</p>
<p>Goal: To cut pieces of project stock into individual project parts according to specific layout marks</p> <p>Role: Manufacturer, woodworker</p> <p>Audience: Supervisor, coworkers, customer</p> <p>Situation: Pieces of project stock have been laid out according to a set of detailed drawings. This stock must now be cut and shaped into individual parts according to the layout marks.</p> <p>Product: Individual project parts that are the correct size and shape for the project</p> <p>Standards for Success: All parts measured for accuracy; usability of parts in subsequent sanding and assembly processes.</p>	<ul style="list-style-type: none"> • Oral question and answer to check for understanding • Teacher observation of students during tool practice • Student collaboration, helping each other to achieve proficiency with tools
Suggested Resources	
<ul style="list-style-type: none"> • Feirer, John and Feirer, Mark. <u>Wood Technology and Processes</u>. New York, New York: Glencoe McGraw-Hill, 2002. 	

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Committee Member: Jeff Teravainen Unit 5: Sanding and Abrasives	Course/Subject: Introductory Woodworking Grade Levels: 9-12 # of Weeks: 3
Identify Desired Results	
Connecticut Technology Education Standards	
<ul style="list-style-type: none"> • WM.04.17: Differentiate among various abrasive materials. • WM.06.04: Identify hand sanding equipment and procedures. 	
Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that ...)	Essential Questions Inquiry used to explore generalizations
<ul style="list-style-type: none"> • Sanding is the process of smoothing wood by rubbing it with an abrasive. • Sanding is done to prepare wood for finishing, not to form or shape it. • Abrasives come in different types and grits and have a specific classification system. • When used appropriately, power sanders can expedite the sanding process. 	<ul style="list-style-type: none"> • When should one sand his/her project? • What is the purpose of sanding? • How are abrasives classified? • What types and grits of abrasive should be used when sanding? • When and how are power sanders used?
Expected Performances	
What students should know and be able to do	
<p>Students will know the following:</p> <ul style="list-style-type: none"> • The definition of an abrasive • The appropriate time to sand a project • The different types of abrasives and their purposes • The abrasive grit range and how it is used to progressively sand a project • The classification system for abrasives that defines the grit and type • How to properly sand a piece of stock by hand • Various techniques for specialty sanding situations • The different power sanders available and their purposes • How to select and use the appropriate power sander for a job <p>Students will be able to do the following:</p> <ul style="list-style-type: none"> • Take all necessary safety precautions when sanding • Identify the correct time to sand a project • Select the best sanding method for a particular task • Use the abrasive classification system to identify a particular piece of abrasive 	

<ul style="list-style-type: none"> • Select the appropriate type and grit of abrasive for a particular task • Work progressively through a grit range to prepare a piece for finishing • Properly sand a piece of stock by hand • Use a power sander to sand a piece of stock • Use hand and power sanding techniques to sand all project parts and prepare them for assembly and finishing 	
Character Attributes	
<ul style="list-style-type: none"> • Honesty • Integrity 	
Technology Competencies	
<ul style="list-style-type: none"> • Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. • Students demonstrate a sound understanding of technology concepts, systems, and operations. 	
Develop Teaching and Learning Plan	
<p>Teaching Strategies:</p> <ul style="list-style-type: none"> • Teacher gives presentation on abrasives – definition, how they are made, what they are used for, different types and grits, and how they are classified. • Teacher introduces students to different abrasive types and grits, showing many examples. • Teacher passes out samples of abrasive and guides students through the identification process. • Teacher demonstrates proper technique for hand sanding a piece of stock. • Teacher demonstrates proper technique for working progressively through grits to prepare stock for finishing. • Teacher demonstrates various techniques for specialty sanding situations. • Teacher guides students through practice hand sanding a sample piece of stock and working progressively through the grits. 	<p>Learning Activities:</p> <ul style="list-style-type: none"> • Students will observe and take notes on teacher presentation on abrasives. • Students will receive sample pieces of abrasive and engage in the identification process of each one. • Students will observe and take notes on teacher demonstration of proper technique for hand sanding a piece of stock. • Students will observe and take notes on teacher demonstration of proper technique for working progressively through grits to prepare stock for finishing. • Students will observe and take notes on teacher demonstration of various techniques for specialty sanding situations. • Students will practice hand sanding a sample piece of stock, working progressively through the grits. • Students will observe and take notes on teacher introduction and demonstration of power sanders.

<ul style="list-style-type: none"> • Teacher introduces students to power sanders and explains appropriate times to use them. • Teacher demonstrates proper use of power sanders. • Teacher guides students through practice using a power sander to sand a sample piece of stock. • Teacher assigns students the task of sanding all of their project parts to prepare them for assembly and finishing, then observes/guides students through the process. 	<ul style="list-style-type: none"> • Students will practice using power sanders to sand a sample piece of stock. • Students will use appropriate hand and power sanding techniques to sand all of their project parts to prepare them for assembly and finishing.
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Assessments

Performance Task	Other Evidence
Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	Application that is functional in a classroom context to evaluate student achievement of desired results
<p>Goal: To sand all project parts to prepare them for assembly and finishing</p> <p>Role: Manufacturer/woodworker</p> <p>Audience: Supervisor, coworkers, customer</p> <p>Situation: All project parts have been cut and shaped and must now be sanded to prepare them for assembly and finishing. This will require the use of hand and power sanding methods and working progressively through grits to achieve the proper surface quality.</p> <p>Product: Adequately sanded project parts that are ready for assembly and finishing</p> <p>Standards for Success: Surface quality of parts and usability of parts in subsequent assembly and finishing process.</p>	<ul style="list-style-type: none"> • Oral question and answer to check for understanding • Teacher observation of students during sanding practice • Student collaboration, helping each other to achieve proficiency with abrasives

Suggested Resources

<ul style="list-style-type: none"> • Feirer, John and Feirer, Mark. <u>Wood Technology and Processes</u>. New York, New York: Glencoe McGraw-Hill, 2002.

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Committee Member: Jeff Teravainen Unit 6: Assembly and Finishing	Course/Subject: Introductory Woodworking Grade Levels: 9-12 # of Weeks: 3
Identify Desired Results	
Connecticut Technology Education Standards	
<ul style="list-style-type: none"> • WM.11.03: Assemble parts. • WM.06.07: Identify types of clamps. • WM.06.08: Demonstrate flat clamping procedures. • WM.16.07: Finish materials according to given designs and specifications. 	
Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that ...)	Essential Questions Inquiry used to explore generalizations
<ul style="list-style-type: none"> • Selecting the appropriate adhesive for a particular task is essential for success in assembly. • Selecting the appropriate clamps and installing those clamps correctly is essential for success in assembly. • Performing a trial assembly provides many advantages that helps to ensure a quality assembly job. • A quality finish is the result of planning, preparation, and practice. 	<ul style="list-style-type: none"> • What are the different types of glue and when are they used? • What are the different types of clamps and when are they used? • Why should one perform a trial assembly? • How can one achieve a quality finish on a project.
Expected Performances	
What students should know and be able to do	
Students will know the following: <ul style="list-style-type: none"> • How to prepare a project for assembly • How to perform a trial assembly • The various types of glue and their purposes • How to properly apply glue to a project • The various woodworking clamps and their purposes • How to correctly install woodworking clamps • The various finishes and application methods • How to select the best finish for one's project • How to prepare a project for finishing • How to properly finish a project 	

Students will be able to do the following:

- Take all necessary safety precautions for assembly and finishing
- Perform a trial assembly
- Prepare a work area for assembly
- Properly apply adhesive during assembly
- Properly assemble a project
- Select the appropriate clamps and install them correctly during assembly
- Prepare a work area for finishing
- Select the appropriate finish for a project
- Properly apply a finish to a project

Character Attributes

- Cooperation
- Perseverance
- Responsibility

Technology Competencies

- Students use critical thinking skills to plan and conduct research, to manage projects, to solve problems, and to make informed decisions using appropriate digital tools and resources.
- Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.

Develop Teaching and Learning Plan

Teaching Strategies:

- Teacher gives explanation of adhesives, different types and their uses.
- Teacher demonstrates a trial assembly and explains the benefits of doing one.
- Teacher guides students through a trial assembly of their projects, assessing and troubleshooting any issues that arise.
- Teacher exhibits/introduces students to various woodworking clamps, explaining and demonstrating their uses.
- Teacher gives various clamps to each student and guides them through practice using them.
- Teacher demonstrates the gluing, assembly, and clamping of a sample project.

Learning Activities:

- Students will observe and take notes on teacher explanation of adhesives.
- Students will observe and take notes on teacher demonstration of trial assembly.
- Students will engage in trial assembly of their projects and troubleshoot any issues that arise.
- Students will observe and take notes on teacher demonstration of various woodworking clamps.
- Students will receive various clamps and practice using them.
- Students will observe and take notes on teacher demonstration of gluing, assembly, and clamping of a sample project.
- Students will glue, assemble, and clamp their projects.

<ul style="list-style-type: none"> • Teacher assigns students the gluing, assembly, and clamping of their projects, providing guidance where needed. • Teacher gives explanation of the various types of finishes and their individual characteristics. • Teacher exhibits samples of various finishes. • Teacher demonstrates the application of a finish to a sample project. • Teacher assigns students the task of finishing their projects, providing guidance where needed. 	<ul style="list-style-type: none"> • Students will observe and take notes on teacher explanation of finishes and their characteristics. • Students will observe and take notes on teacher demonstration of application of finish to a sample project. • Students will apply a finish to their projects.
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Assessments

Performance Task	Other Evidence
Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	Application that is functional in a classroom context to evaluate student achievement of desired results
<p>Goal: To assemble and finish project</p> <p>Role: Manufacturer, woodworker</p> <p>Audience: Supervisor, coworkers, customer</p> <p>Situation: All project parts are sanded and ready for assembly and finishing. The project must be glued, assembled, clamped, allowed to dry, and finished in order to produce a completed project.</p> <p>Product: Assembled and finished project</p> <p>Standards for Success: Completed project rubric, all projects are assessed for quality of assembly and finishing. Student and teacher view project and critique it on a structural and aesthetic basis.</p>	<ul style="list-style-type: none"> • Oral question and answer to check for understanding • Teacher observation of students during practice • Student collaboration, helping each other to achieve proficiency

Suggested Resources

<ul style="list-style-type: none"> • Feirer, John and Feirer, Mark. <u>Wood Technology and Processes</u>. New York, New York: Glencoe McGraw-Hill, 2002.
