

Advanced Woodworking

COURSE OF STUDY

Technology Department

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This course is designed to increase technological literacy through the development of knowledge in woodworking. Students will learn to apply proper procedure and techniques to develop and build wood working projects. Problem solving and the systematic approach to solving these problems are emphasized. This course will teach and reinforce science, history, math, communication, and hands-on skills.

1. Mechanical Drawing and Measuring

Comprehend and develop free hand sketching techniques. Interpret and apply orthographic orientation, interpretation and application of measuring skills.

2. Wood Science and Processing. Students will learn about the origin, types and characteristics of wood. Students will learn to identify multiple types of wood and manufactured wood products. Students will learn the steps of material processing from tree to finished project.

3. Safety. Students learn basic safe shop practices, along with specific tool and machine safety presentations, and demonstrations including written and manual student safety testing.

4. Project Planning. Students will learn to plan a project, calculate board foot and material costs, create a bill of materials, and create an order of operations before a project begins.

5. Tool Identification and knowledge. Students will learn to identify, use, and care for hand tools.

6. Machines and Power Tools. Students will learn how to safely operate, adjust, maintain, and care for machines and blades in the shop.

7. Advanced Joinery. Students learn and identify multiple types of wood joints. Students will apply advanced wood joinery to a project.

8. Fasteners and Hardware. Students will learn about the many types of fastening systems. Students will apply an appropriate fastening system to a project.

6. Advanced Finishing Processes. Students will learn about the many finishing options available. Students will learn to prepare wood for the finishing process and apply a finish

system to a project.

9. CNC Machining. Students will learn to operate computer numerical controlled machines. These machines will be used to make a CNC project.

10. Design Elements. Students will identify multiple different historical styles of woodworking. Students will use the technological design process to design certain elements of a project to add individuality and creativity to the project.

11. Woods Related Fields of Study

Students will develop, research, and plan a woodworking project which is either related to another field of study or is historically, scientifically, or environmentally significant. Students will engage within the field with an in depth project and presentation.

Course Expectations and Skills

1. Keep and maintain a woodworking notebook.
2. Document daily activities in the notebook.
3. Practice proper attitude and safe discipline.
4. Develop an acceptable degree of craftsmanship in each activity.
5. Participate and contribute equally to a group generated projects and solutions.
6. Apply and analyze science and math related concepts of woodworking.
6. Prepare students to be successful in high school, higher level technology courses, trade school, and college.

Resources

Text Books:

“Modern Woodworking, 11th Edition”, By Willis H. Wagner and Clois E. Kicklighter. Published by Goodheart-Willcox 2006.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title: Advanced Woodworking Mechanical Drawing and Measuring</p>	<p>This course is designed to increase technological literacy through the development of knowledge in woodworking. Students will learn to apply proper procedure and techniques to develop and build wood working projects. Problem solving and the systematic approach to solving these problems are emphasized. This course will teach and reinforce science, history, math, communication, and hands-on skills.</p>
<p>Grade Level(s): 10-12</p>	<p>Unit Summary:</p> <ul style="list-style-type: none">• Class procedures and expectations• Measurement skills (fractional inches)• Advanced fine measurement skills• Basic sketching, orthographic, and isometric drawing
<p>Essential Question(s):</p> <ul style="list-style-type: none">• What are class procedures and rules?• How do we measure accurately?• How can we sketch an idea on paper?• How do we read a set of plans?• How do we make plans?	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none">• Identify and read divisions of a ruler and measure accurately to within 1/32 inch• Represent (draw) a 3D object with orthographic and isometric views following proper techniques• Understanding how to read and follow a set of plans through examination and application.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

<u>Learning Target</u>	<u>NJCCCS or CCS</u>
<ol style="list-style-type: none">1. Understand and observe classroom rules, requirements, emergency, and general procedures2. Understand the differences in the fractional and metric systems of measurement.3. Demonstrate accurate measurement skills (fractional inch) to read a ruler to 1/32nd of an inch.4. Students will be able to identify and use multiple different common measuring devices (rulers, tape measures, folding rules)5. Students will be able to read and use fine measurement tools such as micrometers, dial calipers, and dial indicators.6. Identify and read ruler divisions and transfer divisions to construct a wooden ruler.7. Demonstrate basic sketching, orthographic drawing, isometric drawing, and proper dimensioning of various 3D objects8. Understand the location and relationship of the different drawing views9. Read, examine, and create a bill of materials for a set of plans.10. Reverse engineer a set of plans by measuring a project and drawing orthographic and isometric drawings of the project.	<ol style="list-style-type: none">1. TEC.9-122. TEC.9-12.8.2.123. MA.K-12.4.5.C.44. SCI.8.5.3.8 B.A5. MA.K-12.4.5.C.36. MA.K-12.4.5.F.17. WORK.K-12.9.1

Inter-Disciplinary Connections:

MATH - fractional inch, decimal measurement, geometric principles.

English - An engineering notebook including written documentation of the technological design process

Students will engage with the following textbook

“Modern Woodworking, 11th Edition”, By Willis H. Wagner and Clois E. Kicklighter. Published by Goodheart-Willcox 2006.

Periodicals to include but not limited to newspapers, magazine articles, internet web pages.

Students will write:

Students will keep a woodworking notebook to include daily journal entries, notes, research, problems encountered, and dimensions and notes applicable to projects and shop processes.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

Classroom rules will be introduced and students will write them in their notebooks (see Classroom Safety Rules Sheet).

Students will be given a lesson on reading a ruler along with guided practice in using a ruler. Students will construct their own ruler from a paint stick (see Ruler Construction TLA)

Students will use tape measures and folding rules to measure large and odd shaped objects and projects

Students will read and draw Orthographic and Isometric sketches (L Block, C block, T block, Step Block)

Students will analyze a real set of woodworking plans and make a bill of materials for it.

Students will reverse engineer a set of plans from a project. Students will sketch a project and measure all of the dimensions. Students will then make an accurate set of plans for the project.

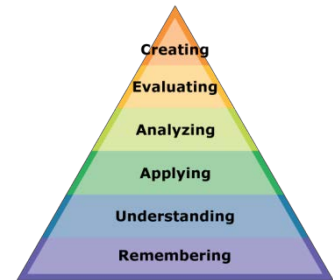
Materials and supplies

Rulers, $\frac{1}{4}$ grid graph paper, isometric paper, wooden or plastic ruler slab, try squares, pencils, woodworking plans, orthographic and isometric block worksheets and examples.

PART IV: EVIDENCE OF LEARNING

**IDENTIFY THE METHODS BY WHICH STUDENTS WILL
DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND
THEIR ABILITY TO APPLY SKILLS.**

IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

Safe work practice with hand tools as outlines in the lesson: direct teacher observation and guided practice.

Students will follow classroom procedures as provided in teacher lecture and written in woodworking notebook:

Direct teacher observation by teacher for safe working habit (see Class Participation Rubric).

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Summative Assessments:

Orthographic and Isometric drawings assignments will be graded for accuracy and neatness.

Creation of orthographic drawings from isometric will be grades for accuracy and neatness.

Bill of materials will be graded or neatness and accuracy

Measuring test

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Performance Assessments:

Orthographic and isometric sketching

Wooden ruler construction

Making of a Bill of materials

Reverse engineer plans for a project

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title: Advanced Woodworking</p> <p>Wood Science and Processing</p>	<p>Unit Summary:</p> <ul style="list-style-type: none">• This unit will give students the basic knowledge of science of wood. Students will learn where wood come from, the various types and species of wood and their uses. Students will learn about the environmental impacts of wood as a renewable and non-renewable resource. Students will learn how the wood is processed from forest to furniture.
<p>Grade Level(s): 10-12</p>	
<p>Essential Question(s):</p> <ul style="list-style-type: none">• What is wood?• Where does wood come from?• How does the diversity of wood affect its uses?• How can wood be managed to maintain it as a renewable resource?	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none">• Students will understand the biological basics of wood origins and structure. Students will identify different types of trees that different woods come from.• Students will understand the journey that wood makes as it is processed from a forest to a piece of furniture.• Students will learn about the many types of wooden manufactured materials (ex. Plywood, Masonite)• Students will be aware of the environmental impacts of modern society and the management of forests, trees, and wood.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

<u>Learning Target</u>	<u>NJCCCS or CCS</u>
<ol style="list-style-type: none">1. Students will be able to explain what wood is and the scientific structure of a tree.2. Students will be able to identify the main different types of wood and the origin tree of that wood.3. Students will be able to apply the proper type of wood to the intended best use.4. Students will become environmentally aware of the threats to the global resources including wood and forests.5. Students will be able to identify the order of operations in the system of wood extraction from a forest and to a finished product.	<ol style="list-style-type: none">1. TEC.9-12.8.2.12.G.12. TEC.9-12.8.2.12.F.23. TEC.9-12.8.2.12.B4. TEC.K-12.8.2.A.15. TEC.K-12.8.2.C.26. SCI.8.5.4.8 A.A7. SCI.8.5.5.8 B.18. SCI.8.5.5.8 B.29. SCI.8.5.10.8 B.a10. LA.9-12.3.4

Inter-Disciplinary Connections:

<p>MATH - Fractions, measurement, geometric principles.</p> <p>English - An woodworking notebook including written documentation of the technological design process</p> <p>Science – Biological plant structure, tree identification, physical properties analysis, environmental science</p> <p>Social Studies – The socio-economic impact that forestry and modern woodworking have on global populations</p>
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Students will engage with the following textbook

<p><u>“Modern Woodworking, 11th Edition”</u>, By Willis H. Wagner and Clois E. Kicklighter. Published by Goodheart-Willcox 2006.</p> <p>Periodicals to include but not limited to newspapers, magazine articles, internet web pages.</p>
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Students will write:

Students will keep a woodworking notebook to include daily journal entries, notes, research, problems encountered, and dimensions and notes applicable to projects and shop processes.

Students will write notes, essays, and posters on where wood come from.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

Students will uncover content through lessons about the science of wood.
Students will read and analyze articles about the global impacts of forestry.
Students will watch videos about the extraction of lumber from a forest.
Students will get to feel and see the different types of wood and the corresponding trees.
Students will take a branch segment of a tree and label the parts of the tree.
Students will make a poster showing the cycle of life of a tree and piece of wood.

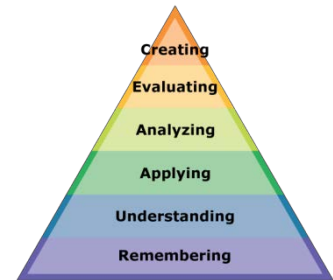
Materials and supplies

Wood examples, tree pictures and examples, lumberjack videos, wood identification poster board, worksheets with tree part identification.

PART IV: EVIDENCE OF LEARNING

**IDENTIFY THE METHODS BY WHICH STUDENTS WILL
DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND
THEIR ABILITY TO APPLY SKILLS.**

IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

Engagement in lessons after reading assignments.

Analytical writing about the life and journey of a piece of wood from tree to furniture.

Notes on videos and lessons

Direct teacher observation by teacher for safe working habit (see Class Participation Rubric).

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Summative Assessments:

Wood Identification test

Tree part identification test

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Performance Assessments:

Students must apply wood knowledge to a real piece of wood or branch by labeling the parts of the tree.

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title: Advanced Woodworking</p> <p>Safety</p>	<p>Unit Summary: This unit is designed to facilitate the attitude and maturity necessary in students for shop safety. Students will learn all elements of safety including:</p> <ul style="list-style-type: none">• Shop procedures and expectations• General Shop Safety• Hand tool safety• Machine safety
<p>Grade Level(s): 10-12</p>	
<p>Essential Question(s):</p> <ul style="list-style-type: none">• What are class/shop procedures and rules?• Why do people get injured?• How can one avoid hand tool injury?• How do you avoid machine injury?	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none">• It is important to be aware of and follow organizational and safety procedures.• The main causes of injury in general and how to avoid these causes• Processes and techniques to keep safe with hand tools• Processes and techniques to keep safe with individual power tools.• Responsibility and Awareness

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

Learning Target	NJCCCS or CCS
1. Understand and observe classroom rules, requirements, emergency, and general procedures	1. TEC.9-12
2. Students will learn to identify all the safety risks in any situation or procedure	2. WORK.9-12.9.2.12 F.4
3. Students will learn shop safety rules.	3. WORK.9-12.9.2.12 F.3
4. Students will learn to predict and prevent possible injury with hand tools by using proper focus, procedures, techniques and hand placement.	4. TEC.9-12.8.2.12
5. Students will learn to predict and prevent possible injury with power tools and machines by using proper focus, procedures, techniques and hand placement.	5. WORK.9-12.9.1.12 B.4.d
6.	6. LA.9-12.3.4
7.	

Inter-Disciplinary Connections:

MATH - fractional inch, fractions, measurement, geometric principles, blade speeds (rpms)
English - A woodworking notebook including written documentation of the technological design process
Science – Physics behind tasks that cause injury
Social Studies –

Students will engage with the following textbook

“Modern Woodworking, 11th Edition”, By Willis H. Wagner and Clois E. Kicklighter. Published by Goodheart-Willcox 2006.

Periodicals to include but not limited to newspapers, magazine articles, internet web pages.

Students will write:

Students will keep a woodworking notebook to include daily journal entries, notes, research, problems encountered, and dimensions and notes applicable to projects and shop processes.

Students will write safety notes

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

Lessons will be given on each safety topic. Students will take notes, watch videos, fill out accompanying worksheets and assignments. Students will participate in safety discussions and make predictions and think critically about safety. Students will be given live demonstrations on all proper procedures and techniques on all equipment. Students will be closely watched and guided through their first experiences on any procedure tool or machine. Students must take handwritten tests on each machine and procedure to demonstrate the knowledge required to perform the task. Students must also perform manipulative hands on test demonstrating proper procedures, focus, and techniques.

Lessons include

General shop rules

Shop safety

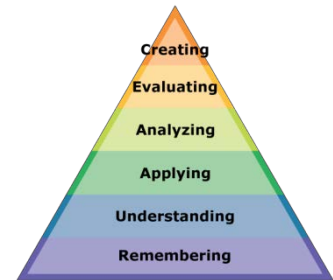
Hand tool safety

Individual machine safety lessons on each machine available

PART IV: EVIDENCE OF LEARNING

**IDENTIFY THE METHODS BY WHICH STUDENTS WILL
DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND
THEIR ABILITY TO APPLY SKILLS.**

IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

Safe work practice with hand tools as outlines in the lesson: direct teacher observation and guided practice.

Students will follow classroom procedures as provided in teacher lecture and written in woodworking notebook:

Direct teacher observation by teacher for safe working habit (see Class Participation Rubric).

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Summative Assessments:

Written safety tests and quizzes

Lesson worksheets

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Performance Assessments:

Manipulative Safety tests
Application of proper procedures, focus and techniques

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title: Advanced Woodworking</p> <p>Project Planning</p>	<p>Unit Summary: Students will learn the process procedures and skills necessary to take an idea and turn it into a project in an efficient manner.</p> <ul style="list-style-type: none">• Planning a project – Making, finding and reading plans and blueprints• Making a Bill of Materials• Calculating Board foot, and material costs• Creating an Order of Operations• Wood selection and efficient layout
<p>Grade Level(s): 10-12</p>	
<p>Essential Question(s):</p> <ul style="list-style-type: none">• How do we read a set of plans?• How do we make plans?• How do we know how much material to buy?• What do we start?• How can this be done efficiently?	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none">• Planning a project is the first step to success• One must have plans for any and every project• Board foot calculations are how wood is priced and sold• Organization is key to efficiency• Efficient and calculated material usage is very important

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

Learning Target	NJCCCS or CCS
1. Students will learn about the many sources of plans.	1. TEC.9-12
2. Students will apply the mechanical drawing unit information to make plans	2. TEC.9-12.8.2.12
3. Students will make a bill of materials	3. MA.K-12.4.5.C.4
4. Students will calculate board feet and project cost	4. TEC.9-12.8.2.12.G.1
5. Students will create an order of operations to build on information from the wood science unit.	5. TEC.K-12.8.2.B.b
6. Students will solve the wood layout puzzle and find the most efficient way to layout a project on the selected material.	6. TEC.K-12.8.2.B.2
	7. TEC.K-12.8.2.C.b
	8. MA.K-12.4.5
	9. WORK.9-12.9.2.12
	B.2
	10. WORK.9-12.9.1.12
	B.3
	11. WORK.9-12.9.1.12
	B.4.d

Inter-Disciplinary Connections:

MATH - fractional inch, fractions, measurement, geometric principles, board foot calculations
English - An woodworking notebook including written documentation of the technological design process
Science -
Social Studies –

Students will engage with the following textbook

“Modern Woodworking, 11th Edition”, By Willis H. Wagner and Clois E. Kicklighter. Published by Goodheart-Willcox 2006.

Periodicals to include but not limited to newspapers, magazine articles, internet web pages.

Students will write:

Students will keep a woodworking notebook to include daily journal entries, notes, research, problems encountered, and dimensions and notes applicable to projects and shop processes.

Students will write a Bill of Materials

Students will write an Order of Operations List

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

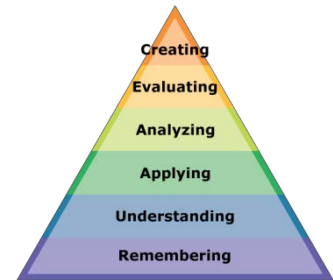
How will students uncover content and build skills.

Students will be introduced to a drawing of a project or an actual project through a lesson
Students will participate in a lesson while we make a Bill of materials for that project
Students will then participate in calculating board ft. of each part and the entire project
Students will calculate the cost of the project with 15 percent waste based on actual wood prices
Students will then participate in a lesson while they make an actual Order of Operations
Students will turn in this set of paperwork which is considered a full set of plans.
Students will then make their own full set of plans on the project intended for their first project.

PART IV: EVIDENCE OF LEARNING

**IDENTIFY THE METHODS BY WHICH STUDENTS WILL
DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND
THEIR ABILITY TO APPLY SKILLS.**

IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

Students will follow classroom procedures as provided in teacher lecture and written in woodworking notebook:

Accurate Calculations of Board foot

Accurate parts identification in the bill of materials

Review of wood processing unit in order of operation activity

Direct teacher observation by teacher for safe working habit (see Class Participation Rubric).

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Summative Assessments:

Bill of Materials will be graded for accuracy and neatness

Board foot calculations graded for accuracy

Order of Operations will be graded for neatness and accuracy

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Performance Assessments:

Students will be able to apply the planning steps and process to make their own set of plans for a project.

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title: Advanced Woodworking</p> <p>Tool Identification and knowledge</p>	<p>Unit Summary:</p> <ul style="list-style-type: none">• This unit is intended to increase the technological literacy of students through identification, proper application, care, and safety associated with hand tools.
<p>Grade Level(s): 10-12</p>	
<p>Essential Question(s):</p> <ul style="list-style-type: none">• Why is it important to use the right tool for the job?• What benefits to hand tools have over machine tools?• What are the most common hand tools?• What can be done to prevent injury with hand tools?	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none">• It is important to be aware of and follow organizational and safety procedures.• Using each tool for its intended purpose is critical.• Hand tools are very useful and the proper care and maintenance of these tools is critical.• Proper procedures, techniques, and focus are necessary for safety.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

<u>Learning Target</u>	<u>NJCCCS or CCS</u>
<ol style="list-style-type: none">1. Students will be able to identify the names and uses of the many hand tools available (Handsaws, Japanese handsaws, coping saws, chisels, striking tools, struck tools, planes and scrapers, files).2. Students will be able to identify the names and uses of the many layout tools available (chalk line, level, marking devises, compass, marking gauge, punch, squares, sliding bevels, calipers).3. Students will be able to apply proper procedures and techniques while safely using various hand tools.4. Students will learn to maintain and hand tools and properly care for and store them.5. Students will be able to use hand tools to complete certain procedures to build a woodworking project.	<ol style="list-style-type: none">1. TEC.9-122. TEC.9-12.8.2.12.B3. TEC.K-12.8.2.B.a4. TEC.K-12.8.2.B.b5. TEC.K-12.8.2.C.b6. MA.K-12.4.5.A.27. MA.K-12.4.5.C.38. WORK.9-12.9.1.12 B.59. WORK.9-12.9.2.12 F.410. WORK.9-12.9.2.12 B.311. LA.9-12.3.4

Inter-Disciplinary Connections:

MATH - Fractional inch, fractions, measurement, geometric principles

English - A woodworking notebook including written documentation of the technological design process

Science – Physics of hand tools and cutting edges.

Social Studies – History of hand tools

Students will engage with the following textbook

“Modern Woodworking, 11th Edition”, By Willis H. Wagner and Clois E. Kicklighter. Published by Goodheart-Willcox 2006.

Periodicals to include but not limited to newspapers, magazine articles, internet web pages.

Students will write:

Students will keep a woodworking notebook to include daily journal entries, notes, research, problems encountered, and dimensions and notes applicable to projects and shop processes.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

Students will begin to learn tool identification with a tool scavenger hunt.

Students will then learn about the many different hand tools through a series of lessons; these lessons will include presentations, videos, demonstrations, examples, and stations where students will engage with the hand tools in a safe guided manner.

Lessons:

Edged tools

Saws and saw tooth science

Chisel use safety and sharpening

Planes, Scrapers, rasps, files

Layout tools

Striking tools

Specialty tools

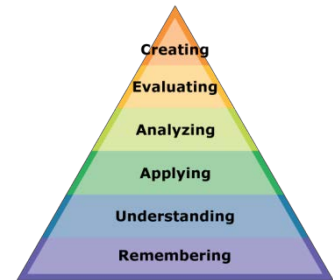
Students will be tested on tool identification, use and care.

Students will apply this knowledge of hand tools by performing specific procedures and ultimately building a project with hand tools.

PART IV: EVIDENCE OF LEARNING

**IDENTIFY THE METHODS BY WHICH STUDENTS WILL
DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND
THEIR ABILITY TO APPLY SKILLS.**

IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

Safe work practice with hand tools as outlines in the lesson: direct teacher observation and guided practice.

Students will follow classroom procedures as provided in teacher lecture and written in woodworking notebook:

Direct teacher observation by teacher for safe working habit (see Class Participation Rubric).

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Summative Assessments:

Hand tool identification test
Hand tool identification worksheets

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Performance Assessments:

Application of hand tool procedures during station training

Application of hand tool knowledge during construction of a hand tool project

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title: Advanced Woodworking</p> <p>Advanced Power Tools</p>	<p>Unit Summary:</p> <ul style="list-style-type: none">• This unit will safely introduce students to power tools used in modern woods manufacturing. Students will learn machine purpose, safety, procedures, techniques, and maintenance.
<p>Grade Level(s): 10-12</p>	
<p>Essential Question(s):</p> <ul style="list-style-type: none">• How can power tools be used to make woodworking more efficient?• What task does each machine perform?• What safety concerns to power tools create?• What are the specific procedures and techniques for safe operation of each machine?	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none">• There are many power tools available to modern woods manufacturing.• Safe and appropriate use of the machines is essential.• Care and maintenance of machines is also essential.• Each machine and process has its own procedure and techniques that must be followed to allow safe manipulation of stock.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

Learning Target	NJCCCS or CCS
<ol style="list-style-type: none">1. Students will learn to identify general power tool safety concerns2. Students will be able to identify the correct operation and purpose for each of the machine. (Drills, drill press, band saw, scroll saw, power miter saw, planer, jointer, lathe, table saw, radial arm saw, saber saws, circular saw, routers and router tables, sanders, lathe, mortising machine)3. Students will be able to identify all of the parts of each machine.4. Students will know the safety considerations with each specific machine.5. Students will learn proper procedure and techniques associated with each machine.6. Students will learn the general and specific care and maintenance associated with each machine.7. Students will practice with each machine to perform safe and solid proficiency in all elements of machine knowledge and control.	<ol style="list-style-type: none">1. TEC.9-122. TEC.K-12.8.2.A.13. TEC.K-12.8.2.B.b4. TEC.K-12.8.2.C.25. MA.K-12.4.5.A.26. SCI.8.5.4.8 A.A7. WORK.9-12.9.2.12 <p>F.4</p> <ol style="list-style-type: none">8. LA.9-12.3.4

Inter-Disciplinary Connections:

MATH - fractional inch, fractions, measurement, geometric principles

English - A woodworking notebook including written documentation of the technological design process

Science – Physics

Social Studies – History of power tools

Students will engage with the following textbook

“Modern Woodworking, 11th Edition”, By Willis H. Wagner and Clois E. Kicklighter. Published by Goodheart-Willcox 2006.

Periodicals to include but not limited to newspapers, magazine articles, internet web pages.

Students will write:

Students will keep a woodworking notebook to include daily journal entries, notes, research, problems encountered, and dimensions and notes applicable to projects and shop processes.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

Lessons on specific machines will include formal presentations which include lecture, video, examples, demonstrations, notes, machine part identification. Focus will be on safety with each power tool including proper procedure and techniques.

Lessons include: (Drills, drill press, band saw, scroll saw, power miter saw, planer, jointer, lathe, table saw, radial arm saw, saber saws, circular saw, routers and router tables, sanders, mortising machine)

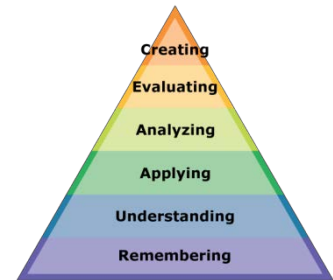
Students will be required to pass a use and safety test with each machine. Students must also demonstrate proper procedures and techniques through manipulative tests.

Students will apply appropriate machine knowledge and procedures to a woodworking project.

PART IV: EVIDENCE OF LEARNING

**IDENTIFY THE METHODS BY WHICH STUDENTS WILL
DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND
THEIR ABILITY TO APPLY SKILLS.**

IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

Safe work practice with hand tools as outlines in the lesson: direct teacher observation and guided practice.

Machine identification worksheets

Machine part identification worksheets

Accommodations/Modifications:

Jigs and fixtures to accommodate individual safety concerns

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Summative Assessments:

Machine parts identification test

Machine procedures safety test

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Performance Assessments:

Manipulative machine safety test
Students will apply machine safety and procedures to specific project processing.

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title: Advanced Woodworking</p> <p>Advanced Joinery</p>	<p>Unit Summary:</p> <ul style="list-style-type: none">• This unit will introduce students to many of the common and advanced joints that are commonly used to build woodworking projects. Students will learn to think critically about joint design and application and apply this knowledge by using advanced joinery in projects.
<p>Grade Level(s): 10-12</p>	
<p>Essential Question(s):</p> <ul style="list-style-type: none">• How can we connect parts of a project together?• What makes a joint strong?• How to know when to use which joint?	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none">• Students will learn about the many basic and advanced woodworking joints available (Butt, dowel, spline, plate, miter, lap, rabbet, dado, tongue and groove, mortise and tenon, dovetail, box, and rule joints.• Many variables contribute to a joints strength and success in any certain application. (surface preparation, glue application, glue strength, physics)

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

Learning Target	NJCCCS or CCS
<ol style="list-style-type: none">1. Students will be able to identify many common joints (Butt, dowel, spline, plate, miter, lap, rabbet, dado, tongue and groove, mortise and tenon, dovetail, box, and rule joints) used in woodworking.2. Students will learn to predict joint strength based on the critical variables that effect a wood joints strength3. Students will learn to make a few common and complicated joint examples.4. Students will think critically and apply joint knowledge to use appropriate joints for a project.	<ol style="list-style-type: none">1. TEC.9-122. TEC.K-12.8.2.A.13. TEC.K-12.8.2.B.b4. TEC.K-12.8.2.C.25. MA.K-12.4.5.A.26. SCI.8.5.4.8 A.A7. WORK.9-12.9.2.12F.48. LA.9-12.3.4

Inter-Disciplinary Connections:

MATH - fractional inch, fractions, measurement, geometric principles

English - A woodworking notebook including written documentation of the technological design process

Science – Physics, forces, chemical and physical bonds.

Social Studies – Historical and wood joints

Students will engage with the following textbook

“Modern Woodworking, 11th Edition”, By Willis H. Wagner and Clois E. Kicklighter. Published by Goodheart-Willcox 2006.

Periodicals to include but not limited to newspapers, magazine articles, internet web pages.

Students will write:

Students will keep a woodworking notebook to include daily journal entries, notes, research, problems encountered, and dimensions and notes applicable to projects and shop processes.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

Lessons on wood joinery will be used to teach this unit. These lessons will include examples of the many different joints, demonstrations of making examples of each common joint.

Students will need to read about different joints, predict their strength and draw pictures of the many common joints.

Students will be required to manufacture small joint examples to be turned in for a project grade.

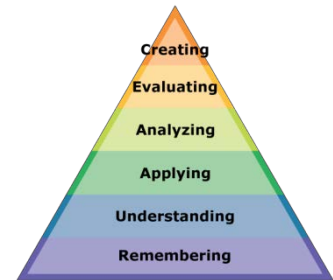
Students will apply appropriate joint knowledge to a complicated woodworking project.

Students will be tested on joint knowledge.

PART IV: EVIDENCE OF LEARNING

**IDENTIFY THE METHODS BY WHICH STUDENTS WILL
DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND
THEIR ABILITY TO APPLY SKILLS.**

IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

Safe work practice with hand tools as outlines in the lesson: direct teacher observation and guided practice.

Joint identification worksheets

Students will follow classroom procedures as provided in teacher lecture and written in woodworking notebook:

Direct teacher observation by teacher for safe working habit (see Class Participation Rubric).

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Summative Assessments:

Joint identification test

Joint examples collected and graded for neatness, strength and accuracy.

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Performance Assessments:

Students will Practice making example joints by hand and with machines
Students will apply common and advanced joints to a machine woodworking project.

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title: Advanced Woodworking Fasteners and Hardware</p>	<p>Unit Summary:</p> <ul style="list-style-type: none">• This unit will introduce multiple different types of fasteners and hardware. This unit will explore the variety and uses of the many hardware options available. Students will learn proper procedure and techniques involved in using fasteners and hardware.
<p>Grade Level(s): 10-12</p>	
<p>Essential Question(s):</p> <ul style="list-style-type: none">• What are the most common fasteners?• What are the pros and cons of different fasteners?• What safety precautions should be used when using fasteners?	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none">• Students will follow proper safety procedures while learning good techniques with use of fasteners.• Students will think critically about which fastener is best for certain projects.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

<u>Learning Target</u>	<u>NJCCCS or CCS</u>
<ol style="list-style-type: none">1. Identify common types of fasteners (types of nails, types of screws, bolts, nuts, washers, catches, latches, hasps, handles, knobs, pulls, hinges, locks, stays, supports, casters and hooks)2. Learn the proper procedure and techniques for using common fasteners3. Students will apply the correct procedure for installing a wood screw4. Students will learn to use the units in which screws and nails are measured5. Students will predict the correct fastener for certain applications6. Students will apply this knowledge to a project including and utilizing fasteners.	<ol style="list-style-type: none">1. TEC.9-122. TEC.K-12.8.2.A.13. TEC.K-12.8.2.B.b4. TEC.K-12.8.2.C.25. MA.K-12.4.5.A.26. SCI.8.5.4.8 A.A7. WORK.9-12.9.2.12 F.4 <ol style="list-style-type: none">8. LA.9-12.3.4

Inter-Disciplinary Connections:

MATH - Fractions, measurement, geometric principles,
English - A woodworking notebook including written documentation of the technological design process
Science – Simple machines
Social Studies – Historical styles of hardware

Students will engage with the following textbook

“Modern Woodworking, 11th Edition”, By Willis H. Wagner and Clois E. Kicklighter. Published by Goodheart-Willcox 2006.

Periodicals to include but not limited to newspapers, magazine articles, internet web pages.

Students will write:

Students will keep a woodworking notebook to include daily journal entries, notes, research, problems encountered, and dimensions and notes applicable to projects and shop processes.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

Students will learn about fasteners through a series of progressive lessons. These lessons will include examples of the many different fasteners, videos, and demonstrations showing proper procedure and techniques installing fasteners.

Lessons

Common fastener identifications – nails and screw varieties

Demonstration of proper wood screw installation

Specialty and advanced fasteners

Students will be required to learn the proper sizing terminology associated with fasteners through fastener identification activities and worksheets.

Students will go through a series of station activities to practice safely using fasteners.

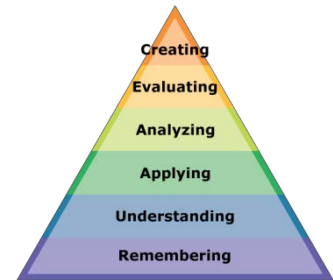
Students will do a small screw series timeline project to show and label all of the steps of a properly installed wood screw.

Students will build a woodworking project that utilizes multiple types of hardware and fasteners.

PART IV: EVIDENCE OF LEARNING

**IDENTIFY THE METHODS BY WHICH STUDENTS WILL
DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND
THEIR ABILITY TO APPLY SKILLS.**

IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

Safe work practice with hand tools as outlines in the lesson: direct teacher observation and guided practice.

Fastener identification worksheets

Students will follow classroom procedures as provided in teacher lecture and written in woodworking notebook:

Direct teacher observation by teacher for safe working habit (see Class Participation Rubric).

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Summative Assessments:

Fastener identification test

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Performance Assessments:

Timeline of a screw project

Application of fasteners to woodworking projects

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title: Advanced Woodworking</p> <p>Finishing Process</p>	<p>Unit Summary:</p> <ul style="list-style-type: none">• This unit is intended to introduce students to multiple different finishing techniques. Finish is necessary to protect and enhance woods appearance. There are many different types of finishes and application methods for these finishes and students must learn to think critically about a projects final uses to choose the best finishing options and procedures.
<p>Grade Level(s): 10-12</p>	
<p>Essential Question(s):</p> <ul style="list-style-type: none">• Why do we finish wood?• What types of finishes are available?• Why chose certain finishes?• How can finish be applied?• Why is finish preparatory work is essential.	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none">• It is important to be aware of and follow organizational and safety procedures.• Wood finish is historically significant has been around for over 10 thousand years.• Wood finish is used to protect wood and also enhance its appearance.• There are many types of finishing options: constraints and intended uses must be considered when choosing a finish.• Proper procedures, techniques, and focus are necessary for safety.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

Learning Target	NJCCCS or CCS
<ol style="list-style-type: none">1. Students will be able to identify the names and characteristics of the many finishing options available (fillers, sealers, stains, natural finishes, chemical finishes).2. Students will be able to identify and choose from multiple application methods (wipe, brush, spray)3. Students will follow proper safety and clean up procedures with each finish.4. Students will be able to apply proper finish application procedures and techniques.5. Students will be able to apply different finishes and finishing techniques to build woodworking projects.	<ol style="list-style-type: none">1. <i>TEC.9-12</i>2. <i>TEC.K-12.8.2.A.1</i>3. <i>TEC.K-12.8.2.B.b</i>4. <i>TEC.K-12.8.2.C.2</i>5. <i>MA.K-12.4.5.A.2</i>6. <i>SCI.8.5.4.8 A.A</i>7. <i>WORK.9-12.9.2.12</i>F.48. <i>LA.9-12.3.4</i>

Inter-Disciplinary Connections:

MATH - Fractional inch, fractions, measurement, geometric principles

English - A woodworking notebook including written documentation of the technological design process

Science – Chemically and physically bonding finishes

Social Studies – History of finishes

Students will engage with the following textbook

“Modern Woodworking, 11th Edition”, By Willis H. Wagner and Clois E. Kicklighter. Published by Goodheart-Willcox 2006.

Periodicals to include but not limited to newspapers, magazine articles, internet web pages.

Students will write:

Students will keep a woodworking notebook to include daily journal entries, notes, research, problems encountered, and dimensions and notes applicable to projects and shop processes.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

Students will learn about the many different finishes through a series of lessons; these lessons will include reading, presentations, videos, demonstrations, and examples.

Lessons:

Preparatory work (sanding, fillers, raising grains)

Application methods

Natural Finishes (Oils, shellacs)

Stains

Synthetic/chemical finishes (Urethanes, lacquer, varnish, epoxy, paints)

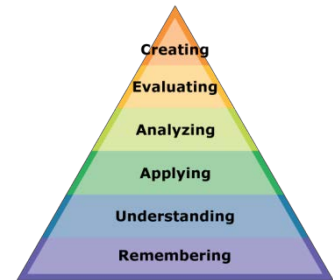
Students will be tested on finish identification, use and safety.

Students will apply this knowledge of finishes by performing specific procedures and ultimately building a project and choosing an appropriate finish.

PART IV: EVIDENCE OF LEARNING

**IDENTIFY THE METHODS BY WHICH STUDENTS WILL
DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND
THEIR ABILITY TO APPLY SKILLS.**

IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

Safe work practice with finishes as outlined in the lesson: direct teacher observation and guided practice.

Students will follow classroom procedures as provided in teacher lecture and written in woodworking notebook:

Direct teacher observation by teacher for safe working habit (see Class Participation Rubric).

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Summative Assessments:

Finish knowledge and identification test

Safety with finishing test

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Performance Assessments:

Application of finish procedures during finish training
Application of finish knowledge during construction woodworking project

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title: Advanced Woodworking CNC Machining</p>	<p>Unit Summary: This unit will introduce students to the power of CNC for production and custom work. Examples of machines include a laser cutter and engraver, CNC router, and CNC lathe.</p>
<p>Grade Level(s): 10-12</p>	

Essential Question(s):

- **What does CNC stand for and what does it mean?**
- **What are the different types of CNC machines?**
- **What are the advantages of CNC Machining?**
- **What should each type of machine be used for?**
- **What is the Cartesian coordinate system and why is it so important in CNC Machining?**
- **How do you prepare a file to transfer it to a CNC Tool?**
- **What are some general safety practices to follow?**
- **What should the various speed, power, frequencies, be for various materials?**
- **How is each CNC tool operated?**

Enduring Understanding(s):

- **Identify computer numerically controlled machines and their applications.**
- **Classify different types of CNC machines and explain what the use of each one is.**
- **Have a fluent understanding of terminology used in CNC Manufacturing.**
- **Explain the advantages of CNC Manufacturing.**
- **Analyze and contrast the Cartesian Coordinate Systems.**
- **Understand and employ proper safety procedure for using CNC machines.**
- **Review and assess the correct settings to use for each machine.**
- **Utilize proper techniques necessary to operate each CNC machine.**

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

	NJCCCS or CCS
1. List the different types of CNC machines	
2. Summarize and categorize the use and materials for each CNC machine..	1. TEC.9-12.8.2.12.F.3
3. Develop an order of operations for a product design to product production.	2. TEC.9-12.8.2.12.F.1
4. Compare and contrast computer-aided design, computer-aided manufacturing, computer-integrated manufacturing, and computer numerical control.	3. TEC.9-12.
5. Produce a complex product with and without the use of CAD and CNC and list the advantages and disadvantages of CNC machining.	WORK.9-12.9.1.12 B.4.d
6. Use mathematics to practice the quantitative relationships associated with the Cartesian coordinate system.	4. TEC.9-12.8.2.12.F.3 TEC.9-12.8.2.12.F.1
7. Create models in CAD software and export them as the right file for the job and machine.	5. TEC.9-12.8.2.12 B.4 TEC.9-12.8.2.12 C.3
8. Demonstrate the ability to use problem solving skills to complete drawing and modeling assignments.	6. TEC.9-12.8.2.12.F.3 MA.9-12.4.2.12 C.1 MA.9-12.4.2.12 C.2 MA.9-12.4.2.12 E.1
9. Use a NC or G-Code line editor to revise, edit, compare, backplot basic NC code.	
10. Demonstrate the ability to use the advanced modeling techniques by extruding, sweeping, lofting, and/or revolving a part.	7. TEC.9-12.8.2.12.F.1
11. Illustrate proper safety practices when using CNC machines.	8. TEC.9-12. TEC.9-12.8.2.12.E.1
12. Set up the CNC machine with the proper settings and test different applications of them to fine tune the design.	9. TEC.9-12.8.2.12.F.3
13. Create 3d models capable of being used in an assembly drawing that can be exported in the right format and sent to a CNC Machine.	10. TEC.9-12.8.2.12.F.3
	11. WORK.9-12.9.3.12.C.11 WORK.9-12.9.2.12 F.
	12. TEC.9-12.8.2.12.F.3 TEC.9-12.8.2.12.F.1
	13. TEC.9-12.8.1.12 B.9 TEC.9-12.8.2 TEC.9-12.8.2.12 B.4

Inter-Disciplinary Connections:

MATH - fractional inch, fractions, measurement, geometric principles, Cartesian coordinate system
English - A woodworking notebook including written documentation of the technological design process
Social Studies – History of CNC machining

Students will engage with the following textbook

“Modern Woodworking, 11th Edition”, By Willis H. Wagner and Clois E. Kicklighter. Published by Goodheart-Willcox 2006.

Periodicals to include but not limited to newspapers, magazine articles, internet web pages.

Students will write:

Students will keep a woodworking notebook to include daily journal entries, notes, research, problems encountered, and dimensions and notes applicable to projects and shop processes.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

Project based and self-exploration

Real life engineering problems

Examples of solution will be given first then students will problem solve and explore to create their own solutions to the problems.

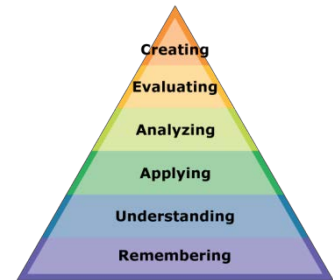
- 1. Students will be completing sketches of models before they complete them on the computer.**
- 2. Students will use 3D models to create the same model**
- 3. Students will use all three views of an orthographic projection to create a 3D solid model.**
- 4. Students will use two views to create a solid model.**
- 5. Students will use the revolve tool to create round objects**
- 6. Students will use the sweep tool to create a profile that will be extruded and a path that will follow to create parts.**
- 7. Students will use the loft tool to create complex parts that include tapers.**
- 8. Students will use real objects and take measurements to create a solid model.**

Students will need to have access to Autodesk AutoCAD and Inventor. Drawing will come from the text and other engineering drawings produced by the teacher.

PART IV: EVIDENCE OF LEARNING

**IDENTIFY THE METHODS BY WHICH STUDENTS WILL
DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND
THEIR ABILITY TO APPLY SKILLS.**

IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

Safe work practice with hand tools as outlines in the lesson: direct teacher observation and guided practice.

Observation of student progress and skill development, checkpoints of understanding at:

1. Set-up of program, layers, and workspace
2. Sketching of models
3. Parts created coping another model
4. Models created by looking at the three views of an orthographic projection
5. Create using two views
6. Revolving
7. Sweeping
8. Lofting
9. Measure and create part from looking at a real object.

Do-now's and checkpoint quizzes will be given during and at the conclusion of these topics

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Summative Assessments:

CNC Test

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Performance Assessments:

Application of CNC machining on a project.

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title: Advanced Woodworking</p> <p>Design Elements</p>	<p>Unit Summary:</p> <ul style="list-style-type: none">• This unit will introduce multiple different types of design styles, principles, and constraint considerations when woodworking projects are developed.
<p>Grade Level(s): 10-12</p>	

Essential Question(s):

- **What is ergonomics?**
- **What are examples of traditional and modern design styles.**
- **What are the two main design considerations? (Form and Function)**
- **What constraints will effect design results?**
- **How can projects be designed to deal with natural and dynamic wood movement?**
- **What is the technological design process?**

Enduring Understanding(s):

- **Students will understand how many design elements, principals, affect the design and construction of furniture and wooden artifacts.**
- **Students will learn to think critically about design elements.**
- **Students learn to apply the technological design process.**

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

Learning Target	NJCCCS or CCS
<ol style="list-style-type: none">1. Students will understand and apply ergonomic principles related to woodworking.2. Students will be able to identify historical, traditional and modern furniture styles.3. Students will think critically about the Form vs Function relationship.4. Students will recolonize manufacturing, machining and complexity constraints.5. Students will apply creativity and personal preference to design challenges while adhering to project constraints.6. Students will identify elements of design intended to deal with natural wood movement.7. Students will think critically about designs intended to deal with dynamic wood movement and stresses (Tension, compressions, flexibility, strength)8. Students will apply the technological design process to woodworking projects.	<ol style="list-style-type: none">1. TEC.9-12.8.2.12.F.22. TEC.K-12.8.2.B3. TEC.K-12.8.2.B.14. TEC.K-12.8.2.B.25. MA.K-12.4.5.C.46. WORK.9-12.9.1.12 B.37. WORK.9-12.9.2.12 F.48. SOC.9-12.6.4.12 D.1

Inter-Disciplinary Connections:

MATH - Fractional inch, fractions, measurement, geometric principles, tolerances.
English - A woodworking notebook including written documentation of the technological design process
Science – Ergonomics and the human body, physical of properties of organic materials.
Social Studies –

Students will engage with the following textbook

“Modern Woodworking, 11th Edition”, By Willis H. Wagner and Clois E. Kicklighter. Published by Goodheart-Willcox 2006.

Periodicals to include but not limited to newspapers, magazine articles, internet web pages.

Students will write:

Students will keep a woodworking notebook to include daily journal entries, notes, research, problems encountered, and dimensions and notes applicable to projects and shop processes.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

Students will learn about design elements through formal lessons, including presentations, examples, demonstrations, and design oriented activities.

Lessons and activities will revolve around the following principles of design:

Technological/Engineering design process

Ergonomics

Traditional and contemporary furniture styles

The Form vs Function relationship

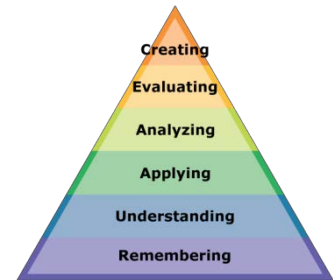
Material, manufacturing, and skill constraints

Designing for natural and dynamic wood movement

Students will apply and document design principles to a woodworking design project.

PART IV: EVIDENCE OF LEARNING

**IDENTIFY THE METHODS BY WHICH STUDENTS WILL
DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND
THEIR ABILITY TO APPLY SKILLS.
IDENTIFY BLOOM'S LEVELS.**



Formative Assessments:

Safe work practice with hand tools as outlines in the lesson: direct teacher observation and guided practice.

Design principle notes, worksheets, and activities.

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Summative Assessments:

Wood design principles test
Design element application on projects

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Performance Assessments:

Application of design principles to woodworking projects

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title: Advanced Woodworking</p> <p>Woods Related Field of Study</p>	<p>Unit Summary:</p> <ul style="list-style-type: none">• This unit is intended to introduce students to the many in-depth fields of study in woodworking. Woodworking is historically significant because of the many in careers and advancements and uses of wood as a technological medium.
<p>Grade Level(s): 10-12</p>	
<p>Essential Question(s):</p> <ul style="list-style-type: none">• What types of woodworkers are there?• What is the historical significance of woodworking?	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none">• Wood has been utilized since the before the stone age• Woodworking has been significant to all cultures and is as diverse as the cultures themselves.• There are many woodworking skills which can be utilized in many fields of study and future careers.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

Learning Target	NJCCCS or CCS
<ol style="list-style-type: none">1. Students will understand the historical significance of woodworking2. Students will be able to identify critical advancements in woodworking3. Students will be able to identify different in depth fields of study and careers related to woodworking.4. Students will research and build a historically, scientific or environmentally significant project.5. Students will be able to communicate this in-depth knowledge of a certain wood related field of study to others.	<ol style="list-style-type: none">1. SOC.9-12.6.1.12 A.12. LA.9-12.3.43. LA.9-12.3.2.12 D.2.c4. WORK.9-12.9.2.12 F.45. WORK.9-12.9.1.12 B.56. WORK.9-12.9.1.12 B.37. WORK.9-12.9.2.12 B.28. SCI.8.5.10.8 B.a9. SCI.8.5.5.8 B.210. MA.K-12.4.5.A.2

Inter-Disciplinary Connections:

MATH - fractional inch, fractions, measurement, geometric principles,
English - A woodworking notebook, woodworking report, presentation
Science – Wood science related topics.
Social Studies – Historical and cultural woodworking

Students will engage with the following textbook

“Modern Woodworking, 11th Edition”, By Willis H. Wagner and Clois E. Kicklighter. Published by Goodheart-Willcox 2006.

Periodicals to include but not limited to newspapers, magazine articles, internet web pages.

Students will write:

Students will keep a woodworking notebook to include daily journal entries, notes, research, problems encountered, and dimensions and notes applicable to projects and shop processes.

Students will research and write a report on an in-depth field of study related to woodworking.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

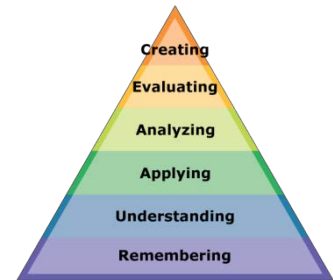
How will students uncover content and build skills.

**Students will be introduced to historical woodworking concepts through lessons and presentations.
Students will choose a woodworking related field of study to write a report and presentation on.
Students will need to develop a related woodworking project to accompany this presentation and report.
Students will present their in-depth study to the rest of the class and therefore sharing knowledge
Students must take notes on their peer's presentations and will be quizzed on the information presented.**

PART IV: EVIDENCE OF LEARNING

**IDENTIFY THE METHODS BY WHICH STUDENTS WILL
DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND
THEIR ABILITY TO APPLY SKILLS.**

IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

Checkpoints with research project

Safe work practice with hand tools as outlines in the lesson: direct teacher observation and guided practice.

Students will follow classroom procedures as provided in teacher lecture and written in woodworking notebook:

Direct teacher observation by teacher for safe working habit (see Class Participation Rubric).

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Summative Assessments:

Final draft Research Paper

Research presentation

Test on woodworking presentations

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Performance Assessments:

Construction of a research related woodworking project

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.