

Course Title	Woods I
Department and Curriculum Writing Team Members	Technology Education Jim Cartier Charles Estabrooks
Course Overview	Woods I is an elective course in the Technology Education department open to grades 9-12. This activity-based course promotes learning through doing. Woods I students will construct various projects with an emphasis on shop safety, problem solving, and manufacturing accuracy. Formal instruction on machine and hand tools will be conducted to give students a foundation from which to build their skills. In addition, basic computerized machining skills will be introduced and practiced. Students will be required to write about manufacturing technology topics. The purpose of Woods I is to introduce students to the process of manufacturing with wood, and to possibly spur an interest that could lead to a vocation after graduation.
Length of Course	<input type="checkbox"/> Full year <input checked="" type="checkbox"/> Semester
Type of Course	<input type="checkbox"/> Humanities Required Credit <input type="checkbox"/> STEM Required Credit <input type="checkbox"/> Humanities Elective Credit <input checked="" type="checkbox"/> STEM Elective Credit <input type="checkbox"/> PE/Health Required Credit <input type="checkbox"/> Other
Grade Level	<input checked="" type="checkbox"/> 9 <input checked="" type="checkbox"/> 10 <input checked="" type="checkbox"/> 11 <input checked="" type="checkbox"/> 12
Prerequisites	None
Ledyard High School Vision of the Graduate	<p>Ledyard High School is a learning community dedicated to the cultivation of skills essential for our students' success in a rapidly-evolving society. At Ledyard High School, we believe our graduates should demonstrate the following:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Collaboration - Colonel Graduates will demonstrate an ability to work effectively with others, sharing ideas, acknowledging one another's strengths, and collaborating to produce presentations, projects, performances, or events.</li> <li><input checked="" type="checkbox"/> Communication- Colonel Graduates will demonstrate an ability to communicate information clearly and effectively through a variety of media, including written, oral, visual, musical, and/or video productions.</li> <li><input checked="" type="checkbox"/> Problem-Solving- Colonel Graduates will demonstrate an ability to solve problems of varying complexity across a variety of content areas.</li> <li><input checked="" type="checkbox"/> Critical Thinking - Colonel Graduates will demonstrate critical thinking skills to find solutions, support arguments, and overcome challenges in a variety of content areas.</li> </ul>

	<input checked="" type="checkbox"/> Perseverance - Colonel Graduates will demonstrate perseverance in academic and extracurricular settings by working through and past obstacles in pursuit of goals. <input checked="" type="checkbox"/> Creativity - Colonel Graduates will demonstrate creativity through their participation in fine arts courses as well as through their inventive approaches to learning activities in a variety of settings.
VOG Portfolio Component	Air Powered Dragster Problem Solving

## Unit 1: Safety

Pacing:  
Week 1

Description	In this unit, students will demonstrate an understanding of workplace safety.
Essential Questions	<ol style="list-style-type: none"><li>1. What is the role of safety in the workplace?</li><li>2. How are personal safety practices pertaining to eye wear, footwear, clothing, and personal protective equipment (PPE) applied in the workplace?</li><li>3. What are the proper procedures for safe handling and operation of workplace tools, equipment, and materials?</li></ol>
Standards/Learning Objectives	<p><b><u>CT SDE Career and Technical Performance Standards</u></b></p> <p><b><u>Students will be able to...</u></b></p> <p><b>A. Safety:</b> Describe and demonstrate the procedures related to workplace and job-site safety, including personal protective equipment, machine safety, and material handling practices.</p> <ol style="list-style-type: none"><li>1. Demonstrate knowledge of proper use, storage, and disposal of hazardous materials following OSHA's proper safety practices for a woodworking facility.</li><li>2. Demonstrate and explain knowledge of workplace safety procedures.</li><li>3. Demonstrate and explain knowledge of personal safety practices pertaining to eye wear, footwear, clothing, and personal protective equipment (PPE) used in wood technology.</li><li>4. Describe safety practices for the following machines: table saw, drill press, stationary sander, router table, and miter saw.</li><li>5. Demonstrate and explain knowledge of proper use and storage of basic hand tools.</li><li>6. Demonstrate and explain knowledge of proper use and storage of portable power tools.</li><li>7. Explain safe proper use, disposal, and storage of chemicals following OSHA standards.</li></ol> <p><b>B. Machines and Tools:</b> Identify and describe the function of various types of layout hand and power tools in the Wood Technology field.</p> <ol style="list-style-type: none"><li>8. Identify, use, and maintain the following measuring, layout, and marking tools: steel rule, tape measure, combination square, sliding "T" bevel, and compass.</li><li>9. Identify proper use and function of the following portable power tools: drill, scroll saw, finishing sanders, and router-table.</li><li>10. Identify proper use and function of the following fastening tools: hammer, phillip head screwdriver, and slotted/flat head screwdriver.</li><li>11. Identify proper use and function of the following hand tools: cross cut saw, rip saw, level, coping saw, hand plane, chisel, and file.</li><li>12. Identify proper use and function of the jointer.</li></ol>

Application of Learning Objectives	<p>In every unit, it is critical to apply the safety knowledge gained in this unit. It is not sufficient to just understand the safety principles. It is imperative to apply those principles throughout the course.</p> <p>Students will demonstrate safe behavior through the manufacture and production of relevant products in an authentic workplace setting.</p> <p>At the beginning of the course, students participate in three class safety lessons where forty five safety rules are read and gone over. In addition, OSHA, NIOSH and the role of MSDS sheets are discussed.</p> <p>During the finishing lesson, students will learn about using certain glues , safe use, storage and disposal.</p> <p>At the beginning of the course, students participate in three class safety lessons where forty five safety rules are introduced. In addition, OSHA, NIOSH and the role of MSDS sheets are gone over.</p> <p>The wood lathe, drill press, stationary sander, router table, and miter saw machines are gone over in class, have associated assessments and all have been filmed by the instructor and posted in Google Classroom.</p> <p>Measuring, layout, and marking tools are gone over during a layout tool lesson and are used during work periods.</p> <p>Portable power tools are covered individually in a safe use lesson.</p> <p>The various types of screwdrivers are covered during our fastening lesson. This occurs naturally because the first project has screws which need to be installed.</p> <p>The jointer machine is gone over in class, and there is an associated assessment in Google Classroom. The safety lesson has been filmed and is also posted in Google Classroom.</p>
Vocabulary	OSHA, NIOSH, MSDS, Pinch Point, Safety Guard, Personal Protective Equipment, Fire Triangle, ABC Fire Extinguishers, Fire Blanket
Resources	General Safety Rule Handout. Safety video which explains all safety rules, safety quiz. These are all in Google Classroom/Drive
Assessments	Students will demonstrate knowledge of workplace safety through a written assessment and demonstrate safe behavior in the shop. <i>The assessment is in Google Drive.</i>

## Unit 2: Planning & Layout

Pacing:  
Weeks  
2-3

Description	Students will develop a Bill of Materials for their first project. Students will identify the views in a three view drawing. Students will read dimensions off of a three view drawing
Essential Questions	<ol style="list-style-type: none"> <li>1. What are three-view drawings and how are they read/interpreted?</li> <li>2. What is a Bill of Materials?</li> </ol>
Standards/Learning Objectives	<p><b><u>CT SDE Career and Technical Performance Standards</u></b></p> <p><b><u>Students will be able to...</u></b></p> <p><b>C. Design, Measurement, and Layout:</b> Interpret technical drawings, rough drawings and sketches, and the use fractional measurement.</p> <ol style="list-style-type: none"> <li>13. Describe and identify fractional measurements from a basic plan and assembly drawings.</li> <li>14. Describe and prepare rough drawings and sketches.</li> <li>15. Explain and prepare a cut list or bill of material from a basic plan and assembly drawing.</li> <li>16. Measure accurately to a sixteenth of an inch.</li> <li>17. Identify the difference between both nominal and actual dimensions.</li> <li>18. Estimate material quantities in both board feet and linear feet.</li> <li>19. Consider the natural characteristics of grain, knots, and checks when laying out a board.</li> </ol>
Application of Learning Objectives	<p>Project planning is an imperative first step towards creating a successful product. Taking the time to understand and interpret the drawings associated with a project is important.</p> <p>Students receive a drawing of the desired end product and interpret the drawing to produce a model of the product and/or create a bill of material.</p> <p>Students receive a drawing of the desired end product and interpret the drawing to produce a model of the product and/or create a bill of material.</p>
Vocabulary	Front View, Top View, Side View, <b>Isometric</b> , units of measure, <b>nominal</b> , measuring, <b>accuracy</b> and <b>precision</b> , <b>tolerance</b> , layout, defects, dimension line, extension lines, center line, reduce
Resources	Wall shelf drawing. (Hard copies in the woodshop) Bill of Materials work sheet.. (Hard copies in the woodshop) measuring worksheet (Hard copies), rulers, board foot sample which is located in the wood shop.
Assessments	<p>Students will demonstrate their ability to measure accurately to within 1/16th of an inch.</p> <p>Students will properly lay out and label the views of a technical drawing.</p> <p>Students will calculate the cost of a product using board feet.</p>

## Unit 3: Cutting and Preparation

Pacing:  
Weeks  
4-6

Description	Students will lay out the rough cuts for their first project using a tape measure and a square. They will safely and effectively utilize rip saws for cutting parallel with the grain and cross cut saws for cutting perpendicular to the grain.
Essential Questions	<ol style="list-style-type: none"> <li>1. Why is it important to plan a layout before cutting materials?</li> <li>2. Which tools are appropriate for specific material processing tasks and how do we use them properly?</li> </ol>
Standards/Learning Objectives	<p><b><u>CT SDE Career and Technical Performance Standards</u></b></p> <p><b><u>Students will be able to...</u></b></p> <p><b>E. Material Processing:</b> Identify and describe the various types of processes associated with the woodworking field and the characteristics of wood as a medium.</p> <p>23. Identify and select the proper cutting process based on grain direction.</p> <p>24. Identify how grain direction affects a material's strength.</p> <p>25. Understanding kerf and its application to cutting and layout operations.</p>
Application of Learning Objectives	<p>It is important to follow a specific material processing sequence for optimum productivity and safety.</p> <p>Students will optimize yield from selected stock materials, using hand and machine tools in the production of relevant products.</p>
Vocabulary	Layout, dimensions, <b>tolerance</b> , <b>kerf</b> , grain, knots, <b>checks</b> , combination square, tape measure, hand plane, <b>back saw</b> , scrap side, square, parallel, crosscut, rip, <b>jointer</b> , planer
Resources	Drawings of the wall shelf, frame or other projects, Bill of material worksheet.
Assessments	Students will demonstrate the ability to safely use hand and power tools to prepare materials for fabrication into various products.

## Unit 4: Joining

Pacing:  
Weeks  
7-9

Description	Techniques for Joining Materials
Essential Questions	<ol style="list-style-type: none"> <li>1. Which joining method is appropriate for a particular assembly?</li> <li>2. How are joining methods applied for the desired result?</li> </ol>
Standards/Learning Objectives	<p><b><u>CT SDE Career and Technical Performance Standards</u></b></p> <p><b><u>Students will be able to...</u></b></p> <p><b>G. Joinery: Identify various types of joints and describe the process for preparation and assembly.</b></p> <p>27. Identify and assemble the following types of joints: butt, miter, dado, rabbet, and lap.</p> <p>28. Prepare stock for use.</p> <p><b>H. Assembly: Identify and describe the purpose of various types of fasteners, adhesives, and clamping devices.</b></p> <p>29. Identify and describe the purpose and use of the following woodworking fasteners: common nails, round head screws, flat head screws, and oval head screws.</p> <p>30. Identify and describe the purpose of the following clamping devices: bar clamp, c-clamp, parallel/hand screw clamp, and spring clamps.</p>
Application of Learning Objectives	<p>It is important to choose the proper method and technique for proper joining of materials</p> <ol style="list-style-type: none"> <li>1. Students participate in a teacher led discussion on the importance of wood joinery with an emphasis on dados. <i>A teacher-made video is in Google Classroom which demonstrates a safely cut dado.</i></li> <li>2. The students make a relevant hands-on shelf which requires dados</li> <li>3. The instructor develops the layout of dados while the students watch and take notes</li> <li>4. The instructor models safe and accurate cutting practices while completing accurate dados while the students take notes</li> <li>5. Students will layout dados which will accept vertical support</li> <li>6. Students will cut a dado using clamps, a mallet, chisels and a router plane</li> </ol>
Vocabulary	<b>Grain</b> , stud spacing, material properties, adhesives, <b>dado</b> , <b>biscuit</b> , metal fasteners, <b>counterbore</b> , <b>countersink</b> , plug, through hole, blind hole, furniture clamps, router plane, chisels
Resources	<u>Wood</u> Textbook located in class. Demonstrations of joints. Joint display in shop
Assessments	<ol style="list-style-type: none"> <li>1. Student are observed as they are cutting dados with regards to safety and accuracy</li> <li>2. Dados are assessed using a rubric for accuracy. <i>The project rubric for dados is in Google Classroom and is posted on the woodshop door. <a href="#">curr. Woods one second quarter project rubric.docx</a></i></li> </ol>

## Unit 5: Finishing

Pacing:  
Weeks  
10-11

Description	Techniques for Finishing Materials
Essential Questions	<ol style="list-style-type: none"> <li>1. Why is applying wood finish important for beauty and protection?</li> <li>2. How does stain affect a wood's color and what is clear coating (polyurethane)?</li> <li>3. Why is it important to properly sand and prepare a piece of wood for finishing and what would the result be if finish is put over a rough surface?</li> <li>4. What are the advantages and disadvantages of water based finishes and oil based finishes?</li> </ol>
Standards/Learning Objectives	<p><b><u>CT SDE Career and Technical Performance Standards</u></b></p> <p><b><u>Students will be able to...</u></b></p> <p><b>I. Finishing: Describe various types of available finishes and safety precautions used during the application process.</b></p> <p>31. Identify and apply various wood finishes for interior and exterior, with brush or wipe on, for the following: paint, stain, and clear coat.</p>
Application of Learning Objectives	<p>Although the thickness of the finish is measured in thousandths of an inch, this thin layer covers all the other work. A bad finish can make an otherwise well made project look bad.</p> <p>Students will prepare and finish a relevant project using water based polyurethane, and if desired, they will apply stain too.</p>
Vocabulary	<p><b>Clear coat</b>, spray <b>aerosol</b> finish, <b>polyurethane</b>, <b>stain</b>, water based, oil based, <b>tack cloth</b>, fire extinguisher, fire blanket, paint brush, <b>flammable</b> storage cabinet, <b>ventilation</b>, with the <b>grain</b></p>
Resources	<p>Safety rules. Demonstrations. <u>Wood</u> textbook.</p>
Assessments	<p>Student are observed as they are applying finishing with regards to safety and accuracy. The quality of the finished application will be graded.</p>



## Unit 6: Lathe

Pacing:  
Weeks  
12-14

Description	<b>Students will safely and accurately turn a piece of wood on a lathe.</b>
Essential Questions	<ol style="list-style-type: none"> <li>1. How do the two methods of turning (scraping and cutting) differ and describe the advantages and disadvantages of each?</li> <li>2. How is wood turning similar to methods utilized in other industries?</li> </ol>
Standards/Learning Objectives	<p><b><u>CT SDE Technology Education Standards</u></b></p> <p><b><u>Students will be able to...</u></b></p> <p><b>C. Design, Measurement, and Layout: Interpret technical drawings, rough drawings and sketches, and the use fractional measurement.</b></p> <p>13. Describe and identify fractional measurements from a basic plan and assembly drawings.</p> <p><b>D. Materials: Describe characteristics and appropriate applications for softwoods, hardwoods, and plywoods.</b></p> <p>21. Identify characteristics and applications of the following deciduous hardwoods: oak, maple, and poplar.</p>
Application of Learning Objectives	<p>The lathe spins wood while various shaped turning tools cut into its surface. The turning process can be very precise and repeatable and can also be free-flowing and artistic.</p> <p>Students turn a functional flower vase on the lathe.</p>
Vocabulary	<b>spindle turning, faceplate turning, headstock, tailstock, bed, toolrest, spur center, live center, spindle speed in revolutions per minute (rpms), step pulleys, belt, draw bar, gouge, skew, round-nose, spear-point, parting tool, hand plane, chamfer, outside calipers</b>
Resources	Lathe safety rule handout (Google CR, Google Drive), Lathe safety video (Google CR, Google Drive), Lathe quiz (Google CR, Google Drive), <u>Wood</u> textbook.
Assessments	The turning process will be graded for technique and safety. The turned product will be graded for accuracy and quality.

## Unit 7: Air Car Design, Fabrication and Testing

Pacing:  
Weeks  
15-17

Description	<b>Students will utilize learned shop skills to design, fabricate and race an air powered dragster.</b>
Essential Questions	<ol style="list-style-type: none"> <li>1. In what ways do axle friction and weight impact speed?</li> <li>2. What is an example of good aerodynamics?</li> <li>3. What is “alignment” and how does it impact performance?</li> <li>4. How can your developed skills from previous projects be cross-utilized to make the air car?</li> </ol>
Standards/Learning Objectives	<p><b><u>CT SDE Career and Technical Performance Standards</u></b></p> <p><b><u>Students will be able to...</u></b></p> <p><b>E. Material Processing:</b> Identify and describe the various types of processes associated with the woodworking field and the characteristics of wood as a medium.</p> <p>23. Identify and select the proper cutting process based on grain direction.</p> <p>24. Identify how grain direction affects a material’s strength.</p> <p>25. Understanding kerf and its application to cutting and layout operations.</p>
Application of Learning Objectives	<p>This unit encourages competition through the racing and timing of air powered cars. The processes involved in making the car were also used when the shelf was made. The design rules are presented, and a general manufacturing sequence is suggested, however the students will ultimately work independently in their design, construction and testing of their car. Also, A good car example is shown and raced. The best times from each school year, going back to 2002, are posted in the shop on our airway champions board.</p> <p>Students design, build and race a car.</p>
Vocabulary	<b>aerodynamics, infra-red timing sensor, thousandth of second, alignment, production sequence, car weight, axle</b>
Resources	Handout on car design parameters, Video on how car is made and raced (Google CR, Google Drive)
Assessments	The process of making the cars is graded for safety and the performance of the cars are assessed using a rubric.

## Unit 8: Independent Application of Acquired Skills

Pacing:  
Week  
18

Description	<b>Students will utilize existing knowledge and skills to design and fabricate self-directed projects independently.</b>
Essential Questions	1. How can acquired skills be utilized to design and construct desired outcomes?
Standards/Learning Objectives	<b><u>CT SDE Career and Technical Performance Standards</u></b> <b><u>Students will be able to...</u></b> <b>C. Design, Measurement, and Layout:</b> Interpret technical drawings, rough drawings and sketches, and the use fractional measurement. <b>D. Materials: Describe characteristics and appropriate applications for softwoods, hardwoods, and plywoods.</b> <b>E. Material Processing:</b> Identify and describe the various types of processes associated with the woodworking field and the characteristics of wood as a medium.
Application of Learning Objectives	Students will finish and modify projects and may use the skills learned in the course to make independent projects. Options include : Air car innovations & improvements; Advanced lathe work; CNC Laser cutting design & fabrication; scroll saw work.
Vocabulary	<b>finishing, design , shop safety, modifications</b>
Resources	Machine safety rules, safety videos for projects being made. (Google CR, Google Drive)
Assessments	Students will be graded on their safe and efficient use of their shop time while working independently.