Nutley Public Schools

Woodworking
Grades: 9-12

Unit I: Measurement
Summary and Rationale
Measurement is the process of determining the ratio of a physical quantity, such as a length, time, or temperature (our focus being on length). Measurements are expressed with numbers, allowing the logic, precision and power of mathematics to be brought to bear on the study of nature. Measurement is the foundation on which we build STEM-literacy. Measurement may seem like a small part of the overall learning process, but in a world evermore dependent on the STEM industries, measurement has become as foundational as reading, writing, and arithmetic.
Recommended Pacing
1 week **ongoing throughout entire year**
Standards
Career and Technical Education 9.3

9.3.12.AC.1	Use vocabulary, symbols and formulas common to architecture and construction.
9.3.12.AC.6	Read, interpret and use technical drawings, documents and specifications to plan a project.
9.3.12.AC-DES.2	Use effective communication skills and strategies (listening, speaking, reading, writing and graphic communications) to work with clients and colleagues.
9.3.MN-PPD.1	Produce quality products that meet manufacturing standards and exceed customer satisfaction.
9.3.ST-SM.1	Apply science and mathematics to provide results, answers and algorithms for engineering and technological activities.

Career Ready Practices	
CRP2.	Apply appropriate academic and technical skills.
CRP4.	Communicate clearly and effectively and with reason.
CRP6.	Demonstrate creativity and innovation.
CRP8.	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11.	Use technology to enhance productivity.

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Interdisciplinary Connections	
Standard x.x	
4.9.3	Recognize the need for a uniform unit of measure.
4.9.6	Understand and incorporate estimation and repeated measures in measurement activities.
4.9.9	Determine the degree of accuracy needed in a given situation and choose units accordingly.
4.9.13	Convert measurement units from one form to another, and carry out calculations that involve various units of measurement.
4.9.19	Choose appropriate techniques and tools to measure quantities in order to achieve specified degrees of precision, accuracy, and error (or tolerance) of measurements.

Integration of Technology	
Standard x.x	
CPI #	Cumulative Progress Indicator (CPI)

Instructional Focus

Enduring Understandings

- Students will understand the history of measurements.
- Students will understand dating back beyond the Roman Empire, the need to know how far, how long, how deep and how much could something hold was information people needed to accomplish many tasks.
- Students will understand throughout time, people created and improved on the methods and tools used to measure, making them more and more exact.
- Students will understand precision and consistency are essential to the process of manufacturing.

Essential Questions

- What is measurement?
- What is a measurement system?
- How many systems of measurement are there?
- What do measurement tools look like and how are they used?
- What role does measurement have in manufacturing?
- Is the Metric System better than the English System?

Evidence of Learning (Assessments)

Successful completion of:

- Measurement Quizzes
- Capstone project (Plaque, Reindeer, Serving Tray, Mantle Clock)

Objectives

Students will know:

- how to measure
- how to use drafting tools (square, ruler, protractor, compass)
- safely use the appropriate hand tool for the requested job

Students will be able to:

- use a ruler to 1/16” tolerance

• use a caliper to measure to 1/1000" tolerance • layout lines, arcs and angles on material • successfully complete measurement quiz
Integration
Technology Integration
Writing Integration
Competencies
Suggested Resources

Woodworking

Grades: 9-12

Unit II: Plaque
Summary and Rationale
The first project that the students will be working on is a basic plaque that will introduce them to many woodworking skills and habits. Students will be introduced to basic measurement using rulers and tri-squares, various power tools, and finishing applications. Students will have the freedom to create any form of wording or design pattern that will fit in the allotted space. Students will work on coarse and fine

motor skills during the designing, transfer, and carving stages of their project. Students will also be introduced to the grading process and will be afforded the opportunity to reflect on their work.
Recommended Pacing
6 weeks
Standards

Career and Technical Education 9.3	
9.3.12.AC.1	Use vocabulary, symbols and formulas common to architecture and construction.
9.3.12.AC.3	Comply with regulations and applicable codes to establish and manage a legal and safe workplace.
9.3.12.AC.5	Describe the roles, responsibilities, and relationships found in the architecture and construction trades and professions, including labor/management relationships.
9.3.12.AC.6	Read, interpret and use technical drawings, documents and specifications to plan a project.
9.3.12.AC-CST.2	Describe the approval procedures required for successful completion of a construction project.
9.3.12.AC-CST.3	Implement testing and inspection procedures to ensure successful completion of a construction project.
9.3.12.AC-CST.4	Apply scheduling practices to ensure the successful completion of a construction project.
9.3.12.AC-CST.5	Apply practices and procedures required to maintain jobsite safety.
9.3.12.AC-CST.8	Demonstrate the construction crafts required for each phase of a construction project.
9.3.12.AC-CST.9	Safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.
9.3.12.AC-DES.2	Use effective communication skills and strategies (listening, speaking, reading, writing and graphic communications) to work with clients and colleagues.
9.3.12.AC-DES.8	Apply standards, applications and restrictions pertaining to the selection and use of construction materials, components and assemblies in the project design.
9.3.12.AC-MO.1	Recognize and employ universal construction signs and symbols to function safely in the workplace.
9.3.MN.6	Demonstrate workplace knowledge and skills common to manufacturing.
9.3.MN-HSE.1	Demonstrate the safe use of manufacturing equipment.

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9.3.MN-HSE.4	Evaluate a system of health, safety and/or environmental programs, projects, policies or procedures to determine compliance.
9.3.MN-LOG.2	Demonstrate proper handling of products and materials in a manufacturing facility.
9.3.MN-MIR.5	Implement a preventative maintenance schedule to maintain manufacturing equipment, tools and workstations.
9.3.MN-PPD.1	Produce quality products that meet manufacturing standards and exceed customer satisfaction.
9.3.MN-PPD.5	Develop procedures to create products that meet customer needs.
9.3.MN-PRO.4	Coordinate work teams when producing products to enhance production process and performance.
9.3.MN-QA.1	Evaluate production operations for product and process quality.

Career Ready Practices	
CRP6.	Demonstrate creativity and innovation.
CRP7.	Employ valid and reliable research strategies.
CRP8.	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9.	Model integrity, ethical leadership and effective management.
CRP10.	Plan education and career paths aligned to personal goals.
CRP11.	Use technology to enhance productivity.
CRP12.	Work productively in teams while using cultural global competence.
Interdisciplinary Connections	
Standard x.x	
Integration of Technology	
Standard x.x	
CPI #	Cumulative Progress Indicator (CPI)

Instructional Focus

Enduring Understandings

- Careful planning will save time, resources, and energy while ensuring the production of a high quality product.
- Creating a plan of procedure and a bill of materials is essential to move from design to production.
- Cost, durability, appearance, and availability influence material selection.
- Skilled and safe use of material, equipment and tools will result in a safe working environment for all.
- Acceptable precision and tolerances vary according to materials, processes, implementation, and application.
- Understanding and using machines safely is a lifelong skill for the consumer, hobbyist, and the career professional.

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- Coated abrasives are made from a variety of materials, both natural and synthetic, and have a wide range of uses.
- Proper surface preparation is necessary to achieve a professional-quality finish.
- Woodworking is a substantial bridge connecting manufacturing and construction career pathways.
- Transferable skills, content knowledge, and positive attributes help prepare students for employment and educational opportunities.
- Accurate measurement and layout is necessary for the success of any woodworking project.

Essential Questions

- How does the species of material being used affect the quality of the product created?
- How does the direction of the grain affect the ability to cut the material?
- How does the rotation of the cutter affect how a tool cuts into material?
- How does the quality of sanding impact the absorption rate of stain?
- How do OSHA rules and regulations apply to machine shop safety?
- What are the essential skills necessary to be successful in the wood manufacturing industry and construction trade?
- How does appropriate planning and execution impact results?

Evidence of Learning (Assessments)

Successful completion of:
Safety Quizzes

- Panel Saw
- Disc Sander
- Palm Sander
- Router
- Staining

Capstone project (Plaque)

Objectives

Students will know:

- how to measure
- how to read a bill of materials
- how to layout lines, arcs and angles on material
- how to safely use:
    - Panel Saw
    - Disc Sander
    - Palm Sander
    - Router
- basic machine diagnostics
- the proper progression of sanding grits
- how to apply stain to a project
- how to self evaluate
- how to appropriately manage time

Students will be able to:

- use a ruler to 1/16” tolerance
- successfully complete safety quizzes for various power tools
- proper and appropriate setup and usage of machinery
- transfer designs onto their material
- create rough cuts to approximate length
- bring projects to final size using the disc sander

• use a router to carve designs in their plaque • sand the surfaces of the board to a smooth finish • apply thin and even coats of stain to their project • complete a rubric • follow procedural calendar to stay on task and track their progress
Integration
Technology Integration
Writing Integration
Competencies
Suggested Resources

Woodworking

Grades: 9-12

Unit III: Reindeer
Summary and Rationale
Students will continue their study of basic measurement using rulers and tri-squares, various power tools, and finishing applications. Students will also continue to work on coarse and fine motor skills during the designing, transfer, and cutting stages of their project. Students will begin to "read" working drawings and will utilize graph paper to redraw said plans to full scale. This will also be the students first project that introduce multiple pieces, which will introduce them to efficiently laying out of materials, parts management and storage, and various assembling techniques. Students will again be involved in the grading process and will be afforded the opportunity to reflect on their work.
Recommended Pacing
8 weeks
Standards

Career and Technical Education 9.3	
9.3.12.AC.1	Use vocabulary, symbols and formulas common to architecture and construction.
9.3.12.AC.3	Comply with regulations and applicable codes to establish and manage a legal and safe workplace.
9.3.12.AC.5	Describe the roles, responsibilities, and relationships found in the architecture and construction trades and professions, including labor/management relationships.

9.3.12.AC.6	Read, interpret and use technical drawings, documents and specifications to plan a project.
9.3.12.AC-CST.2	Describe the approval procedures required for successful completion of a construction project.
9.3.12.AC-CST.3	Implement testing and inspection procedures to ensure successful completion of a construction project.
9.3.12.AC-CST.4	Apply scheduling practices to ensure the successful completion of a construction project.
9.3.12.AC-CST.5	Apply practices and procedures required to maintain jobsite safety.
9.3.12.AC-CST.8	Demonstrate the construction crafts required for each phase of a construction project.
9.3.12.AC-CST.9	Safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.
9.3.12.AC-DES.2	Use effective communication skills and strategies (listening, speaking, reading, writing and graphic communications) to work with clients and colleagues.
9.3.12.AC-DES.8	Apply standards, applications and restrictions pertaining to the selection and use of construction materials, components and assemblies in the project design.
9.3.12.AC-MO.1	Recognize and employ universal construction signs and symbols to function safely in the workplace.
9.3.MN.6	Demonstrate workplace knowledge and skills common to manufacturing.
9.3.MN-HSE.1	Demonstrate the safe use of manufacturing equipment.
9.3.MN-HSE.4	Evaluate a system of health, safety and/or environmental programs, projects, policies or procedures to determine compliance.
9.3.MN-LOG.2	Demonstrate proper handling of products and materials in a manufacturing facility.
9.3.MN-MIR.5	Implement a preventative maintenance schedule to maintain manufacturing equipment, tools and workstations.
9.3.MN-PPD.1	Produce quality products that meet manufacturing standards and exceed customer satisfaction.
9.3.MN-PPD.5	Develop procedures to create products that meet customer needs.
9.3.MN-PRO.4	Coordinate work teams when producing products to enhance production process and performance.
9.3.MN-QA.1	Evaluate production operations for product and process quality.

Career Ready Practices	
CRP6.	Demonstrate creativity and innovation.
CRP7.	Employ valid and reliable research strategies.
CRP8.	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9.	Model integrity, ethical leadership and effective management.
CRP10.	Plan education and career paths aligned to personal goals.
CRP11.	Use technology to enhance productivity.
CRP12.	Work productively in teams while using cultural global competence.

Interdisciplinary Connections	
Standard x.x	
Integration of Technology	
Standard x.x	
CPI #	Cumulative Progress Indicator (CPI)

Instructional Focus

Enduring Understandings

- Careful planning will save time, resources, and energy while ensuring the production of a high quality product.
- Creating a plan of procedure and a bill of materials is essential to move from design to production.
- Cost, durability, appearance, and availability influence material selection.
- Skilled and safe use of material, equipment and tools will result in a safe working environment for all.
- Properly maintaining tools and equipment aides in safe and effective use.
- Acceptable precision and tolerances vary according to materials, processes, implementation, and application.
- Understanding and using machines safely is a lifelong skill for the consumer, hobbyist, and the career professional.
- There are a variety of ways to create and strengthen wood joints.
- Modern adhesives can increase design flexibility and simplify assembly.
- Mechanical fasteners can increase the strength, longevity, and aesthetic value of a project.
- Coated abrasives are made from a variety of materials, both natural and synthetic, and have a wide range of uses.
- Proper surface preparation is necessary to achieve a professional-quality finish.
- Woodworking is a substantial bridge connecting manufacturing and construction career pathways.
- Transferable skills, content knowledge, and positive attributes help prepare students for employment and educational opportunities.
- Accurate measurement and layout is necessary for the success of any woodworking project.

Essential Questions

- How do OSHA rules and regulations apply to machine shop safety?
- What affect does joinery have on the strength and durability of a wood product?
- Why are certain joints used in different applications?
- What type of joints should be used in various applications?

- Why use a chemical fastener?
- How does the use of mechanical fasteners increase strength?
- Why is it important to use clamping pressure when using glues and adhesives?

Evidence of Learning (Assessments)

Successful completion of:
Safety Quizzes

- Panel Saw
- Disc Sander
- Palm Sander
- Table Saw
- Band Saw
- Drill Press

Capstone project (Reindeer)

Objectives

Students will know:

- how to measure
- how to read a bill of materials
- how to scale designs using graph paper
- how to layout lines, arcs and angles on material
- how to safely use:
  - Panel Saw
  - Disc Sander
  - Palm Sander
  - Table Saw
  - Band Saw
  - Drill Press
  - Pneumatic Nail Gun
  - Pneumatic Pin Gun
- basic machine diagnostics
- the proper progression of sanding grits
- how to assemble projects
  - glue
  - half lap joint
  - hammer and nails
  - nail/pin gun
- how to apply stain to a project
- how to self evaluate
- how to appropriately manage time

Students will be able to:

- use a ruler to 1/16” tolerance
- successfully complete safety quizzes for various power tools
- proper and appropriate setup and usage of machinery
- transfer designs onto their material
- create rough cuts to approximate length
- select and use properly sized bits to create various sized holes with drill press
- cut curves to rough shape on band saw

- create perfectly straight boards on table saw
- bring projects to final size using the disc sander
- bring projects to final shape with hand files and drum sanders
- sand the surfaces of the board to a smooth finish
- assemble projects using mechanical fasteners
- assemble projects using fine joinery techniques
- assemble projects using glue and clamping techniques
- apply thin and even coats of stain to their project
- complete a rubric
- follow procedural calendar to stay on task and track their progress

Integration
Technology Integration
Writing Integration
Competencies
Suggested Resources

Woodworking

Grades: 9-12

Unit IV: Serving Tray

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Summary and Rationale
Students will continue their study of basic measurement using rulers and tri-squares, various power tools, and finishing applications. Students will also continue to work on coarse and fine motor skills during the designing, transfer, and cutting stages of their project. Students will continue to "read" working drawings and redraw said plans to full scale. The students will continue to efficiently layout their materials, manage and store their pieces, and use new forms of assembling techniques. Students will be allowed to choose the material combination for their tray using contrasting hardwood species, allowing them to put a more personalized touch on their project. Technically speaking this is the students first endeavor in furniture making process and they will be using more durable, furniture grade materials. Students will again be involved in the grading process and will be afforded the opportunity to reflect on their work.

Recommended Pacing
8 weeks

Standards	
Career and Technical Education 9.3	
9.3.12.AC.1	Use vocabulary, symbols and formulas common to architecture and construction.
9.3.12.AC.3	Comply with regulations and applicable codes to establish and manage a legal and safe workplace.
9.3.12.AC.5	Describe the roles, responsibilities, and relationships found in the architecture and construction trades and professions, including labor/management relationships.
9.3.12.AC.6	Read, interpret and use technical drawings, documents and specifications to plan a project.
9.3.12.AC-CST.2	Describe the approval procedures required for successful completion of a construction project.
9.3.12.AC-CST.3	Implement testing and inspection procedures to ensure successful completion of a construction project.
9.3.12.AC-CST.4	Apply scheduling practices to ensure the successful completion of a construction project.
9.3.12.AC-CST.5	Apply practices and procedures required to maintain jobsite safety.
9.3.12.AC-CST.8	Demonstrate the construction crafts required for each phase of a construction project.
9.3.12.AC-CST.9	Safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.
9.3.12.AC-DES.2	Use effective communication skills and strategies (listening, speaking, reading, writing and graphic communications) to work with clients and colleagues.
9.3.12.AC-DES.8	Apply standards, applications and restrictions pertaining to the selection and use of construction materials, components and assemblies in the project design.
9.3.12.AC-MO.1	Recognize and employ universal construction signs and symbols to function safely in the workplace.

9.3.MN.6	Demonstrate workplace knowledge and skills common to manufacturing.
9.3.MN-HSE.1	Demonstrate the safe use of manufacturing equipment.
9.3.MN-HSE.4	Evaluate a system of health, safety and/or environmental programs, projects, policies or procedures to determine compliance.
9.3.MN-LOG.2	Demonstrate proper handling of products and materials in a manufacturing facility.
9.3.MN-MIR.5	Implement a preventative maintenance schedule to maintain manufacturing equipment, tools and workstations.
9.3.MN-PPD.1	Produce quality products that meet manufacturing standards and exceed customer satisfaction.
9.3.MN-PPD.5	Develop procedures to create products that meet customer needs.
9.3.MN-PRO.4	Coordinate work teams when producing products to enhance production process and performance.
9.3.MN-QA.1	Evaluate production operations for product and process quality.

Career Ready Practices	
CRP6.	Demonstrate creativity and innovation.
CRP7.	Employ valid and reliable research strategies.
CRP8.	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9.	Model integrity, ethical leadership and effective management.
CRP10.	Plan education and career paths aligned to personal goals.
CRP11.	Use technology to enhance productivity.
CRP12.	Work productively in teams while using cultural global competence.
Interdisciplinary Connections	
Standard x.x	
Integration of Technology	
Standard x.x	
CPI #	Cumulative Progress Indicator (CPI)

Instructional Focus

Enduring Understandings

- Careful planning will save time, resources, and energy while ensuring the production of a high quality product.
- Creating a plan of procedure and a bill of materials is essential to move from design to production.
- Cost, durability, appearance, and availability influence material selection.

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- Skilled and safe use of material, equipment and tools will result in a safe working environment for all.
- Properly maintaining tools and equipment aides in safe and effective use.
- Acceptable precision and tolerances vary according to materials, processes, implementation, and application.
- Understanding and using machines safely is a lifelong skill for the consumer, hobbyist, and the career professional.
- There are a variety of ways to create and strengthen wood joints.
- Modern adhesives can increase design flexibility and simplify assembly.
- Mechanical fasteners can increase the strength, longevity, and aesthetic value of a project.
- Coated abrasives are made from a variety of materials, both natural and synthetic, and have a wide range of uses.
- Proper surface preparation is necessary to achieve a professional-quality finish.
- Woodworking is a substantial bridge connecting manufacturing and construction career pathways.
- Transferable skills, content knowledge, and positive attributes help prepare students for employment and educational opportunities.
- Accurate measurement and layout is necessary for the success of any woodworking project.

Essential Question

- How do OSHA rules and regulations apply to machine shop safety?
- What affect does joinery have on the strength and durability of a wood product?
- Why are certain joints used in different applications?
- What type of joints should be used in various applications?
- Why use a chemical fastener?
- How does the use of mechanical fasteners increase strength?
- Why is it important to use clamping pressure when using glues and adhesives?

Evidence of Learning (Assessments)

Successful completion of:
Safety Quizzes

- Panel Saw
- Disc Sander
- Palm Sander
- Jointer
- Table Saw
- Surface Planer
- Band Saw
- Drill Press

Capstone project (Serving Tray)

Objectives

Students will know:

- how to measure
- how to read a bill of materials
- how to scale designs using graph paper
- how to efficiently layout parts on material
- how to layout lines, arcs and angles on material
- how to safely use:
    - Panel Saw
    - Disc Sander

- Palm Sander
- Jointer
- Table Saw
- Surface Planer
- Band Saw
- Drill Press

- basic machine diagnostics
- the proper progression of sanding grits
- how to assemble projects
  - glue
    - butt joint
    - dado
    - dowel
- how to apply stain to a project
- how to self evaluate
- how to appropriately manage time

Students will be able to:

- use a ruler to 1/16" tolerance
- successfully complete safety quizzes for various power tools
- proper and appropriate setup and usage of machinery
- transfer designs onto their material
- create rough cuts to approximate length
- create a straight edge using the jointer
- create perfectly straight boards on table saw
- select and use properly sized bits to create various sized holes and depths with drill press
  - blind holes
  - through holes
- cut curves to rough shape on band saw
- bring projects to final size using the disc sander
- bring projects to final shape with hand files and drum sanders
- surface plane a board to given thickness
- create a dado cut to specified thickness and depth
- sand the surfaces of the board to a smooth finish
- assemble projects using glue and clamping techniques
- assemble projects using fine joinery techniques
- apply thin and even coats of stain to their project
- complete a rubric
- follow procedural calendar to stay on task and track their progress

Integration
Technology Integration
Writing Integration
Competencies
Suggested Resources

Nutley Public Schools

Woodworking
Grades: 9-12

Unit V: Mantle Clock
Summary and Rationale
This unit is the culmination of the student's knowledge from the year. Students will apply the knowledge and skills learned from previous units, as well as utilize new skills to complete their final project. Problem solving, and order of operations will be critical for this project as creating specialty cuts must be done in a certain order to safely and efficiently complete the project. Students will also continue to work on coarse and fine motor skills during the designing, transfer, and cutting stages of their project. Students will continue to "read" working drawings and redraw said plans to full scale. The students will continue to efficiently layout their materials, manage and store their pieces, and use new forms of assembling techniques. As this is a very elegant furniture piece, students will again be allowed to choose from various species of hardwood to suit their taste. Students will again be involved in the grading process and will be afforded the opportunity to reflect on their work.
Recommended Pacing
11 weeks
Standards

Career and Technical Education 9.3	
9.3.12.AC.1	Use vocabulary, symbols and formulas common to architecture and construction.
9.3.12.AC.3	Comply with regulations and applicable codes to establish and manage a legal and safe workplace.
9.3.12.AC.5	Describe the roles, responsibilities, and relationships found in the architecture and construction trades and professions, including labor/management relationships.

9.3.12.AC.6	Read, interpret and use technical drawings, documents and specifications to plan a project.
9.3.12.AC-CST.2	Describe the approval procedures required for successful completion of a construction project.
9.3.12.AC-CST.3	Implement testing and inspection procedures to ensure successful completion of a construction project.
9.3.12.AC-CST.4	Apply scheduling practices to ensure the successful completion of a construction project.
9.3.12.AC-CST.5	Apply practices and procedures required to maintain jobsite safety.
9.3.12.AC-CST.8	Demonstrate the construction crafts required for each phase of a construction project.
9.3.12.AC-CST.9	Safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.
9.3.12.AC-DES.2	Use effective communication skills and strategies (listening, speaking, reading, writing and graphic communications) to work with clients and colleagues.
9.3.12.AC-DES.8	Apply standards, applications and restrictions pertaining to the selection and use of construction materials, components and assemblies in the project design.
9.3.12.AC-MO.1	Recognize and employ universal construction signs and symbols to function safely in the workplace.
9.3.MN.6	Demonstrate workplace knowledge and skills common to manufacturing.
9.3.MN-HSE.1	Demonstrate the safe use of manufacturing equipment.
9.3.MN-HSE.4	Evaluate a system of health, safety and/or environmental programs, projects, policies or procedures to determine compliance.
9.3.MN-LOG.2	Demonstrate proper handling of products and materials in a manufacturing facility.
9.3.MN-MIR.5	Implement a preventative maintenance schedule to maintain manufacturing equipment, tools and workstations.
9.3.MN-PPD.1	Produce quality products that meet manufacturing standards and exceed customer satisfaction.
9.3.MN-PPD.5	Develop procedures to create products that meet customer needs.
9.3.MN-PRO.4	Coordinate work teams when producing products to enhance production process and performance.
9.3.MN-QA.1	Evaluate production operations for product and process quality.

Career Ready Practices	
CRP6.	Demonstrate creativity and innovation.
CRP7.	Employ valid and reliable research strategies.
CRP8.	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9.	Model integrity, ethical leadership and effective management.
CRP10.	Plan education and career paths aligned to personal goals.
CRP11.	Use technology to enhance productivity.
CRP12.	Work productively in teams while using cultural global competence.

Interdisciplinary Connections	
Standard x.x	
Integration of Technology	
Standard x.x	
CPI #	Cumulative Progress Indicator (CPI)

Instructional Focus

Enduring Understandings

- Careful planning will save time, resources, and energy while ensuring the production of a high quality product.
- Creating a plan of procedure and a bill of materials is essential to move from design to production.
- Cost, durability, appearance, and availability influence material selection.
- Skilled and safe use of material, equipment and tools will result in a safe working environment for all.
- Properly maintaining tools and equipment aides in safe and effective use.
- Acceptable precision and tolerances vary according to materials, processes, implementation, and application.
- Understanding and using machines safely is a lifelong skill for the consumer, hobbyist, and the career professional.
- There are a variety of ways to create and strengthen wood joints.
- Modern adhesives can increase design flexibility and simplify assembly.
- Mechanical fasteners can increase the strength, longevity, and aesthetic value of a project.
- Coated abrasives are made from a variety of materials, both natural and synthetic, and have a wide range of uses.
- Proper surface preparation is necessary to achieve a professional-quality finish.
- Woodworking is a substantial bridge connecting manufacturing and construction career pathways.
- Transferable skills, content knowledge, and positive attributes help prepare students for employment and educational opportunities.
- Accurate measurement and layout is necessary for the success of any woodworking project.

Essential Questions

- How do OSHA rules and regulations apply to machine shop safety?
- What affect does joinery have on the strength and durability of a wood product?
- Why are certain joints used in different applications?
- What type of joints should be used in various applications?

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- Why use a chemical fastener?
- How does the use of mechanical fasteners increase strength?
- Why is it important to use clamping pressure when using glues and adhesives?

Evidence of Learning (Assessments)

Successful completion of:
Safety Quizzes

- Panel Saw
- Disc Sander
- Palm Sander
- Jointer
- Table Saw
- Surface Planer
- Band Saw
- Drill Press
- Chop Saw

Capstone project (Mantle Clock)

Objectives

Students will know:

- how to measure
- how to read a bill of materials
- how to efficiently layout parts on material
- how to layout lines, arcs and angles on material
- how to safely use:
    - Panel Saw
    - Disc Sander
    - Palm Sander
    - Jointer
    - Table Saw
    - Surface Planer
    - Band Saw
    - Drill Press
    - Chop Saw
    - Router
- basic machine diagnostics
- the proper progression of sanding grits
- how to assemble projects
    - glue
        - butt joint
        - lap joint
        - dado
        - rabbet
        - miter
    - semi-permanent glue bond (spray glue)
    - mechanical fasteners
        - wood screw
        - nut/bolt
        - threaded insert
- how to apply stain to a project

- how to self evaluate
- how to appropriately manage time

Students will be able to:

- use a ruler to 1/16” tolerance
- successfully complete safety quizzes for various power tools
- proper and appropriate setup and usage of machinery
- transfer designs onto their material
- create rough cuts to approximate length
- create a straight edge using the jointer
- create perfectly straight boards on table saw
- select and use properly sized bits to create various sized holes and depths with drill press
- cut curves to rough shape on band saw
- create square cuts to perfect length on chop saw
- create miter cuts on chop saw
- bring projects to final size using the disc sander
- bring projects to final shape with hand files and drum sanders
- surface plane a board to given thickness
- create a dado cut to specified thickness and depth
- create a rabbet cut to specified thickness and depth
- create decorative profile with router
- sand the surfaces of the board to a smooth finish
- assemble projects using glue and clamping techniques
- assemble projects using fine joinery techniques
- apply thin and even coats of stain to their project
- complete a rubric
- follow procedural calendar to stay on task and track their progress

Integration

Technology Integration

Writing Integration

Competencies

Suggested Resources