Wood 2- Intermediate Woodworking

Content Area: **Science**
Course(s): **Wood 2**
Time Period: **1st Semester**
Length: **40 weeks (full year)**
Status: **Not Published**

Course Overview: Objectives, benchmarking and screening plan

Wood 2 is an intermediate woodworking course for students in grades 9–12 who have successfully completed Wood 1. This course builds on foundational skills in safety, measurement, tool use, and basic joinery, and challenges students to plan and complete more complex, high-quality projects. Emphasis is placed on safe work habits, accuracy, problem-solving, project planning, and pride in craftsmanship. Students will be expected to work more independently, follow multi-step plans, and demonstrate responsibility in the shop.

Course Objectives

By the end of Wood 2, students will be able to:

1. Apply advanced shop safety practices when using stationary and portable power tools, consistently following all safety rules, procedures, and expectations established in Wood 1 and expanded in Wood

2. Interpret and create project plans (drawings, cut lists, and material layouts) with accurate measurements, tolerances, and sequencing appropriate for intermediate-level projects.

3. Select and use hand and power tools appropriately (e.g., table saw, band saw, drill press, sanders, routers, and hand tools) to complete cuts and operations that meet quality and safety standards.

4. Demonstrate intermediate joinery and construction techniques (such as reinforced butt joints, dadoes, rabbets, simple mortise-and-tenon, or similar) that result in structurally sound and well-fitted assemblies.

5. Plan, build, and finish at least one major project from start to finish, demonstrating growth in accuracy, time management, problem-solving, and overall craftsmanship compared to Wood 1.

6. Evaluate the quality of their own work and the work of others using rubrics and criteria that address safety, accuracy, craftsmanship, and appropriate use of materials and time.

7. Demonstrate employability and career-readiness skills commonly valued in the trades and industry, such as punctuality, teamwork, communication, responsibility, and care of tools and equipment.

Course Name, Length, Date of Revision and Curriculum Writer

Course Name: Wood 2: Intermediate Woodworking

Length: Full Year (40 weeks)

Date of Revision: 4/13/2026

Curriculum Writer: Catherine Zank

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Unit 1: Review and Advanced Safety

Content Area: **Science**
Course(s): **Wood 2**
Time Period: **1st Marking Period**
Length: **1-2 weeks**
Status: **Not Published**

Summary of the Unit

Students review core safety expectations from Woodshop 1 and deepen their understanding of machine-specific safety, tool maintenance and care, and shop roles and responsibilities. The goal is to move from "following rules" to owning safety as a culture and habit. Students will practice identifying real-world hazards in the shop and take an active role in correcting them before problems occur. They will rotate through maintenance and cleanup roles so that every student takes responsibility for tools, machines, and shared spaces. Through discussion, reflection, and daily routines, students will learn how individual choices impact the safety of the entire class. By the end of the unit, they should be able to model professional shop behavior and hold themselves and peers accountable for maintaining a safe learning environment.

Enduring Understandings

- Safe woodworking is a mindset and culture, not just a list of rules.
- Proper maintenance, inspection, and setup of tools and machines prevent accidents and ensure quality work.
- Every student has a responsibility for shop cleanliness, organization, and accountability.

Essential Questions

- How does my behavior in the shop affect my safety and the safety of others?
- What does it mean to be "machine proficient" versus just "allowed to use" a machine?
- How does regular tool maintenance impact accuracy, safety, and the life of equipment?

Unit Summative Assessment and Alternate Assessment Options

- Safety Contract Review & Quiz – Revisit rules from Woodshop 1, discuss changes and new expectations for advanced students.
- Safety Walkthrough – Tour the shop; students identify hazards, correct PPE, emergency stops, and first aid locations.
- Machine-Specific Mini-Lessons – Short demos reviewing safe startup/shutdown, guards, push sticks, and safe body positions.
- Maintenance Stations – Rotate through stations (cleaning and oiling tools, checking cord condition, verifying guards, sweeping and dust management).
- Roles & Responsibilities Chart – Co-create daily/weekly responsibilities (sweep team, machine checks, tool inventory, scrap bin management).

Resources

Sample Resources

- Woodshop safety contract
- Machine safety manuals (table saw, jointer, planer, miter saw, router table, bandsaw)
- Safety videos from manufacturers
- OSHA/NIOSH basic shop safety posters
- Example maintenance checklists/logs

- https://www.youtube.com/@thisoldhouse/playlists
- https://www.youtube.com/@SteveRamsey
- https://www.youtube.com/@WorkshopCompanion
- https://youtube.com/playlist?list=PLx7nYfZqLp-HLQr-4fXBein3xZY6Io9ud&si=R0sUkDBdKEr0NKoX

Unit Plan

Topic/ Selection Timeframe	General Objectives	Instructional Activities	Assessments
Safety Contract Review and Quiz 2-4 days	• SWBAT recall and describe core Woodshop 1 safety rules related to PPE, behavior, and machine use. • SWBAT explain new or updated Woodshop 2 expectations, including increased independence and leadership in safety culture. • SWBAT distinguish between simply following safety rules and "owning" safety as a consistent habit. • SWBAT identify and explain examples of safe and unsafe behaviors in a woodshop environment.	Refresh Woodshop 1 safety knowledge, highlight new expectations for Woodshop 2, and document student accountability. Warm-Up / Activation • Students complete a quick bell-ringer on paper or on the board (e.g., "List 3 non-negotiable safety rules" or "Name 2 unsafe behaviors in the shop"). • Brief share-out to surface prior knowledge. Distribute & Review Contract • Hand out the updated Woodshop 2 safety contract to each student. • Read through key sections as	• Bell-ringer / warm-up responses (non-negotiable rules / unsafe behaviors) • Class share-out of prior safety knowledge • Whole-class discussion on "owning" safety • Student examples of good and bad safety habits • Safety diagnostic quiz (PPE, behavior, machine permissions, emergency procedures) • Signed safety contract (student signature and date) • Written reflection on one current safety

	• SWBAT demonstrate understanding of PPE requirements, machine permission/check-off procedures, and emergency protocols by completing a safety quiz. • SWBAT articulate at least one personal safety strength and one specific safety habit they will improve in Woodshop 2, as documented on their signed safety contract.	a class (PPE expectations, machine use permissions, behavior standards, consequences). • Pause to clarify any new or changed expectations from Woodshop 1 (e.g., higher standard of independence, leadership in safety culture). Discussion: “Owning” Safety • Whole-class discussion: “What’s the difference between just following rules and owning safety as a habit?” • Ask students to give examples of times they’ve seen good or bad safety habits (in Woodshop 1 or elsewhere). Safety Quiz • Administer a short diagnostic quiz covering: Core rules (PPE, hair/clothing, behavior), Machine	strength • Written reflection on one safety habit to improve • Teacher observation of seriousness/engagement during safety review • Participation in contract review and safety discussion

		permissions and check-off process. Emergency procedures (stops, first aid, reporting injuries). • Students complete quietly and turn in; this is formative but sets the tone for seriousness. Contract Signing & Reflection • Students sign and date the safety contract. • On the back or on a separate sheet, they write 1–2 sentences on: One safety habit they already do well. One safety habit they commit to improving in Woodshop 2. • Collect contracts for your records.	

Safety Walkthrough 2 days	• SWBAT identify potential shop hazards in different areas of the woodshop. • SWBAT locate and label emergency equipment (emergency stops, first aid, fire extinguisher, eye wash if applicable). • SWBAT determine appropriate PPE for specific shop areas and tasks. • SWBAT describe safe • behaviors and procedures for each area of the shop. • SWBAT explain proper response steps in the event of an emergency or unsafe situation. • SWBAT propose specific improvements to enhance safety and organization in the shop.	Safety Walkthrough: Help students actively identify hazards, PPE needs, and emergency equipment so they can prevent problems before they happen. Procedures: Pre-Brief & Expectations • Explain that this is a professional-style safety walkthrough, not a tour. • Review "look-fors": tripping hazards, cluttered walkways, missing guards, unplugged vs. plugged tools, proper storage, PPE stations, emergency stops, fire extinguishers, first aid. Provide Walkthrough Checklist • Give students a simple safety checklist/map of the room with prompts like:"Locate and label: emergency stop(s), first aid, fire extinguisher, eye wash (if applicable)." "Identify two potential	• Completion of individual or group safety walkthrough checklist/map. • Recorded list of identified hazards and proposed fixes for each shop area. • Observation of students locating and naming emergency stops and safety equipment. • Brief teacher questioning at key machines about emergency stop use and evacuation routes. • Group share-out of 1–2 key hazards found and solutions during debrief. • Class "Top 10 Safety Improvements" list generated from student findings. • Informal participation/engagement check during walkthrough and discussion.

		hazards in this area." "What PPE is required/optional here?" Guided Tour in Small Groups • Divide students into small groups (2–4). • Move through the shop in a set route (e.g., entrance → hand tool wall → sanding area → machine row → finishing area → exits). • At each stop, groups: Identify hazards or potential hazards and write them down. Note correct PPE and safe behaviors for that area. Physically locate emergency stops and safety equipment. Teacher Demonstration Moments • At 1–2 key machines, model how to hit the emergency stop and how you expect students to respond if something goes	

		wrong. • Briefly explain shop evacuation routes and what to do if you are not in the room. Debrief & Share-Out • Groups share 1–2 hazards they found and how to fix them. • Create a class “Top 10 Safety Improvements” list on the board that you’ll actively work on throughout the year.	

Machine Specific Mini-Lessons 1 -2 weeks	• SWBAT describe the primary purpose and typical operations of each core machine (table saw, miter saw, jointer, planer, router table, bandsaw). • SWBAT identify required PPE and proper body position for each machine. • SWBAT outline the correct startup and shutdown sequence for each machine. • SWBAT locate and explain the function of guards, fences, push sticks/blocks, and other safety devices on each machine. • SWBAT demonstrate safe hand and body placement relative to the blade/bit and line of cut. • SWBAT perform	Machine-Specific Mini-Lessons: Refresh and refine safe, proficient use of core machines (table saw, miter saw, jointer, planer, router table, bandsaw, etc.). Pre-Assessment / Discussion- Ask: "Which machines are you most comfortable with? Least comfortable?" Station or Whole-Class Demo Structure (per machine, 10–15 min) For each machine, follow a consistent pattern for mini-lessons. • Review Purpose: "This machine is used for…" (ripping, crosscutting, surfacing, profiling). • PPE & Setup: Required PPE, correct stance, clear zones, stock inspection. • Startup & Shutdown Sequence: Step-by-step (power on, wait for full speed, feed, power off, wait for complete stop). • Guards & Safety Devices: Show blade guards, riving knife, fence, push	• Pre-assessment discussion or quick poll on machine comfort level. • Teacher observation checklist during mini-lesson demos and guided practice. • Student verbal safety checks before cutting (e.g., "Fence locked. Guard in place. Push stick ready."). • Supervised practice cuts/operations on scrap wood for each machine. • Quick oral check or exit ticket identifying guards, feed direction, and safe body position. • Machine safety checklist performance for each student (used for later independent use approval).

		basic supervised operations on each machine using proper setup and safety checks.	sticks/blocks, featherboards, etc., and when they must be used. • Safe Body Position: Hands, feet, line of cut, where not to stand. Demonstration of a Few Key Operations • Teacher demonstrates 1–2 standard operations: Table saw: a basic rip cut, then a crosscut with a miter gauge/sled. Jointer: face-jointing then edge-jointing. Planer: proper infeed/outfeed and grain direction. Router table: feeding in correct direction, using fence and guard. • Verbally call out each safety step as you do it. Guided Student Practice • Students practice on scrap wood only, one at a time, with you nearby.	

		• Require them to: Verbally state critical safety checks before cutting (e.g., “Fence locked. Guard in place. Push stick ready.”). Complete 1–3 supervised cuts/operations per student. Quick Check-Off / Exit Ticket • After each mini-lesson, do a quick oral check or mini checklist (students point to guards, explain feed direction, etc.). • Note which students need re-teaching before independent use.	
Maintenance Stations 1 week	• SWBAT explain why regular maintenance and cleanliness are important for safety, accuracy, and tool life. • SWBAT follow safety procedures for unplugging and handling tools during basic maintenance tasks.	Maintenance Stations: Build habits of tool care, shop cleanliness, and shared responsibility by rotating students through simple maintenance tasks. Intro & Safety Reminders • Explain why maintenance matters (safety, accuracy, tool	• Completion of station-specific maintenance checklists by each group. • Teacher observation of student technique at each station (cleaning, coiling cords, sweeping, etc.). • Maintenance log entries noting any damaged cords,

	• SWBAT clean and lightly oil designated hand tools appropriately. • SWBAT inspect power cords, plugs, and portable tools for visible damage and safety concerns. • SWBAT verify that guards and safety devices are present, functional, and correctly positioned on assigned machines. • SWBAT maintain floor and dust control in assigned shop zones to reduce slip, trip, and respiratory hazards. • SWBAT record maintenance observations and report damaged or unsafe tools and equipment to the teacher.	life). • Review general rules: unplug before working on tools, no opening machine cases without teacher, proper rag and chemical safety if applicable. Set Up Maintenance Stations (before class) Example stations: • Station A – Hand Tool Cleaning & Oiling: Wipe down chisels, planes, measuring tools; light oil if appropriate. • Station B – Power Cord & Plug Check: Inspect cords on portable tools for cuts, exposed wires, loose plugs; tag and report issues. • Station C – Guard & Safety Device Check: Verify guards and safety devices are present, move freely, and are correctly adjusted. • Station D – Floor & Dust Management:	missing guards, or other issues. • Condition of tools and shop areas before/after rotations. • Brief debrief participation on tool/machine condition and class maintenance needs. • Informal rubric/participation mark for fulfilling assigned maintenance tasks responsibly.

		Sweep assigned zones, empty dust pans, check dust collection hoses for clogs/loose connections. Assign Students to Small Groups • Post a rotation schedule on the board so students know where they start and where they go next. • Each group gets a simple checklist specific to their station. Rotation Rounds • Timer-based rotations (e.g., 3–4 stations x ~10 minutes). • At each station, groups: Read the checklist. Complete tasks (cleaning, inspecting, sweeping, etc.). Record any problems (damaged cords, missing guards, loose parts) on a maintenance log sheet. Teacher Oversight & Mini-Demos (throughout)	

		• Circulate to correct technique (e.g., how to coil cords properly, how not to over-oil, correct sweeping into dust pan vs. into machines). • Emphasize what students should and should not attempt (e.g., students inspect and report; you handle repairs/adjustments beyond their level). Wrap-Up & Reflection • Quick debrief: "What did you notice about the condition of our tools/machines?" • Highlight 1–2 maintenance wins and 1–2 areas the class needs to improve. • Remind students that maintenance duties will become part of their regular roles.	
Roles and Responsibilities Chart 1-3 days	• SWBAT Explain and demonstrate safe operation procedures for all core machines used in the	Roles & Responsibilities Chart: Co-create a system so every student regularly contributes to shop safety, cleanliness, and	• Safety diagnostic quiz (formative) • Machine safety

	course. • SWBAT Identify potential shop hazards and propose ways to correct them. • SWBAT Use and maintain PPE correctly (eye, ear, respiratory, clothing/hair). • SWBAT Perform basic maintenance on hand tools and machines as assigned (cleaning, inspection, minor adjustments as appropriate). • SWBAT Follow a daily cleanup and shutdown routine to maintain a safe, orderly shop.	organization. Brainstorm Jobs as a Class • On the board, ask: "What needs to happen every day/weekly to keep this shop safe and functional?" • Build a list together (sweep team, tool check, machine shutdown, scrap bin sorting, dust collection check, clamp rack organization, etc.). Define Each Role • As a class, define simple, clear responsibilities for each role. For example: Sweep Team: Sweep assigned zones, empty dustpans into the main bin, check for nails/screws on the floor. Machine Checks: Verify machines are powered down, guards in place, and tables cleared of scrap. Tool Inventory: Count and return hand tools to correct	checklist performance (teacher observes correct procedures) • Signed safety contract and reflection on personal responsibility • Participation rubric for maintenance and shop roles

		locations, report missing/damaged tools.Scrap Bin Management: Separate usable offcuts from trash, keep bins organized, and below fill lines. Create a Visible Chart • On poster paper or a whiteboard section, build a chart with columns: Role name, Daily tasks, Weekly tasks (if any), Student names by day or week. Fill in example names for the first rotation. Assign Rotations • Decide whether roles rotate daily, weekly, or by project phase. • Assign each student a role for the first cycle, ensuring a mix of tasks across the marking period. • Have students copy their job and responsibilities into notebooks or on a small “job card.”	

		Ongoing Check-Ins • Build a daily habit where the last few minutes are for roles/cleanup. • Do a quick visual inspection and acknowledge groups that are consistently on top of their own progress	

Standards for Course Content Area and Cross Content Standards Addressed

9.3.12.AC	Architecture & Construction
9.3.12.AC.1	Use vocabulary, symbols and formulas common to architecture and construction.
9.3.12.AC.2	Use architecture and construction skills to create and manage a project.
9.3.12.AC.3	Comply with regulations and applicable codes to establish and manage a legal and safe workplace.
9.3.12.AC.4	Evaluate the nature and scope of the Architecture & Construction Career Cluster and the role of architecture and construction in society and the economy.
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	Construction
9.3.12.AC-CST.1	Describe contractual relationships between all parties involved in the building process.
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.7	Compare and contrast the building systems and components required for a construction project.
9.3.12.AC-CST.8	Demonstrate the construction crafts required for each phase of a construction project.
9.3.12.AC-DES	Design/Pre-Construction
9.3.12.AC-DES.1	Justify design solutions through the use of research documentation and analysis of data.
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.3	Describe the requirements of the integral systems that impact the design of buildings.

Suggested Modifications for Students with Disabilities, 504 eligible, Multilingual Learners, At Risk Students and Gifted Students

Students with Disabilities / 504-Eligible Students

- Provide clear, step-by-step written directions and visual supports (photos, diagrams, checklists) for safety, procedures, and projects.
- Offer preferential seating and strategic partner/group work for modeling and support.
- Allow extended time on quizzes, projects, and safety check-offs as needed.
- Break multi-step tasks into smaller chunks with interim check-ins.
- Adjust tools, workspace, and project scale to support fine-motor, sensory, and mobility needs (e.g., clamps, jigs, adaptive grips, seated work when appropriate).
- Provide alternative formats for demonstrations and assessments (oral, visual, or recorded responses as appropriate to the IEP/504).
- Pre-teach and re-teach key vocabulary (safety terms, tool names) with visuals.

Multilingual Learners (MLL/ELL)

- Pre-teach essential vocabulary with images, labeled diagrams, and word banks posted in the shop.
- Use clear, concise language and model directions with demonstrations.
- Provide bilingual glossaries, sentence starters, and graphic organizers for reflections and written tasks.
- Allow students to demonstrate understanding through visuals, demonstrations, or brief oral explanations instead of lengthy written responses.
- Encourage peer support and structured partner work, pairing multilingual learners with supportive classmates.
- When possible, provide key documents (safety contract, major project overviews) in the student's home language or with translated summaries.

At-Risk Students

- Establish predictable routines and clear expectations for safety, cleanup, and participation.
- Provide frequent check-ins and positive feedback for on-task behavior and safe choices.
- Offer flexible deadlines when appropriate and provide in-class time to complete key tasks.
- Use highly structured roles and checklists during projects to support organization and follow-through.
- Connect projects to real-world applications (careers, theater productions, home use) to increase engagement.
- Coordinate with counselors/support staff as needed to monitor progress and address barriers to success.

Gifted and Advanced Students

- Offer optional extension tasks (more complex joinery, added design details, or leadership roles in group builds).
- Encourage students to propose small design modifications or custom elements within safety and time limits.
- Allow advanced students to mentor peers on specific skills (measuring, layout, machine setup) under teacher supervision.
- Provide opportunities for deeper research (materials, professional woodworking, set design) and brief presentations or written reflections.
- Differentiate project rubrics to recognize higher levels of complexity, precision, and independence.

Note: All modifications and accommodations should be aligned with students' IEPs, 504 Plans, and district policies, and can be applied flexibly across all units in this course.

Computer Sci Design Thinking

CS.9-12.8.2.12.ED.1	Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.
CS.9-12.8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to

	increase optimization based on feedback.
CS.9-12.8.2.12.ED.3	Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis.
CS.9-12.8.2.12.ED.4	Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.
CS.9-12.8.2.12.ED.5	Evaluate the effectiveness of a product or system based on factors that are related to its requirements, specifications, and constraints (e.g., safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, ergonomics).
CS.9-12.8.2.12.ED.6	Analyze the effects of changing resources when designing a specific product or system (e.g., materials, energy, tools, capital, labor).

Career Readiness, Life Literacies and Key Skills Practice

9.2.12.CAP.4	Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.
9.2.12.CAP.5	Assess and modify a personal plan to support current interests and post-secondary plans.
9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.
9.2.12.CAP.7	Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest.
9.2.12.CAP.8	Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.

Unit 2: Advanced Measurement and Material Selection

Content Area: **Science**
Course(s): **Wood 2**
Time Period: **1st Marking Period**
Length: **1-2 weeks**
Status: **Not Published**

Summary of the Unit

This unit builds precision skills in measurement, layout, and reading plans, and deepens understanding of wood as a material. Students learn to read blueprints and cut lists, calculate board feet, select lumber based on grain and defects, and understand wood movement and moisture.

Enduring Understandings

- Accurate measurement and layout are the foundation of quality woodworking.
- Wood is a natural, changing material; understanding movement and grain direction prevents structural and aesthetic problems.
- Reading plans and cut lists allows woodworkers to plan efficiently, reduce waste, and communicate clearly.

Essential Questions

- What does “precision” really mean in woodworking, and why does a 1/16" matter?
- How do wood species, grain, and moisture content influence design and construction choices?
- How can a cut list and board foot calculations save time and material?

Unit Summative Assessment and Alternate Assessment Options

- Measurement Accuracy Drills – Practice reading to 1/16" and 1/32"; measurement relay games, error analysis.
- Blueprint Reading Workshop – Students interpret dimensions, views, and notes on provided plans.
- Cut List Creation – Given a simple project drawing, students generate a cut list, then compare with teacher example.
- Board Foot Calculations – Practice calculating board feet from stock dimensions and planning material purchase.
- Grain & Defect Study – Examine boards for knots, checks, cupping, and grain direction; discuss best faces and edges.
- Wood Movement Demo – Compare cupped/warped boards with flat boards; discuss seasonal effects and design implications.

Resources

- Sample blueprints and shop drawings for simple furniture/cabinet projects
- Board foot calculation reference charts
- Moisture meter (if available) and example kiln-dried vs. green wood
- Species samples (pine, oak, maple, birch, poplar, etc.)
- Wood Shop 2: Resources and Worksheets Wood 2 Resources
- https://www.youtube.com/@thisoldhouse/playlists
- https://www.youtube.com/@SteveRamsey
- https://www.youtube.com/@WorkshopCompanion

- https://youtube.com/playlist?list=PLx7nYfZqLp-HLQr-4fXBein3xZY6Io9ud&si=R0sUkDBdKEr0NKoX

Unit Plan

Topic/ Selection Timeframe	General Objectives	Instructional Activities	Assessments
Measurement Accuracy Drills 1-2 days	• SWBAT read a standard ruler or tape measure to at least 1/16" (and 1/32" where appropriate). • SWBAT correctly label common fractional markings on a ruler/tape (1", 1/2", 1/4", 1/8", 1/16", and 1/32"). • SWBAT accurately mark given measurements on paper and on scrap wood using a ruler/tape, pencil, and square. • SWBAT check and describe errors in measurements to the nearest 1/16" (and/or 1/32") and explain how far off a mark is.	Measurement Accuracy Drills: Sharpen students' ability to read and mark measurements accurately to at least 1/16" (and 1/32" if desired). Reading Drill – Individual Practice • On the board, draw a tape measure segment and ask students to label: 1", 1/2", 1/4", 1/8", 1/16" (and 1/32" if you use it). Hand out printed ruler/tape diagrams or use real tapes. • Call out random measurements (e.g., 3 7/16", 5 1/8", 2 25/32" if appropriate), students: Point to or mark that measurement on their paper/diagram. Write the fraction that matches each indicated line. Measurement Relay Game • In pairs or small groups, one student calls out a measurement, another must: Mark that measurement on a piece of scrap wood with a pencil and square. Partner	• Teacher observation during individual reading drills (students pointing to or labeling called measurements on printed rulers/tapes). • Accuracy of student markings on scrap wood in the Measurement Relay Game (partner check against a tape measure). • Small-group error analysis sheets identifying incorrect marks on pre-marked boards and describing the error amount (e.g., "off by 1/16""). • Quick 3–5 question measurement quiz where students read and record measurements from a ruler/tape to the nearest 1/16" (and/or 1/32").

		checks with their own tape for accuracy. • Rotate roles so each student both calls and marks measurements. Error Analysis Mini-Activity • Pre-mark a few boards with slightly wrong measurements (off by 1/16", 1/8", etc.). • In small groups, students use accurate tapes/squares to find and circle the errors, then explain how far off each mark is. • Quick 3–5 question sheet where students read a ruler/tape to the nearest 1/16" (and/or 1/32")	

Blueprint Reading Workshop 1-2 days	• SWBAT identify and describe basic elements of a shop drawing/blueprint, including top, front, and side views, dimension lines, arrows, and part labels. • SWBAT interpret overall dimensions and key measurements from a simple furniture or cabinet plan. • SWBAT locate and name each main part of a project (e.g., sides, top, bottom, shelves, back) using the blueprint. • SWBAT determine the thickness, width, and length of individual parts by reading dimensions and relating them across different views. • SWBAT use a blueprint to	Blueprint Reading Workshop: Teach students to interpret simple shop drawings/blueprints: views, dimensions, and part labeling. Intro to Views & Symbols • Show an example blueprint on the projector or a handout. • Briefly explain: top view, front view, side view, dimension lines, arrows, part labels. • Have students label these on the example. Guided Walkthrough of a Sample Plan • As a class, work through one simple furniture/cabinet plan (e.g., small box or shelf): Identify overall dimensions. Identify each main part (sides, top, bottom, shelves, back). Find the thickness and width/length for each part. Partner Activity – "Blueprint Scavenger Hunt" • Give pairs a second drawing (similar difficulty). • Provide a question sheet, e.g., What is the thickness of the top? How long are the side panels? How	• Guided practice questions • Partner "Blueprint Scavenger Hunt" worksheet for the second drawing (questions such as part thickness, panel length, number and size of shelves, view that shows joinery, etc.). • Teacher observation of students correctly pointing out dimensions, views, and labels during class discussion and projected plan review. • Optional student-annotated blueprint (color-coding parts and listing dimensions) checked for accuracy and completeness. • Brief exit ticket where students answer 2–3 targeted questions from a blueprint (e.g., "What is the length of the side panel?" "Which view shows the joinery?").

	answer specific questions about part size, quantity, and placement without guessing.	many shelves are there and what are their dimensions? Which view shows the joinery (if included)? Partners must use the drawing to answer all questions. Check & Clarify • Review answers as a class, projecting the drawing and highlighting where each piece of info is found. • Emphasize reading the drawing instead of guessing. Optional Extension – Student Annotation • Have students lightly color-code different parts (sides one color, top/bottom another) and list dimensions beside each part for clarity.	

Cut List Creation 2-3 days	• SWBAT explain the purpose of a cut list and how it supports efficient, accurate project building. • SWBAT identify and name all major parts of a simple woodworking project from a drawing (e.g., sides, top, bottom, shelves, back, legs). • SWBAT extract and record correct thickness, width, and length for each part by reading dimensions on a project plan. • SWBAT organize part information into a clear cut list table that includes part name, quantity, thickness, width, length, and material/species.	Cut List Creation: Have students turn a simple plan into a clear, organized cut list they can actually build from. Explain What a Cut List Is On the board, show a sample cut list table with columns like: Briefly connect it to saving time and reducing mistakes. • Part name • Quantity • Thickness • Width • Length • Material/species Modeling with a Simple Project • Take a very simple project drawing (e.g., small box or shelf). • As a class, identify parts and fill out one or two rows together. • Emphasize consistent naming (e.g., “Left Side / Right Side” vs. just “Side”). Student Cut List Creation • Give students a slightly more complex drawing (small cabinet, bookshelf, plant stand, etc.). • Have them create a full cut list on a	• Teacher review of student-created cut lists for a simple project drawing, checking for: o Accurate part names and quantities o Correct thickness, width, and length for each part o Complete and organized table format • Peer check activity where students compare cut lists and note discrepancies or missing dimensions, collected or spot-checked for completion. • Comparison against a teacher example cut list to self-correct; students make visible edits/revisions to their original cut list. • Short written reflection prompt (e.g., “One thing that was harder than I expected when making a cut list was…”) used as a quick formative check on understanding. • Informal observation of

	• SWBAT check a peer's cut list for missing information, obvious errors, or inconsistencies and suggest corrections.	template you provide or in their notebooks. • Circulate to help them find hidden dimensions (like part lengths that must be inferred from overall size minus thicknesses). Peer Check & Compare • Pair students to compare cut lists: • After peer check, hand out your teacher example cut list for the same project so they can self-correct.	students locating and transferring dimensions from the drawing to the cut list during work time.
Board Foot Calculations 1-2 days	• SWBAT define a board foot and explain what it measures in the lumber industry. • SWBAT state and use the board foot formula: Board feet = (Thickness in inches × Width in inches × Length in inches) ÷ 144. • SWBAT calculate board feet for single boards with given thickness, width, and	Board Foot Calculations: Teach students to calculate board feet and connect that to planning material usage and cost. Introduce Board Foot Concept • On the board, write the formula: Board feet = (Thickness in inches × Width in inches × Length in inches) ÷ 144 • Show a 1" × 12" × 12" board and explain why it equals 1 board foot. Whole-Class Practice with Simple Numbers • Do a few sample calculations together, starting with easy dimensions (e.g., 1×6×48, 2×4×96).	• Whole-class practice problems completed on whiteboards or paper (teacher checks for correct setup and answers using the board foot formula). • Small-group worksheet with a variety of problems: ○ Calculating board feet for individual boards of different sizes. ○ Finding total board feet for sets of boards needed for a project. ○ Word problems involving cost based on a price

	length. • SWBAT calculate total board feet for multiple boards of the same or different sizes. • SWBAT use board foot calculations to estimate total material needed for a small project. • SWBAT connect board foot calculations to basic cost estimates when given a price per board foot.	• Have students work them out on mini whiteboards or scrap paper, then show answers. Small-Group Problem Set • Hand out a worksheet with a variety of stock sizes and quantities, e.g.: "You need 4 boards that are 1" × 8" × 36". How many board feet is that?" "You have one 2" × 10" × 96" board. How many board feet?" • Include a few word problems connecting board feet to cost (e.g., "If oak is $5.00 per board foot…"). Hands-On Measurement • If safe and practical, bring students to the lumber rack. • Have them measure real boards, record T×W×L, and calculate board feet for 2–3 pieces.	per board foot. • Optional hands-on activity at the lumber rack where students measure real boards, record dimensions, and calculate board feet for 2–3 pieces (teacher spot-checks calculations). • Informal observation of students' ability to correctly measure thickness, width, and length before performing board foot calculations.
Grain and Defect Study 1-2 days	• SWBAT identify and describe common grain patterns in wood (e.g., straight grain, cathedral grain) on sample boards.	Grain & Defect Study: Help students recognize grain direction and common defects so they can choose the best faces and edges for strength and appearance. Show & Tell • Gather a variety of boards (different species and	• Station activity sheets where students: o Mark grain direction with arrows on board diagrams or photos. o Label or circle defects on sample boards

	• SWBAT recognize and name common wood defects such as knots, checks, splits, cupping, bowing, twisting, and wane. • SWBAT determine grain direction on a board and indicate it with an arrow or mark. • SWBAT evaluate boards and choose appropriate "show surfaces" and edges for visible project parts based on grain and defects. • SWBAT explain how specific defects can affect the strength, stability, or appearance of different project parts (e.g., legs, tabletops, shelves).	conditions). • Briefly point out: straight grain, cathedral grain, knots, checks, splits, cupping, twisting, wane, etc. Observation Stations • Set out labeled boards at tables or stations. • At each station, students: Identify grain direction (mark an arrow). Circle or label defects with sticky notes (e.g., "knot," "check," "warp"). Decide which face/edge they would use as the "show surface" on a project. Group Discussion at Each Station • As groups rotate, ask quick questions: m"If this were a table top, where would you NOT want this knot?" "Which edge would you joint first and why?" Whole-Class Debrief • Back at their seats, students share one "bad board" and explain why it's a problem. • Create a class list: "Defects that make a board a bad choice for…" (e.g., legs,	(using sticky notes or written labels). ○ Note which face/edge they would select as the show surface and briefly explain why. • Teacher observation and questioning during station rotations (students correctly identifying grain direction and naming defects). • Whole-class debrief contributions to a list of "Defects that make a board a bad choice for…" (legs, tabletops, shelves, etc.), checked for accurate reasoning. • Short written reflection (e.g., "Describe one defect you would avoid on a visible furniture surface and why.") used as a quick formative assessment. • Optional quick quiz or exit ticket with photos/diagrams where students identify grain direction and name at least two defects shown.

		tabletops, shelves). Short Written Reflection • Prompt: "Describe one defect you would avoid for a visible furniture surface and why."	
Wood Movement Demo 1-2 days	• SWBAT describe, in their own words, how wood expands and contracts across the grain more than along the grain. • SWBAT identify visual signs of wood movement and distortion (cupping, bowing, twisting) by examining sample boards with a straightedge. • SWBAT explain how seasonal changes in humidity can affect the width, flatness, and fit of solid-wood parts. • SWBAT predict how a given board is likely	Wood Movement Demo: Demonstrate how wood moves and why grain and orientation matter in design and construction. Visual Comparison • Show a clearly cupped/warped board alongside a flat, stable board. Ask: "What do you notice? How might this affect a project?" Mini-Lesson on Movement • Brief notes on: Wood expanding/shrinking across the grain more than along it. Seasonal changes (humidity). How this affects panel width, doors, tabletops, etc. Hands-On Exam • In small groups, students examine several boards and: Identify which ones are cupped, bowed, or twisted. • Use a straightedge to see gaps and high spots. Predict how each might change more with moisture.	• Small-group observation notes/worksheet • Whole-class discussion responses during the design scenario activity (e.g., choosing how to attach a tabletop or panel so it can move), with teacher questioning to check understanding. • Short written scenario response: students explain what could go wrong if a wide solid panel is rigidly fastened on all sides and how to fix or avoid the issue. • Informal teacher observation of students' vocabulary and reasoning as they compare warped vs. flat boards and discuss causes/effects of movement.

	to move or cause problems in a project if not allowed to move (e.g., tabletops, panels, doors). • SWBAT propose basic design and fastening strategies that allow for wood movement (e.g., slotted holes, figure-8 fasteners, frame-and-panel construction) in simple scenarios.	Design Scenario Discussion • Give each group a quick scenario: "You're building a tabletop out of solid wood. How will you orient the boards? What joinery/fasteners will you use to allow movement?" "You're attaching a wide solid panel to a frame. What could go wrong if you screw it down tight on all sides?" • Groups share answers; you highlight correct strategies (slotted holes, figure-8 fasteners, panel in frame, etc.).	

Standards for Course Content Area and Cross Content Standards Addressed

9.3.12.AC	Architecture & Construction
9.3.12.AC.1	Use vocabulary, symbols and formulas common to architecture and construction.
9.3.12.AC.2	Use architecture and construction skills to create and manage a project.
9.3.12.AC.3	Comply with regulations and applicable codes to establish and manage a legal and safe workplace.
9.3.12.AC.6	Read, interpret and use technical drawings, documents and specifications to plan a project.
9.3.12.AC-CST	Construction
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.6	Manage relationships with internal and external parties to successfully complete construction projects.
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	Design/Pre-Construction

9.3.12.AC-DES.1	Justify design solutions through the use of research documentation and analysis of data.
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.3	Describe the requirements of the integral systems that impact the design of buildings.
9.3.12.AC-DES.4	Apply building codes, laws and rules in the project design.
9.3.12.AC-DES.5	Identify the diversity of needs, values and social patterns in project design, including accessibility standards.
9.3.12.AC-MO.1	Recognize and employ universal construction signs and symbols to function safely in the workplace.

Suggested Modifications for Students with Disabilities, 504 eligible, Multilingual Learners, At Risk Students and Gifted Students

Students with Disabilities / 504-Eligible Students

- Provide clear, step-by-step written directions and visual supports (photos, diagrams, checklists) for safety, procedures, and projects.
- Offer preferential seating and strategic partner/group work for modeling and support.
- Allow extended time on quizzes, projects, and safety check-offs as needed.
- Break multi-step tasks into smaller chunks with interim check-ins.
- Adjust tools, workspace, and project scale to support fine-motor, sensory, and mobility needs (e.g., clamps, jigs, adaptive grips, seated work when appropriate).
- Provide alternative formats for demonstrations and assessments (oral, visual, or recorded responses as appropriate to the IEP/504).
- Pre-teach and re-teach key vocabulary (safety terms, tool names) with visuals.

Multilingual Learners (MLL/ELL)

- Pre-teach essential vocabulary with images, labeled diagrams, and word banks posted in the shop.
- Use clear, concise language and model directions with demonstrations.
- Provide bilingual glossaries, sentence starters, and graphic organizers for reflections and written tasks.
- Allow students to demonstrate understanding through visuals, demonstrations, or brief oral explanations instead of lengthy written responses.
- Encourage peer support and structured partner work, pairing multilingual learners with supportive classmates.
- When possible, provide key documents (safety contract, major project overviews) in the student's home language or with translated summaries.

At-Risk Students

- Establish predictable routines and clear expectations for safety, cleanup, and participation.
- Provide frequent check-ins and positive feedback for on-task behavior and safe choices.
- Offer flexible deadlines when appropriate and provide in-class time to complete key tasks.
- Use highly structured roles and checklists during projects to support organization and follow-through.
- Connect projects to real-world applications (careers, theater productions, home use) to increase engagement.
- Coordinate with counselors/support staff as needed to monitor progress and address barriers to success.

Gifted and Advanced Students

- Offer optional extension tasks (more complex joinery, added design details, or leadership roles in

group builds).
- Encourage students to propose small design modifications or custom elements within safety and time limits.
- Allow advanced students to mentor peers on specific skills (measuring, layout, machine setup) under teacher supervision.
- Provide opportunities for deeper research (materials, professional woodworking, set design) and brief presentations or written reflections.
- Differentiate project rubrics to recognize higher levels of complexity, precision, and independence.

Note: All modifications and accommodations should be aligned with students' IEPs, 504 Plans, and district policies, and can be applied flexibly across all units in this course.

Computer Sci Design Thinking

CS.9-12.8.2.12.ED.1	Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.
CS.9-12.8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.
CS.9-12.8.2.12.ED.3	Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis.
CS.9-12.8.2.12.ED.4	Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience. Engineering design is a complex process in which creativity, content knowledge, research, and analysis are used to address local and global problems. Decisions on trade-offs involve systematic comparisons of all costs and benefits, and final steps that may involve redesigning for optimization.

Career Readiness, Life Literacies and Key Skills Practice

9.2.12.CAP.4	Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.
9.2.12.CAP.5	Assess and modify a personal plan to support current interests and post-secondary plans.
9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.
9.2.12.CAP.7	Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest.
9.2.12.CAP.8	Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.

Unit 3: Power Tools Mastery

Content Area: **Science**
Course(s): **Wood 2**
Time Period: **1st Semester**
Length: **6-8 weeks**
Status: **Awaiting Review**

Summary of the Unit

Students refine their skills on major stationary and portable power tools, focusing on accuracy, repeatability, and safety. They complete a router practice board or jig to reinforce setup, bit selection, and precise cuts.
Students will be able to:

- Set up and operate the table saw, miter saw, jointer, planer, and router table safely and accurately.
- Choose the appropriate machine for ripping, crosscutting, surfacing, and profiling tasks.
- Adjust fences, stops, and depth of cut correctly on major tools.
- Design and construct a simple router practice board or jig that improves repeatability and safety.
- Use dust collection systems effectively and explain why dust control is important for health and safety.

Enduring Understandings

- Each machine has specific strengths, limitations, and safest uses.
- Accurate setups and jigs increase safety, speed, and repeatability in woodworking.
- Effective dust collection is a critical component of a healthy shop environment.

Essential Questions

- When is the table saw the best tool for the job, and when should another tool be used instead?
- How do jigs and fixtures improve both safety and accuracy?
- How does dust affect health, visibility, and machine performance, and how can we manage it?

Unit Summative Assessment and Alternate Assessment Options

- Machine Demonstrations & Practice Rotations
    - Table saw: ripping, crosscutting with miter gauge/sled, dado setup (if available).
    - Miter saw: accurate crosscuts, safe clamping, cutting to length.
    - Jointer & planer: proper face-jointing, edge-jointing, planing sequence.
    - Router table: bit change, depth setting, fence setup, feed direction.

- Safety & Setup Checklists – Students follow step-by-step checklists before operating each machine.

- Router Practice Board/Jig Project
    - Design: choose a practice pattern or simple jig (e.g., straight-edge routing jig, circle-cutting jig, decorative profile board).
    - Layout: mark reference lines and cut locations.
    - Execution: make controlled cuts with instructor supervision at first, then more independently.

- Dust Collection Focus
    - Show main system vs. shop vac usage.
    - Students connect hose/ports correctly and evaluate dust levels before/after.

Resources

- Manufacturer manuals and safety guides for each machine
- Diagrams of blade/bit geometry and feed direction
- Sample jigs (crosscut sled, tapering jig, router templates)
- Dust collection best-practice handouts or videos
- Wood 2 Resources
- https://www.youtube.com/@thisoldhouse/playlists
- https://www.youtube.com/@SteveRamsey
- https://www.youtube.com/@WorkshopCompanion
- https://youtube.com/playlist?list=PLx7nYfZqLp-HLQr-4fXBein3xZY6Io9ud&si=R0sUkDBdKEr0NKoX

Unit Plan

Standards for Course Content Area and Cross Content Standards Addressed

9.3.12.AC.1	Use vocabulary, symbols and formulas common to architecture and construction.
9.3.12.AC.2	Use architecture and construction skills to create and manage a project.
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.6	Manage relationships with internal and external parties to successfully complete construction projects.
9.3.12.AC-CST.7	Compare and contrast the building systems and components required for a construction project.
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.1	Justify design solutions through the use of research documentation and analysis of data.
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.6	Apply the techniques and skills of modern drafting, design, engineering and construction to projects.

Suggested Modifications for Students with Disabilities, 504 eligible, Multilingual Learners, At Risk Students and Gifted Students

Students with Disabilities / 504-Eligible Students

- Provide clear, step-by-step written directions and visual supports (photos, diagrams, checklists) for

safety, procedures, and projects.

- Offer preferential seating and strategic partner/group work for modeling and support.
- Allow extended time on quizzes, projects, and safety check-offs as needed.
- Break multi-step tasks into smaller chunks with interim check-ins.
- Adjust tools, workspace, and project scale to support fine-motor, sensory, and mobility needs (e.g., clamps, jigs, adaptive grips, seated work when appropriate).
- Provide alternative formats for demonstrations and assessments (oral, visual, or recorded responses as appropriate to the IEP/504).
- Pre-teach and re-teach key vocabulary (safety terms, tool names) with visuals.

Multilingual Learners (MLL/ELL)

- Pre-teach essential vocabulary with images, labeled diagrams, and word banks posted in the shop.
- Use clear, concise language and model directions with demonstrations.
- Provide bilingual glossaries, sentence starters, and graphic organizers for reflections and written tasks.
- Allow students to demonstrate understanding through visuals, demonstrations, or brief oral explanations instead of lengthy written responses.
- Encourage peer support and structured partner work, pairing multilingual learners with supportive classmates.
- When possible, provide key documents (safety contract, major project overviews) in the student's home language or with translated summaries.

At-Risk Students

- Establish predictable routines and clear expectations for safety, cleanup, and participation.
- Provide frequent check-ins and positive feedback for on-task behavior and safe choices.
- Offer flexible deadlines when appropriate and provide in-class time to complete key tasks.
- Use highly structured roles and checklists during projects to support organization and follow-through.
- Connect projects to real-world applications (careers, theater productions, home use) to increase engagement.
- Coordinate with counselors/support staff as needed to monitor progress and address barriers to success.

Gifted and Advanced Students

- Offer optional extension tasks (more complex joinery, added design details, or leadership roles in group builds).

- Encourage students to propose small design modifications or custom elements within safety and time limits.
- Allow advanced students to mentor peers on specific skills (measuring, layout, machine setup) under teacher supervision.
- Provide opportunities for deeper research (materials, professional woodworking, set design) and brief presentations or written reflections.
- Differentiate project rubrics to recognize higher levels of complexity, precision, and independence.

Note: All modifications and accommodations should be aligned with students' IEPs, 504 Plans, and district policies, and can be applied flexibly across all units in this course.

Computer Sci Design Thinking

CS.9-12.8.2.12.ED.1	Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.
CS.9-12.8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.
CS.9-12.8.2.12.ED.3	Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis.
CS.9-12.8.2.12.ED.4	Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.
CS.9-12.8.2.12.ED.5	Evaluate the effectiveness of a product or system based on factors that are related to its requirements, specifications, and constraints (e.g., safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, ergonomics).
CS.9-12.8.2.12.ED.6	Analyze the effects of changing resources when designing a specific product or system (e.g., materials, energy, tools, capital, labor).
CS.9-12.ED	Engineering Design
	Engineering design evaluation, a process for determining how well a solution meets requirements, involves systematic comparisons between requirements, specifications, and constraints.
	Engineering design is a complex process in which creativity, content knowledge, research, and analysis are used to address local and global problems. Decisions on trade-offs involve systematic comparisons of all costs and benefits, and final steps that may involve redesigning for optimization.

Career Readiness, Life Literacies and Key Skills Practice

9.2.12.CAP.4	Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.
9.2.12.CAP.5	Assess and modify a personal plan to support current interests and post-secondary plans.
9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.
9.2.12.CAP.7	Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest.

9.2.12.CAP.8	Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.

Unit 4: Joinery Techniques

Content Area: **Science**
Course(s): **Wood 2**
Time Period: **2nd Semester**
Length: **6-8 weeks**
Status: **Awaiting Review**

Summary of the Unit

Students explore and practice a range of mechanical and reinforced joints, understanding when and why each type is used. Through joinery samples and small projects, they balance strength, appearance, time, and tooling considerations. Students will be able to:

- Layout and cut accurate mortise and tenon, rabbet, dado, box/finger, dovetail (if used), biscuit, and dowel joints using appropriate tools.
- Evaluate joint fit and make adjustments for tighter, gap-free connections.
- Explain when and why different joint types are used in furniture and cabinetmaking.
- Select an appropriate joint for a given design situation, considering strength, appearance, and efficiency.
- Apply joinery skills to create small projects that are square, structurally sound, and reasonably well-crafted.

Enduring Understandings

- The choice of joint affects the strength, appearance, and longevity of a piece.
- Different joints are suited to different loads, directions of force, and aesthetic goals.
- Precision in layout and cutting is what makes joinery both strong and beautiful.

Essential Questions

- How do I choose the “right” joint for a particular application?
- What makes a joint strong: the glue, the fit, the design, or all of the above?
- When is it worth spending extra time on a decorative joint, and when is a simpler joint more appropriate?

Unit Summative Assessment and Alternate Assessment Options

- Joinery Demonstrations and Portfolios
    - Mortise & tenon: layout, chopping/drilling mortises, tenon cheeks/shoulders.
    - Rabbet & dado: table saw and/or router table methods.
    - Box & finger joints: jig setup and spacing.
    - Dovetails: hand-cut or jig-based (depending on your shop), marking pins/tails.
    - Biscuit & dowel joints: tool setup, alignment strategies.
- Joinery Practice Boards – Students produce labeled samples of each joint type, focusing on fit.

- Mini Joinery Projects – Small boxes or frames that require specific joints (e.g., rabbeted box, box-jointed tissue holder, doweled frame).

- Comparison & Testing – Students test joint strength with simple load or break tests and discuss results.

Resources

- Joinery reference books/charts
- Sample joints (good and bad examples) for comparison
- Videos showing layout and cutting techniques for dovetails, mortise and tenon, etc.
- Jigs for box joints, dovetails, doweling, and biscuits
- https://www.youtube.com/@thisoldhouse/playlists
- https://www.youtube.com/@SteveRamsey
- https://www.youtube.com/@WorkshopCompanion
- https://youtube.com/playlist?list=PLx7nYfZqLp-HLQr-4fXBein3xZY6Io9ud&si=R0sUkDBdKEr0NKoX

Unit Plan

Topic/ Selection Timeframe	General Objectives	Instructional Activities	Assessments
Joinery Demonstrations and Portfolios 6-8 weeks	• SWBAT Describe the basic purpose, typical uses, and relative strength of mortise and tenon, rabbet, dado, box/finger, dovetail, biscuit, and dowel joints. • SWBAT Identify each joint by name when shown examples or diagrams. • SWBAT Explain, in simple terms, why certain joints are better for specific applications (e.g., shelves vs. legs vs. drawer boxes). • SWBAT Outline the main layout and cutting steps needed to produce	Joinery Demonstrations: Introduce and model safe, accurate layout and cutting techniques for key joint types so students understand when and how to use each one. Pre-Brief & Prior Knowledge Check • Ask: “What joints do you already know from Woodshop 1 or everyday objects (bookshelves, doors, drawers)?” • Briefly connect Unit 4 to real furniture: “Most of what you sit on, open, or store things in is held together by some version of these joints.” Mortise & Tenon Demonstration • Show examples of good mortise and tenon joints and one or two poor fits (gaps, loose, too tight). • Explain when this joint is used (chairs, tables, frames) and why it’s strong (long grain-to-long grain glue surface,	• Teacher observation of student engagement and responses during demonstrations and discussions (naming joints, identifying uses). • Labeling activity • Short written or oral check • Informal questioning

	each joint type using appropriate tools. • SWBAT Recognize examples of poor joint fit (gaps, misalignment) and describe why they weaken the piece.	mechanical interlock). • Demonstrate step-by-step: Layout: mark shoulder lines and tenon cheeks with square and marking gauge/pencil. Cutting tenons (by machine and/or hand tools depending on your shop): saw or router/table saw method. Cutting mortises (drill press/mortiser/router) and cleaning up. Test fit and light adjustments with chisel or sandpaper block. • Verbally call out critical safety steps if using machines (clamping, fence use, bit/blade setup). Rabbet & Dado Demonstration • Show where rabbets and dados appear (backs of cabinets, shelves in bookcases, drawer bottoms). • Demonstrate two methods: Table saw (with dado stack or multiple passes) using fence and/or sled. Router table using straight bit and fence.	

		• Emphasize: depth/width layout, test cuts on scrap, avoiding tearout (feed direction, backing boards). Box & Finger Joint Demonstration • Show examples of box/finger joints on small boxes or sample blocks. • Explain advantages (lots of glue surface, decorative potential). • Demonstrate: Using a box-joint jig or shop-made sled. Setting pin spacing and indexing from the first cut. Cutting mating pieces and dry fitting. • Highlight safety: secure workpiece, hands away from blade/bit, steady feed. Dovetail Demonstration (Hand or Jig-Based) • Show hand-cut vs. machine-cut dovetails if available. • Explain where dovetails are used (drawers, boxes) and why they resist pulling apart. • Demonstrate one	

		method appropriate for your shop: Hand-cut: mark pins/tails, saw, then chisel to the line. Jig-based: set up dovetail jig, adjust router depth, test on scrap. • Emphasize accurate layout and patience; this is a precision joint. Biscuit & Dowel Joint Demonstration • Show where biscuits and dowels are used (panels, face frames, alignment of parts). • Demonstrate: Setting up biscuit joiner: fence height, depth, reference faces. Marking and plunging slots; dry fitting with biscuits. Using a doweling jig or drill press for accurate dowel holes and alignment. • Stress alignment marks, referencing from the same face, and clamping strategies. Comparison & Discussion • Lay out sample joints side by side. • Ask: “Which of these joints would	

		you use for a bookshelf shelf? For a drawer front? For a table leg?" Build a quick class chart of each joint: Where used / Strength / Difficulty / Tools required.	
Joinery Practice Boards 1 week	• SWBAT Lay out mortise and tenon, rabbet, dado, box/finger, dovetail (if used), biscuit, and dowel joints accurately on practice stock. • SWBAT Use appropriate tools and machines (as allowed in your shop) to cut and	Joinery Practice Boards: Give students structured, hands-on practice cutting and fitting a range of joints on sample boards before using them in small projects. Setup & Expectations • Explain that practice boards are for skill-building; mistakes are expected and used for learning. • Show a sample "joinery practice board set" with	• Teacher observation during layout and cutting, using a simple checklist (accurate marking, safe tool use, following demonstrated procedures). • Completed practice boards • Short written/self-assessment • Informal peer critique

	assemble practice versions of each joint. • SWBAT Evaluate joint fit by checking for gaps, flush surfaces, and squareness. • SWBAT Make small adjustments to improve fit (light paring, additional passes, or layout corrections). • SWBAT Correctly label each practice joint and describe at least one typical use for it in furniture or cabinetmaking.	labeled joints (e.g., one board for mortise & tenon, one for rabbet/dado, one for box/finger, one for dovetail or biscuit/dowel). Layout Practice • For each joint type, guide students through layout on practice stock: Mark reference faces and edges. Draw shoulder lines, depth lines, and locations for cuts. Emphasize accurate measuring, use of square/marking gauge, and clear, readable marks. • Walk the room to check and correct layout before students cut. Guided Cutting & Fitting • In small groups or station rotations, students use appropriate machines and/or hand tools to cut each joint on the practice boards. • Teacher and/or advanced students demonstrate again as needed at each station. • Students dry fit each joint, note gaps or tight spots,	

		and make small adjustments (paring with chisel, light sanding where appropriate). Labeling & Documentation • Once a joint is complete, students label it directly on the board or on a tag: joint name, tools used, and one note about its typical use. • Optional: have students take pictures of their best and worst joints for a digital portfolio or reflection. Reflection & Self-Assessment • Students complete a brief reflection: “Which joint came out best for you? Why?” “Which joint do you need more practice with, and what specifically was difficult?”	
Mini- Joinery Projects 1-2 weeks	• SWBAT Interpret or use a simple plan to build a small joinery-focused project. • SWBAT elect and apply appropriate	Mini Joinery Projects: Apply joinery skills to small, functional projects that require choosing and executing appropriate joints with attention to fit and squareness. Project Introduction & Choices • Show 2–3 sample mini projects that	• Project-specific rubric assessing: ○ Accuracy of layout and dimensions. ○ Quality and fit of joints (gaps, alignment). ○ Squareness and structural soundness of

	joints (rabbet, dado, box/finger, dovetail if used, biscuit, dowel) based on project requirements. • SWBAT Cut and assemble parts so that joints are reasonably tight and the overall project is square and stable. • SWBAT Execute a basic glue-up with correct clamp placement and pressure to maintain alignment. • SWBAT Evaluate the finished mini project for joint quality, squareness, and overall craftsmanship.	highlight different joints (e.g., rabbeted box, box-jointed tissue holder, doweled or biscuit-joined frame, simple drawer box). • Discuss which joints are used where and why. Planning & Simple Drawings • Provide students with teacher-created plans or simple project options. • Students either: Follow an existing plan, or slightly customize dimensions while keeping required joint types. • Each student (or pair) creates a quick sketch with basic dimensions and labels the joints to be used in each location. Cut List & Layout • Students generate a small cut list for their project (part names, quantities, thickness/width/length). • Transfer dimensions to stock, mark cut lines, and plan which joints will be	the finished piece. ○ Craftsmanship (edges, surfaces, cleanup of glue). • Teacher checkpoints • Short written or oral reflection

		cut first. • Teacher checks plans and layout for feasibility and safety before cutting. Construction & Dry Fit • Students cut parts to size and lay out the required joints. • Cut joints using appropriate tools/machines, referring back to practice boards and demonstration notes. • Assemble a full dry fit (no glue) to check squareness, alignment, and joint fit; make adjustments as needed. Glue-Up & Clamping (if time and scope allow) • Once dry fit is approved, students glue and clamp their projects. • Emphasize proper glue application, clamp pressure, checking for square, and cleaning squeeze-out. Final Touches • Students lightly sand and clean up edges and corners after glue has	

		cured. • Very simple finish (if it fits your schedule), or leave surface prep for later units.	
Comparison and Testing 1 week	• SWBAT Predict how different joints will perform under load based on their design and glue surface. • SWBAT Observe and describe how and where each tested joint fails under stress. • SWBAT Compare joint types in terms of strength, appearance, and efficiency (time/complexity). • SWBAT Use test results to justify joint choices for specific applications (e.g., heavy shelf vs. decorative box).	Comparison & Testing: Help students compare different joints in terms of strength, appearance, and efficiency by observing and discussing simple tests. Set Up Comparison Samples • Prepare or collect pairs of joint samples (e.g., butt joint vs. dado for a shelf, doweled corner vs. box joint, biscuit vs. no reinforcement). • Mark each sample clearly with joint type and orientation. Prediction Discussion • In small groups, have students predict: Which joint will be strongest in each pair and why. Which joint looks the best for a visible corner or front. Which joint might be fastest/easiest to make in a shop setting. Simple Load or Break Tests	• Group comparison charts completed with observations on joint performance and failure points. • Teacher observation of student participation in predictions, testing, and debrief discussions. • Optional brief quiz or matching activity where students choose the best joint for specific real-world scenarios and justify their choices.

		• Safely load or stress sample joints (e.g., adding weight to shelf joints, pulling on corner joints by hand, or using clamps/press to apply force) within what is safe and appropriate in your shop. • Observe where and how joints fail (glue line, wood fibers, hardware, etc.). Group Analysis & Recording • Students record results on a simple chart: Joint Type / Test Used / How It Failed / Relative Strength / Notes. • Discuss surprises: “Did any joint perform differently than you expected?” Whole-Class Debrief • Create a class chart summarizing: Joints best for heavy loads or long spans. Joints best for visible corners and decorative applications. Joints that are strongest but time-consuming, vs. joints that are “good enough” and	

		quick.	

Standards for Course Content Area and Cross Content Standards Addressed

9.3.12.AC.1	Use vocabulary, symbols and formulas common to architecture and construction.
9.3.12.AC.2	Use architecture and construction skills to create and manage a project.
9.3.12.AC.3	Comply with regulations and applicable codes to establish and manage a legal and safe workplace.
9.3.12.AC.6	Read, interpret and use technical drawings, documents and specifications to plan a project.
9.3.12.AC.7	Describe career opportunities and means to achieve those opportunities in each of the Architecture & Construction Career Pathways.
9.3.12.AC-CST.1	Describe contractual relationships between all parties involved in the building process.
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.7	Compare and contrast the building systems and components required for a construction project.
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.1	Justify design solutions through the use of research documentation and analysis of data.
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.3	Describe the requirements of the integral systems that impact the design of buildings.
9.3.12.AC-DES.6	Apply the techniques and skills of modern drafting, design, engineering and construction to projects.

Suggested Modifications for Students with Disabilities, 504 eligible, Multilingual Learners, At Risk Students and Gifted Students

Students with Disabilities / 504-Eligible Students

- Provide clear, step-by-step written directions and visual supports (photos, diagrams, checklists) for safety, procedures, and projects.
- Offer preferential seating and strategic partner/group work for modeling and support.
- Allow extended time on quizzes, projects, and safety check-offs as needed.
- Break multi-step tasks into smaller chunks with interim check-ins.
- Adjust tools, workspace, and project scale to support fine-motor, sensory, and mobility needs (e.g., clamps, jigs, adaptive grips, seated work when appropriate).
- Provide alternative formats for demonstrations and assessments (oral, visual, or recorded responses as appropriate to the IEP/504).
- Pre-teach and re-teach key vocabulary (safety terms, tool names) with visuals.

Multilingual Learners (MLL/ELL)

- Pre-teach essential vocabulary with images, labeled diagrams, and word banks posted in the shop.
- Use clear, concise language and model directions with demonstrations.
- Provide bilingual glossaries, sentence starters, and graphic organizers for reflections and written tasks.
- Allow students to demonstrate understanding through visuals, demonstrations, or brief oral explanations instead of lengthy written responses.
- Encourage peer support and structured partner work, pairing multilingual learners with supportive classmates.
- When possible, provide key documents (safety contract, major project overviews) in the student's home language or with translated summaries.

At-Risk Students

- Establish predictable routines and clear expectations for safety, cleanup, and participation.
- Provide frequent check-ins and positive feedback for on-task behavior and safe choices.
- Offer flexible deadlines when appropriate and provide in-class time to complete key tasks.
- Use highly structured roles and checklists during projects to support organization and follow-through.
- Connect projects to real-world applications (careers, theater productions, home use) to increase engagement.
- Coordinate with counselors/support staff as needed to monitor progress and address barriers to success.

Gifted and Advanced Students

- Offer optional extension tasks (more complex joinery, added design details, or leadership roles in group builds).
- Encourage students to propose small design modifications or custom elements within safety and time limits.
- Allow advanced students to mentor peers on specific skills (measuring, layout, machine setup) under teacher supervision.
- Provide opportunities for deeper research (materials, professional woodworking, set design) and brief presentations or written reflections.
- Differentiate project rubrics to recognize higher levels of complexity, precision, and independence.

Note: All modifications and accommodations should be aligned with students' IEPs, 504 Plans, and district policies, and can be applied flexibly across all units in this course.

Computer Sci Design Thinking

CS.9-12.8.2.12.ED.1	Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.
CS.9-12.8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.
CS.9-12.8.2.12.ED.3	Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis.
CS.9-12.8.2.12.ED.4	Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.
CS.9-12.8.2.12.ED.5	Evaluate the effectiveness of a product or system based on factors that are related to its requirements, specifications, and constraints (e.g., safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, ergonomics).
CS.9-12.8.2.12.ED.6	Analyze the effects of changing resources when designing a specific product or system (e.g., materials, energy, tools, capital, labor).
CS.9-12.ED	Engineering Design Engineering design evaluation, a process for determining how well a solution meets requirements, involves systematic comparisons between requirements, specifications, and

	constraints.
	Engineering design is a complex process in which creativity, content knowledge, research, and analysis are used to address local and global problems. Decisions on trade-offs involve systematic comparisons of all costs and benefits, and final steps that may involve redesigning for optimization.

Career Readiness, Life Literacies and Key Skills Practice

9.2.12.CAP.4	Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.
9.2.12.CAP.5	Assess and modify a personal plan to support current interests and post-secondary plans.
9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.
9.2.12.CAP.7	Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest.
9.2.12.CAP.8	Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.
9.2.12.CAP.9	Locate information on working papers, what is required to obtain them, and who must sign them.
9.2.12.CAP.10	Identify strategies for reducing overall costs of postsecondary education (e.g., tuition assistance, loans, grants, scholarships, and student loans).
9.2.12.CAP.11	Demonstrate an understanding of Free Application for Federal Student Aid (FAFSA) requirements to apply for postsecondary education.
	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.

Unit 5: Furniture Concepts and Carcass Construction

Content Area: **Science**
Course(s): **Wood 2**
Time Period: **2nd Semester**
Length: **8-9 weeks**
Status: **Awaiting Review**

Summary of the Unit

Students apply their joinery and measurement skills to design and build basic furniture/cabinet forms (carcasses). They learn about face-frame vs. frameless construction, door and drawer basics, and proper gluing and clamping methods, creating a functional piece such as a small cabinet, bookshelf, plant stand, or similar.

Students will be able to:

- Interpret or create simple plans for a furniture/cabinet project.
- Layout and cut parts for a carcass accurately from a cut list.
- Assemble a box or frame structure that is square and structurally sound.
- Execute proper gluing and clamping sequences to avoid misalignment, squeeze-out issues, and weak bonds.
- Differentiate between face-frame and frameless construction and build at least one of these systems.
- Install basic door or drawer hardware (if project scope allows).

Enduring Understandings

- Most furniture and cabinetry can be broken down into basic carcass and frame structures.
- Thoughtful layout, sequence of operations, and dry-fitting minimize mistakes and rework.
- Gluing, clamping, and hardware installation are crucial steps that can make or break a project.

Essential Questions

- How do basic box and frame structures become functional furniture?
- What is the difference between face-frame and frameless construction, and when would I use each?
- How do I plan the order of operations so that my project assembles smoothly and accurately?

Unit Summative Assessment and Alternate Assessment Options

- Project plan packet (drawing, cut list, sequence notes)
- Carcass/furniture project rubric (layout accuracy, joinery quality, squareness, stability, craftsmanship)
- Checkpoints: dry fit inspection, glue-up supervision

Topics & Possible Projects:

- Intro to casework and cabinetry
- Carcass layout
- Cabinet box, shelf, drawer box
- Arts and Crafts table, bookshelf, plant stand, cutting board
- Intro to doors and drawer slides
- Gluing and clamping sequences
- Face-frame and frameless construction

Resources

- Simple plans for cabinets, nightstands, tables, and plant stands
- Hardware catalogs or samples (drawer slides, hinges, pulls)
- Diagrams of casework anatomy (sides, top, bottom, back, toe-kick, face frame)

- https://www.youtube.com/@thisoldhouse/playlists
- https://www.youtube.com/@SteveRamsey
- https://www.youtube.com/@WorkshopCompanion
- https://youtube.com/playlist?list=PLx7nYfZqLp-HLQr-4fXBein3xZY6Io9ud&si=R0sUkDBdKEr0NKoX

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Assessments
Casework Anatomy Lesson 1-2 days	• Identify and name the main parts of a basic cabinet or bookcase carcass (sides, top, bottom, shelves, back, toe-kick, face frame). • Describe the structural role of key parts (how they support loads and resist racking). • Distinguish between face-frame and frameless cabinet construction in pictures or physical examples. • Relate these parts to real furniture and storage pieces they see at home or school.	Casework Anatomy Lesson: Help students recognize the main parts of basic furniture/cabinet carcasses and understand how those parts work together structurally. Intro & Visual Examples • Show a simple cabinet, bookcase, or sample carcass (real or diagram). • Point out and label: sides, top, bottom, shelves, back, toe-kick (if applicable), face frame vs. frameless edge. Guided Anatomy Walkthrough • Use a large diagram or projected image and label each part as a class. • Discuss what each part does: Sides: vertical support. Top/Bottom: tie sides together, support load. Shelves: span	• Labeling activity on a provided diagram • Quick oral questioning • Optional matching or sorting activity: students match terms (face frame, back, shelf, toe-kick) with definitions or images.

		between sides, support objects. Back: adds racking resistance and squareness. Face frame: stiffens front, improves appearance, hides edges. • Ask: “What would happen if we removed the back? What if the shelves were too thin or too long?” Real-World Connections • Have students look at classroom cabinets, lockers, or bookcases and identify these parts. • Quick pair-share: “Name one piece of furniture at home and describe its carcass parts.” Quick Note on Face-Frame vs. Frameless • Show side-by-side images or samples: Face-frame: rails/styles on front, smaller openings. Frameless: doors/drawers attached directly to carcass sides with exposed edges or edge banding.	

Design and Planning (throughout unit)	• Select or slightly customize a small furniture/carcass project within given constraints. • Create simple front and side-view drawings that show key dimensions and main parts. • Generate a complete cut list from their drawing, including part names, quantities, and dimensions. • Identify basic hardware needs for their chosen project (as applicable).	Design & Planning: Guide students to select or slightly customize a simple carcass-style project and create a clear plan before cutting wood. Project Options Overview • Present 2–3 possible projects (e.g., small cabinet, open bookshelf, plant stand, simple nightstand). • Show sample photos, dimensions, and where each would realistically be used. Project Selection & Constraints • Review constraints: maximum size, available materials, time frame, required features (e.g., at least one fixed shelf, back panel, etc.). • Students choose a project type individually or in pairs, with teacher approval. Simple Drawings & Views • Students create or adapt simple	• Project sketches/drawings • Cut list checked for correct part names, quantities, and thickness/width/length. • Brief teacher-student conference or checkpoint • Simple planning checklist (drawing completed, cut list completed, hardware identified)

		drawings: Front view and side view with key dimensions (height, width, depth). Indicate shelf locations, back, and any base or toe-kick. • If available, they may lightly modify teacher-provided drawings (change height, number of shelves, etc.). Cut List & Hardware List • From drawings, students generate a cut list that includes: Part name (Left Side, Right Side, Top, Bottom, Shelf(s), Back, Face Frame parts if used). Quantity. Thickness, width, and length. Material/species (plywood, solid, etc.). • If applicable, students also note basic hardware (screws, hinges, slides, pulls) on a simple hardware list. Teacher Review & Approval • Teacher reviews sketches and cut lists for: Feasible dimensions and joinery. Clear	

		labeling and correct quantities.Fit with time and material constraints. • Students make revisions as needed before any stock is cut.	

Layout and Cutting (throughout unit)	• Select appropriate stock (sheet goods and/or solid lumber) based on their cut list and project requirements. • Accurately transfer dimensions from drawings and cut lists to physical stock using measuring and marking tools. • Cut parts to size using appropriate machines and methods while following established safety procedures. • Label all parts clearly and check matching parts for consistent dimensions and squareness.	Layout & Cutting: Have students accurately transfer dimensions to stock, break down materials, and cut carcass parts to size in preparation for assembly. Stock Selection & Breakdown • Students review their cut lists and identify which parts come from sheet goods vs. solid lumber. • With teacher oversight, they choose boards or panels, looking for appropriate grain, flatness, and minimal defects for visible parts. • Demonstrate and supervise initial breakdown of large panels/boards (e.g., rough cutting sheet goods to manageable sizes). Layout on Stock • Students mark individual parts on stock using tape measures/rulers, squares, and pencils: Reference one straight edge or	• Teacher observation of measuring, marking, and cutting techniques • Spot-check measurements • Visual inspection • Quick reflection or checkpoint

		factory edge when possible. Mark length and width clearly; indicate waste areas. • Teacher checks initial layout on first few parts to catch errors early. Machine Setup & Cutting • Students use table saw, miter saw, and other appropriate machines to cut parts to final size, following Unit 3 safety and setup procedures. • Emphasize consistency for paired parts (left/right sides, shelves, etc.)—cut them together or with stops to ensure matching lengths. Labeling Parts • Immediately after cutting, students label each part with a pencil (e.g., “LS,” “RS,” “TOP,” “BOT,” “S1,” “S2,” “BACK”). • Encourage using arrows for orientation (top/bottom, front/back) to reduce assembly mistakes.	

		Quality Checkpoint • Students stack matching parts together (sides with sides, shelves with shelves) and check for equal length and squareness. • Teacher spot-checks critical dimensions and squareness before students move to joinery/assembly.	
Dry Fit Sessions (throughout unit)	• Assemble their carcass parts without glue to test fit and squareness. • Use a square and diagonal measurements (if taught) to check if a box or frame is reasonably square. • Identify and describe common fit problems (gaps, misalignment, out-of-square corners). • Plan and carry out simple adjustments to improve fit	Dry Fit Sessions: Teach students to assemble parts without glue to check fit, squareness, and joint accuracy before final assembly. Dry Fit Setup • Students lay out all carcass parts on a bench/floor in approximate assembled positions. • Teacher models a quick dry fit of a sample carcass: checking corners, diagonals, and shelf fit without glue. Student Dry Fits • Students assemble their carcasses using clamps only (or screws in pre-agreed temporary holes if part of	• Teacher observation during dry fit assembly (safe clamping, correct order of assembly). • A simple dry fit checklist • Teacher approval or feedback notes recorded at the dry fit checkpoint. • Brief written reflection

	before final glue-up.	your practice). • Checkpoints: Do shelves fit into dados/rabbets properly (if used)? Are sides aligned with top and bottom? Does the back fit or is there a consistent gap for it? • Students use a square to check corners and record any problems. Diagnose & Adjust • Students note issues such as: gaps, out-of-square corners, parts cut too long/short, misaligned joints. • With teacher guidance, they decide on appropriate fixes (trimming, shimming, re-cutting a part if necessary). Teacher Checkpoint • Teacher inspects each dry fit and either: Approves for glue-up, or Requires specific corrections before glue is used.	
Gluing & Clamping Sequences	• Plan the order of operations for gluing and clamping a	Gluing & Clamping Sequences: Teach students to plan and execute glue-ups that	• Teacher observation during glue-up, focusing on glue use, clamp

	carcass project. • Apply wood glue correctly to appropriate joints and manage open time. • Use clamps effectively to bring joints together while maintaining squareness. • Identify and correct common glue-up issues (excess squeeze-out, parts shifting out of alignment).	keep carcasses square and strong while avoiding common mistakes. Glue-Up Planning • Demonstrate a sample glue-up on a small carcass: Which joints get glued and which do not (e.g., back sometimes nailed/screwed on later). Order of operations (e.g., assemble sides/shelves first, then add back). Clamp types and placement. Glue Application & Open Time • Review basic glue safety and handling. • Show how much glue to apply (not too little, not excessive) and how to spread it evenly. • Talk about open time and working efficiently once glue is applied. Student Glue-Ups • Students perform glue-ups in stages as appropriate for their project. • Emphasize: Having all clamps and tools ready	placement, and safety. • Visual inspection of glued carcasses • Short written or oral check • Informal grade or checklist for successful completion of glue-up steps.

		before applying glue. Checking for square during clamping (using squares or diagonal measurements). Wiping away squeeze-out where it will be visible or interfere with finishing. Clamp Checks & Cure Time • Teacher does quick clamp checks on each glued carcass for adequate pressure and alignment. • Students leave projects clamped for appropriate cure time (per glue instructions).	
Doors & Drawers Intro (If Time Allows)	• Describe the basic parts and purpose of a cabinet door or drawer box. • Explain the concept of clearances and overlays for simple doors and drawers. • With guidance, lay out and assemble a very simple door or drawer box appropriate to	Doors & Drawers Intro (If Time Allows): Introduce basic concepts of simple doors and drawers and how they relate to carcass construction. Basic Concepts & Examples • Show simple overlay doors and basic drawer boxes (real or sample). • Point out: clearances, reveals, and how hinges or slides	• Teacher observation of students measuring openings and planning appropriate door/drawer sizes. • Visual check • Short written response

		their carcass project (if time and materials allow).	attach. Simple Door Option (Overlay) • Demonstrate a basic overlay door: Measuring opening and deciding on door size and overlay. Cutting and labeling door parts (if frame-and-panel) or a slab door. Simple hinge layout and installation (if your shop hardware allows). Simple Drawer Box Option • Demonstrate a very basic drawer box using rabbet, dado, or dowel joints: Measuring opening and planning for slides and clearances. Cutting parts and assembling a basic box. Attaching slides and checking motion, if time and hardware permit. Student Mini-Application (Optional) • Students who have time may add one simple door or drawer to their carcass, with teacher guidance.	

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9.3.12.AC-CST.2	Describe the approval procedures required for 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.1	Justify design solutions through the use of research documentation and analysis of data.
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.3	Describe the requirements of the integral systems that impact the design of buildings.
9.3.12.AC-DES.5	Identify the diversity of needs, values and social patterns in project design, including accessibility standards.
9.3.12.AC-DES.7	Employ appropriate representational media to communicate concepts and project design.

Suggested Modifications for Students with Disabilities, 504 eligible, Multilingual Learners, At Risk Students and Gifted Students

Students with Disabilities / 504-Eligible Students

- Provide clear, step-by-step written directions and visual supports (photos, diagrams, checklists) for safety, procedures, and projects.
- Offer preferential seating and strategic partner/group work for modeling and support.
- Allow extended time on quizzes, projects, and safety check-offs as needed.
- Break multi-step tasks into smaller chunks with interim check-ins.
- Adjust tools, workspace, and project scale to support fine-motor, sensory, and mobility needs (e.g., clamps, jigs, adaptive grips, seated work when appropriate).
- Provide alternative formats for demonstrations and assessments (oral, visual, or recorded responses as appropriate to the IEP/504).
- Pre-teach and re-teach key vocabulary (safety terms, tool names) with visuals.

Multilingual Learners (MLL/ELL)

- Pre-teach essential vocabulary with images, labeled diagrams, and word banks posted in the shop.
- Use clear, concise language and model directions with demonstrations.
- Provide bilingual glossaries, sentence starters, and graphic organizers for reflections and written tasks.
- Allow students to demonstrate understanding through visuals, demonstrations, or brief oral explanations instead of lengthy written responses.
- Encourage peer support and structured partner work, pairing multilingual learners with supportive classmates.

- When possible, provide key documents (safety contract, major project overviews) in the student's home language or with translated summaries.

At-Risk Students

- Establish predictable routines and clear expectations for safety, cleanup, and participation.
- Provide frequent check-ins and positive feedback for on-task behavior and safe choices.
- Offer flexible deadlines when appropriate and provide in-class time to complete key tasks.
- Use highly structured roles and checklists during projects to support organization and follow-through.
- Connect projects to real-world applications (careers, theater productions, home use) to increase engagement.
- Coordinate with counselors/support staff as needed to monitor progress and address barriers to success.

Gifted and Advanced Students

- Offer optional extension tasks (more complex joinery, added design details, or leadership roles in group builds).
- Encourage students to propose small design modifications or custom elements within safety and time limits.
- Allow advanced students to mentor peers on specific skills (measuring, layout, machine setup) under teacher supervision.
- Provide opportunities for deeper research (materials, professional woodworking, set design) and brief presentations or written reflections.
- Differentiate project rubrics to recognize higher levels of complexity, precision, and independence.

Note: All modifications and accommodations should be aligned with students' IEPs, 504 Plans, and district policies, and can be applied flexibly across all units in this course.

Computer Sci Design Thinking

CS.9-12.8.2.12.ED.1	Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.
CS.9-12.8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.
CS.9-12.8.2.12.ED.3	Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis.
CS.9-12.8.2.12.ED.5	Evaluate the effectiveness of a product or system based on factors that are related to its requirements, specifications, and constraints (e.g., safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, ergonomics).
CS.9-12.8.2.12.ED.6	Analyze the effects of changing resources when designing a specific product or system (e.g., materials, energy, tools, capital, labor).
CS.9-12.ED	Engineering Design Engineering design is a complex process in which creativity, content knowledge, research, and analysis are used to address local and global problems. Decisions on trade-offs involve systematic comparisons of all costs and benefits, and final steps that may involve redesigning for optimization. Engineering design evaluation, a process for determining how well a solution meets requirements, involves systematic comparisons between requirements, specifications, and constraints.

Career Readiness, Life Literacies and Key Skills Practice

9.2.12.CAP.4	Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.

9.2.12.CAP.5	Assess and modify a personal plan to support current interests and post-secondary plans.
9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.
9.2.12.CAP.7	Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest.
9.2.12.CAP.8	Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.
9.2.12.CAP.9	Locate information on working papers, what is required to obtain them, and who must sign them.
9.2.12.CAP.10	Identify strategies for reducing overall costs of postsecondary education (e.g., tuition assistance, loans, grants, scholarships, and student loans).
9.2.12.CAP.11	Demonstrate an understanding of Free Application for Federal Student Aid (FAFSA) requirements to apply for postsecondary education.
	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.

Unit 6: Finishing Techniques

Content Area: **Science**
Course(s): **Wood 2**
Time Period: **2nd Semester**
Length: **4 weeks**
Status: **Awaiting Review**

Summary of the Unit

Students learn that finishing can make or break a project. The focus is on proper surface preparation, understanding types of finishes, and practicing application techniques on test boards and actual projects.

Students will be able to:

- Prepare project surfaces correctly for finishing (sanding sequence, defect filling, dust removal).
- Compare and select appropriate finishes (stains, dyes, paints, clear coats) for a given project based on test board results and intended use.
- Apply finishes using brush, wipe-on, and/or spray methods (if allowed) safely and effectively.
- Explain differences between shellac, lacquer, water-based, and oil-based finishes at a basic level.
- Develop and follow a simple finishing schedule/plan for their own project.

Enduring Understandings

- Good finishing starts with good surface preparation.
- Different finishes offer different levels of protection, color, and sheen; there is no "one-size-fits-all."
- Finishing requires patience, planning, and a dust-controlled environment.

Essential Questions

- How does surface prep affect the final look and durability of a project?
- When should I choose stain, dye, clear finish, or paint?
- What are the pros and cons of water-based vs. oil-based finishes for student projects?

Unit Summative Assessment and Alternate Assessment Options

- Finishing samples labeled with product, number of coats, process notes.
- Finishing safety quiz (rags disposal, ventilation, PPE).
- Finishing plan for their Unit 5/7 project.
- Final finish on a project, graded with a rubric (evenness, coverage, appropriateness to piece).

Resources

- Finish product labels and technical data sheets
- Sample boards showing different finishes and sheens
- Safety data (flammability, ventilation, PPE for finishing)
- https://www.youtube.com/@thisoldhouse/playlists
- https://www.youtube.com/@SteveRamsey
- https://www.youtube.com/@WorkshopCompanion
- https://youtube.com/playlist?list=PLx7nYfZqLp-HLQr-4fXBein3xZY6Io9ud&si=R0sUkDBdKEr0NKoX

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Assessments
Surface Prep Workshop 3-4 weeks (ongoing)	• Explain why careful surface preparation is essential for good finishing results. • Follow a basic sanding sequence using appropriate grits for surface prep. • Identify and address common surface defects (scratches, dents, glue spots, small gaps) before finishing. • Remove dust effectively from a workpiece prior to applying finish.	Surface Prep Workshop: Teach students that good finishing starts with proper surface preparation, including sanding, filling defects, and dust removal. Intro & Demonstration • Show two sample boards: one properly sanded and filled, one with visible scratches, glue spots, and defects. • Ask: "Which one would you rather put finish on? Why?" • Briefly introduce sanding grits (e.g., 80, 120, 150, 180/220) and what each stage does. Progressive Sanding Demo • Demonstrate sanding on a sample board: Start with a coarser grit to remove mill marks and small defects. Work through finer grits, sanding with the grain. Show how to avoid rounding edges excessively. • If you have power sanders, demonstrate safe use and dust collection connection. Defect Filling & Glue Spot Check	• Teacher observation of student sanding technique • Inspection of prepared boards/project surfaces for remaining scratches, glue spots, or obvious defects. • Short response

		• Show how to spot glue squeeze-out, dents, and small gaps before finishing. • Demonstrate using wood filler or putty (if appropriate for your projects) and letting it dry before sanding. • Show a quick method to check for scratches (raking light or wiping with mineral spirits/water if allowed). Student Surface Prep Practice • Students work on scrap boards and/or their Unit 5 project pieces: Follow a specified sanding sequence (e.g., 120 → 150 → 180). Fill small defects where needed and sand flush. Remove dust with brush/vacuum and tack cloth or damp rag (as appropriate to your shop).	

Test Boards – Exploring Finishes: 3-4 weeks (ongoing)	• Apply basic wood finishes (stains, dyes, paints, clear coats) to test boards using appropriate techniques. • Label and compare different finish combinations on test boards. • Describe differences in color, grain visibility, and sheen between finishes. • Use test board results to make an informed finishing choice for their main project.	Test Boards – Exploring Finishes: Let students experiment with different finishes, combinations, and processes on test boards before committing to their project pieces. Finish Options Overview • Show labeled sample boards (or photos) demonstrating: Bare wood vs. pre-stain conditioner + stain. Stain vs. dye (if available). Different topcoats (shellac, lacquer, water-based poly, oil-based poly) as available and safe. • Briefly explain what each product does and when it might be chosen. Test Board Setup • Provide students with prepared test boards of the same or similar species as their projects. • Have them divide the board into sections (taped or pencil lines) and label each section for a specific finish or process. Application Practice • Demonstrate basic application techniques: Wiping or brushing on stain/dye. Applying	• Completed test boards • Teacher observation of application technique (coverage, following with-the-grain strokes, avoiding puddles/drips). • Short written reflection

		a clear topcoat (brush or wipe-on). Following label directions for dry times and re-coating. • Students apply different combinations to their test boards (e.g., bare vs. conditioner + stain; stain + poly; dye + clear coat; paint + clear coat if used). Observation & Comparison • After drying, students compare color, grain visibility, and sheen across sections. • Group or class discussion: “Which finish would you choose for a table top? For a bookshelf? For something on stage?”	

Application Methods (Brush, Wipe, Spray if Applicable): 3-4 weeks (ongoing)	• Follow safety procedures specific to finishing products and application methods. • Apply finishes with a brush using smooth, even strokes that follow the grain. • Apply wipe-on finishes evenly and manage excess product appropriately. • (If applicable) Use basic spray technique to apply a light, even coat without excessive runs or overspray.	Application Methods (Brush, Wipe, Spray if Applicable): Teach students safe and effective techniques for applying finishes by brush and/or wipe (and spray if your shop allows), emphasizing control, even coverage, and safety. Safety Briefing • Review finishing safety: ventilation, PPE (gloves, eye protection, respirators/masks if required), rag disposal for oil-based products, no open flames. • Point out designated finishing area and any special rules (e.g., limited students at a time, no food/drink). Brushing Demo • Demonstrate brushing on a sample piece: Loading the brush properly. Brushing with the grain in long, overlapping strokes. Tipping off to remove bubbles and lap marks. • Show how to avoid runs/drips on edges and wipe them if they appear. Wipe-On Demo • Demonstrate applying a wipe-on	• Teacher observation of student safety practices during finishing (PPE, rag disposal, ventilation). • Inspection of practice pieces • Quick oral or written check on key safety and technique points (e.g., “Why can’t we ball up oily rags in the trash?”).

		finish or oil: Applying a thin, even coat with a cloth or applicator pad. Wiping off excess after dwell time, if required. • Show proper handling and disposal of oily rags (metal container, water, or following product safety guidelines). Spray Demo (Only If Allowed by School Policy) • If you use spray cans or an HVLP system, demonstrate safe spray technique: distance, motion, overlapping passes, masking, and ventilation. • Emphasize overspray control and PPE. Student Practice • On scrap or designated practice pieces, students practice the method(s) you allow: Brushing at least one coat of a sample finish. Wiping on and wiping off a sample finish. Spraying (if allowed) under close supervision.	
Finishing Plans for Main	• Choose an appropriate finish	Finishing Plans for Main Projects: Have students create a simple, written finishing plan for their Unit	• Completed finishing plan forms reviewed for clarity,

Projects: 3-4 weeks (ongoing)	type (or combination) for their project based on test results and project use. • Write a simple, step-by-step finishing plan including products, number of coats, and surface prep between coats. • Explain why their chosen finish is suitable for the piece's function and desired appearance.	5/7 project, choosing products and steps based on test board results. Review of Options • As a class, review the main finishes tested and where each is appropriate (e.g., stain + poly for furniture, paint for stage pieces, clear only for attractive species, etc.). Plan Template • Provide a simple finishing plan form or outline with prompts such as: ○ Wood species of project. ○ Desired look (natural, stained, painted, high-gloss, low-sheen). ○ Products to use (conditioner, stain/dye, clear coat type). ○ Number of coats and approximate dry times. ○ Sanding between coats (grit and when). ○ Special consideration	feasibility, and logical sequence. • Teacher-student conferences where students explain and justify their chosen finishing approach. • Quick written or oral check on the key steps in their individual finishing plan.

		s (masking areas, doing inside surfaces first, etc.). Student Plan Writing • Students complete a finishing plan for their own project using info from test boards and demos. • Teacher reviews plans and gives feedback or approval before any finish is applied.	
Finishing Safety & Quiz: 3-4 weeks (ongoing)	• Identify key safety risks associated with finishing products (fumes, flammability, skin/eye contact, oily rags). • State appropriate PPE and ventilation requirements for common finishing tasks. • Describe proper procedures for cleaning up and disposing of finishing materials and rags. • Demonstrate understanding of	Finishing Safety & Quiz: Ensure students understand and can recall essential safety practices related to finishing products and processes. Safety Mini-Lesson • Review or present a short slide/handout with key finishing safety topics: PPE and ventilation. Flammability and storage of products. Oily rag disposal and risk of spontaneous combustion. Label reading and following manufacturer instructions. This Old House Safety Videos Discussion & Q&A • Invite questions and discuss real examples (if you	• Finishing safety quiz • Teacher observation of student adherence to safety rules during actual finishing sessions. • Quick verbal checks

	finishing safety by passing a short quiz.	have them) of finish-related accidents or near misses in shops. Short Quiz • Administer a brief finishing safety quiz covering: Proper PPE and ventilation. How to handle and dispose of rags. What to do in case of spills or skin contact. Basic rules for using flammable or solvent-based products.	

Standards for Course Content Area and Cross Content Standards Addressed

9.3.12.AC.1	Use vocabulary, symbols and formulas common to architecture and construction.
9.3.12.AC.2	Use architecture and construction skills to create and manage a project.
9.3.12.AC.3	Comply with regulations and applicable codes to establish and manage a legal and safe workplace.
9.3.12.AC.6	Read, interpret and use technical drawings, documents and specifications to plan a project.
9.3.12.AC-CST.1	Describe contractual relationships between all parties involved in the building process.
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.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.1	Justify design solutions through the use of research documentation and analysis of data.
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.3	Describe the requirements of the integral systems that impact the design of buildings.
9.3.12.AC-DES.6	Apply the techniques and skills of modern drafting, design, engineering and construction to projects.
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.

Suggested Modifications for Students with Disabilities, 504 eligible, Multilingual Learners, At Risk Students and Gifted Students

Students with Disabilities / 504-Eligible Students

- Provide clear, step-by-step written directions and visual supports (photos, diagrams, checklists) for safety, procedures, and projects.
- Offer preferential seating and strategic partner/group work for modeling and support.
- Allow extended time on quizzes, projects, and safety check-offs as needed.
- Break multi-step tasks into smaller chunks with interim check-ins.
- Adjust tools, workspace, and project scale to support fine-motor, sensory, and mobility needs (e.g., clamps, jigs, adaptive grips, seated work when appropriate).
- Provide alternative formats for demonstrations and assessments (oral, visual, or recorded responses as appropriate to the IEP/504).
- Pre-teach and re-teach key vocabulary (safety terms, tool names) with visuals.

Multilingual Learners (MLL/ELL)

- Pre-teach essential vocabulary with images, labeled diagrams, and word banks posted in the shop.
- Use clear, concise language and model directions with demonstrations.
- Provide bilingual glossaries, sentence starters, and graphic organizers for reflections and written tasks.
- Allow students to demonstrate understanding through visuals, demonstrations, or brief oral explanations instead of lengthy written responses.
- Encourage peer support and structured partner work, pairing multilingual learners with supportive classmates.
- When possible, provide key documents (safety contract, major project overviews) in the student's home language or with translated summaries.

At-Risk Students

- Establish predictable routines and clear expectations for safety, cleanup, and participation.
- Provide frequent check-ins and positive feedback for on-task behavior and safe choices.
- Offer flexible deadlines when appropriate and provide in-class time to complete key tasks.
- Use highly structured roles and checklists during projects to support organization and follow-through.
- Connect projects to real-world applications (careers, theater productions, home use) to increase engagement.
- Coordinate with counselors/support staff as needed to monitor progress and address barriers to success.

Gifted and Advanced Students

- Offer optional extension tasks (more complex joinery, added design details, or leadership roles in group builds).
- Encourage students to propose small design modifications or custom elements within safety and time limits.
- Allow advanced students to mentor peers on specific skills (measuring, layout, machine setup) under teacher supervision.
- Provide opportunities for deeper research (materials, professional woodworking, set design) and brief presentations or written reflections.
- Differentiate project rubrics to recognize higher levels of complexity, precision, and independence.

Note: All modifications and accommodations should be aligned with students' IEPs, 504 Plans, and district policies, and can be applied flexibly across all units in this course.

Computer Sci Design Thinking

CS.9-12.8.2.12.ED.1	Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.
CS.9-12.8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.

CS.9-12.8.2.12.ED.3	Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis.
CS.9-12.8.2.12.ED.4	Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.
CS.9-12.8.2.12.ED.5	Evaluate the effectiveness of a product or system based on factors that are related to its requirements, specifications, and constraints (e.g., safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, ergonomics).
CS.9-12.8.2.12.ED.6	Analyze the effects of changing resources when designing a specific product or system (e.g., materials, energy, tools, capital, labor).
CS.9-12.ED	Engineering Design Engineering design evaluation, a process for determining how well a solution meets requirements, involves systematic comparisons between requirements, specifications, and constraints. Engineering design is a complex process in which creativity, content knowledge, research, and analysis are used to address local and global problems. Decisions on trade-offs involve systematic comparisons of all costs and benefits, and final steps that may involve redesigning for optimization.

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9.2.12.CAP.4	Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.
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9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.
9.2.12.CAP.7	Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest.
9.2.12.CAP.8	Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.
9.2.12.CAP.9	Locate information on working papers, what is required to obtain them, and who must sign them.
9.2.12.CAP.10	Identify strategies for reducing overall costs of postsecondary education (e.g., tuition assistance, loans, grants, scholarships, and student loans).
9.2.12.CAP.11	Demonstrate an understanding of Free Application for Federal Student Aid (FAFSA) requirements to apply for postsecondary education. Career planning requires purposeful planning based on research, self-knowledge, and informed choices.

Unit 7: Intermediate Projects and Assessment (Intermediate Set Design)

Content Area: **Science**
Course(s): **Wood 2**
Time Period: **2nd Semester**
Length: **6-8 weeks**
Status: **Awaiting Review**

Summary of the Unit

Students synthesize everything from the course in a capstone project. They design or adapt a small furniture piece, plan the entire build, and carry it through from rough lumber to finished product. When possible, projects may support school theater productions or mimic set design challenges.

Students will be able to:

- Design or adapt a small furniture project within given time and material constraints.
- Create a complete build plan (drawings, cut list, joinery, finishing plan).
- Independently execute major steps of construction using appropriate machines and joinery techniques.
- Apply a complete finishing schedule appropriate to their design.
- Present and critique woodworking projects using appropriate vocabulary and constructive feedback.
- Connect woodworking skills to real-world applications such as theater set design.

Enduring Understandings

- Design, planning, and craftsmanship are interconnected; decisions at each step affect the final piece.
- Furniture and set pieces must balance function, strength, appearance, and time/material constraints.
- Giving and receiving critique helps woodworkers improve their work and communicate like professionals.

Essential Questions

- How do I turn an idea into a buildable, realistic furniture project within our timeframe?
- What compromises (materials, joinery, details) are acceptable, and which ones weaken the piece too much?
- How can I talk about my work in a way that shows craft, problem-solving, and growth?

Unit Summative Assessment and Alternate Assessment Options

- Furniture design books, magazines, or online galleries
- Previous student projects (photos or physical examples)
- Basic theater set design guidelines (if collaborating with drama program)

Resources

- Project proposal and plan (sketches, cut list, timeline).
- Process checkpoints (rough milling, joinery completion, dry fit, pre-finish inspection).
- Final project rubric including:
    - Design & planning
    - Structural integrity and joinery quality
    - Craftsmanship and attention to detail
    - Finishing quality
    - Time management and independence
- Peer critique participation and final reflection (written or oral).

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Assessments
Project Proposal & Design: 6-8 weeks	• Choose or design a small furniture/set project that fits within given time, size, and material constraints. • Create initial sketches that communicate the overall form and function of their project. • Write a short design statement explaining purpose, target user, and basic style. • Discuss and adjust their project idea based on teacher feedback about feasibility.	Project Proposal & Design: Guide students to choose or design a realistic small furniture/set piece and create a clear proposal and plan before building. Project Options & Inspiration • Show examples of possible projects (nightstand, bench, cabinet, small table, chair, set piece with furniture qualities, etc.). • Share photos of previous student work or simple designs from books/websites. • If integrating with theater, briefly show current production needs or design concepts. Project Choice & Requirements • Review requirements and constraints: Maximum overall dimensions and time frame. Minimum expectations for	• Project proposal form • Teacher-student conference notes • Quick written reflection

		joinery, stability, and finish. Whether project must serve a real function (home use) or stage function (set piece). • Students choose a project type individually (or in approved pairs for larger builds). Initial Sketches & Ideas • Students create quick perspective or front/side sketches to capture the basic idea. • They write a brief design statement that includes: Purpose and user (who will use it, where it will live). Style or look they're aiming for (simple/modern, rustic, traditional, etc.). Any special features (storage, mobility, specific height for set, etc.). Teacher Checkpoint – Feasibility • Confer briefly	

		with each student to review their idea for feasibility given tools, time, and skill level. • Approve, suggest modifications, or narrow scope before moving to detailed planning.	
Planning & Documentation: 6-8 weeks	• Produce clear, dimensioned drawings for their chosen project. • Create a complete cut list and basic material list from their drawings. • Select appropriate joints and hardware for different parts of their project and document those choices.	Planning & Documentation: Have students turn their approved idea into a concrete build plan, including drawings, cut list, joinery choices, and a rough timeline. Detailed Drawings • Students develop or refine drawings for their project: At minimum, front and side views with key dimensions (height, width, depth). Top	• Project planning packet (drawings, cut list, joinery plan, sequence/timeline) graded with a simple rubric or checklist. • Teacher conference assessing students' ability to verbally walk through their build plan. • Evidence of

	• Outline a logical sequence of operations and rough timeline for completing their build.	view and/or section views were helpful (e.g., to show joinery or interior layout). • Encourage students to reference Unit 5 drawings and Unit 2 blueprint skills. Cut List & Material List • From drawings, students generate a cut list that includes part name, quantity, thickness, width, length, and material/species. • Students then create a simple material list, estimating board feet or sheet usage, and noting any special materials (plywood, hardwood, hardware). Joinery & Hardware Plan • Students decide which joints they will use where (drawing on Unit 4 skills) and note them on their plans	revisions made after teacher feedback (updated drawings or lists).

		(e.g., “dado + rabbet for shelves,” “dowels for aprons to legs”). • If the project includes doors/drawers/set hardware, they identify basic hinge/slide types and attachment points. Timeline / Sequence of Operations • Students outline a simple build sequence (e.g., rough mill → cut to size → cut joinery → dry fit → glue-up → surface prep → finish → hardware). • They sketch a rough timeline or list target checkpoints (weeks or class periods) for major milestones. Teacher Review & Sign-Off • The teacher reviews each student’s documentation packet (drawings, cut list, joinery plan, and basic	

		timeline). • Provide feedback and require corrections where necessary before students begin cutting material.	
Build Process: 6-8 weeks	• Carry out rough milling and final dimensioning of project parts independently, using appropriate machines safely. • Execute planned joinery accurately enough to assemble a stable, functional project. • Use dry fits and checkpoints to identify and correct problems before final assembly. • Manage their build time effectively by working toward intermediate checkpoints.	Build Process: Support students as they independently carry out major construction steps using appropriate machinery, joinery techniques, and quality checks. Stock Selection & Rough Milling • Students select boards/panels based on appearance, grain, and flatness, guided by their material list. • They perform rough milling as needed (jointing, planing, straight-line ripping) in accordance with Unit 3 routines. Cutting to Size & Layout • Students cut parts to final size, referencing their cut lists	• Teacher observation during building, using a checklist for machine safety, joinery execution, and independence. • Verification of checkpoint completion (milling, cutting, joinery, dry fit, glue-up) by specified target dates. • Informal notes on problem-solving (how students respond when something does not fit or goes wrong).

		and drawings. • They mark parts clearly and maintain organization (stacks, labeled bins, or shelves). • The teacher performs spot checks on key dimensions and matching parts. Joinery Execution • Students cut and fit the planned joints (from Unit 4) using appropriate machines, jigs, and/or hand tools. • They perform dry fits of subassemblies (e.g., base frames, carcasses, tops, doors) and adjust as needed. • The teacher checks critical joints or sub-assemblies before students move on. Major Assembly & Glue-Ups • Students plan and execute glue-ups in logical stages	

		(frames, carcass, top attachment, etc.). • Emphasize checking for square, clamp placement, and managing glue squeeze-out. Ongoing Checkpoints • Schedule and enforce build checkpoints such as: Rough milling complete. o All parts cut and labeled. Joinery complete and dry fit approved. Final glue-up complete. • Meet briefly with each student at checkpoints to track progress and adjust their plan if needed.	
Set Design Integration (Optional / As Applicable): 6-8 weeks	• Describe how theatrical use (visibility, movement, load, time constraints) influences design and construction decisions.	Set Design Integration (Optional / As Applicable): For theater-related projects, connect woodworking decisions to set design needs such as visibility, durability, and construction speed.	• Teacher review of adjustments made for set use (design, joinery, finish) where applicable. • Short written

	• Adjust a furniture-style project to function appropriately as a set piece when needed. • Communicate with non-woodworkers (director, designer) about practical build considerations (strength, time, cost).	Production Context • If collaborating with drama, briefly present the play/musical's setting and visual needs. • Show any director/designer sketches or plans that relate to student-built pieces. Functional Requirements Discussion • Discuss with students: How visible the piece will be (front row vs. back of stage). How often it will be moved or stood on. Weight and stability requirements for actors. Need for quick assembly/strike. Design/Build Adjustments • Students adjust project details if needed for set use: Simplified joinery for faster building/repair. Added bracing or larger footprints for stability. Paint/finish choices that	response • Optional feedback from drama staff

		read well under stage lights. • Document any changes in their drawings and plans. Collaboration Moments • If possible, invite the director or set designer for a short walk-through to give feedback. • Students take brief notes on any requested changes and implement what is feasible.	
Finishing & Final Prep: 6-8 weeks	• Execute a finishing schedule for their project as outlined in their finishing plan. • Apply multiple coats of finish with acceptable evenness and coverage. • Install basic hardware and make final adjustments for proper function. • Inspect and refine their project for presentation	Finishing & Final Prep: Have students apply a complete finishing schedule to their project, using skills from Unit 6 and their individual finishing plans. Surface Prep Check • Students inspect their projects for dents, scratches, glue squeeze-out, and tool marks. • They complete final sanding and dust removal following their Unit 6 surface	• Teacher evaluation of finish quality using a simple rubric (evenness, coverage, appropriateness, defect handling). • Check of installed hardware for basic function (doors swing properly, drawers open/close, no dangerous edges). • Comparison of actual steps taken to the written

	(touch-ups, cleaning, minor corrections).	prep skills. Follow the Finishing Plan • Students review and, if needed, update their finishing plan in response to any changes to the project. • They gather the required products and tools and set up in the finishing area. Application & Drying • Students apply finishes in stages: First coat (stain/dye/paint or clear). Light sanding or scuffing between coats if required. Subsequent coats to achieve the planned look/protection. • They track coats and dry times in simple notes or on their plan. Final Touches & Hardware • After finishing cures, students: Install any remaining hardware (pulls, hinges, slides,	finishing plan.

		feet, glides). Make final adjustments (door alignment, drawer action, leveling feet if needed). • Clean projects for presentation (wiping dust, checking for drips/runs to touch up if possible).	
Peer Critique & Shop Talk Presentations: 6-8 weeks	• Present their project and explain key design, joinery, and finishing decisions using appropriate woodworking vocabulary. • Give and receive constructive feedback about woodworking projects in a respectful, specific way. • Reflect on their own strengths, challenges, and growth over the course of the project.	Peer Critique & Shop Talk Presentations: Develop students' ability to talk about their work, give and receive constructive feedback, and reflect on their learning. Mid-Project Critique (Optional but Helpful) • Hold a brief mid-build critique where students share progress and challenges. • Use simple prompts: "One thing I'm happy with so far…" and "One problem I'm still working on…". Final Presentations ("Shop Talk") • Each student presents their finished project	• Presentation rubric or checklist covering clarity, use of vocabulary, and completeness of explanation. • Observation of peer feedback for specificity and respectful tone. • Collected written reflections used as a summative or formative assessment of learning and self-awareness.

		to the class. • Suggested format: Name and purpose of the piece; who it's for. Key design decisions (size, style, features). Main joinery methods and why they were chosen. Finishing choices and how they support the design/use. One thing that went well and one thing they would change next time. Peer Feedback • After each presentation, a few classmates offer specific, positive comments and one constructive suggestion. • Use sentence stems if helpful: "One thing I noticed and liked was…" "One thing you might try differently next time is…" Written Reflection • Students complete a short written	

		reflection after presenting: What they learned technically (tools, joinery, finishing). What they learned about planning and time management. How they might approach a similar project differently in the future.	

Standards for Course Content Area and Cross Content Standards Addressed

9.3.12.AC.1	Use vocabulary, symbols and formulas common to architecture and construction.
9.3.12.AC.2	Use architecture and construction skills to create and manage a project.
9.3.12.AC.3	Comply with regulations and applicable codes to establish and manage a legal and safe workplace.
9.3.12.AC.6	Read, interpret and use technical drawings, documents and specifications to plan a project.
9.3.12.AC-CST.1	Describe contractual relationships between all parties involved in the building process.
9.3.12.AC-CST.2	Describe the approval procedures required for 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.9	Safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.
9.3.12.AC-DES.1	Justify design solutions through the use of research documentation and analysis of data.
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.3	Describe the requirements of the integral systems that impact the design of buildings.
9.3.12.AC-DES.6	Apply the techniques and skills of modern drafting, design, engineering and construction to projects.
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.

Suggested Modifications for Students with Disabilities, 504 eligible, Multilingual Learners, At Risk Students and Gifted Students

Students with Disabilities / 504-Eligible Students

- Provide clear, step-by-step written directions and visual supports (photos, diagrams, checklists) for safety, procedures, and projects.
- Offer preferential seating and strategic partner/group work for modeling and support.
- Allow extended time on quizzes, projects, and safety check-offs as needed.

- Break multi-step tasks into smaller chunks with interim check-ins.
- Adjust tools, workspace, and project scale to support fine-motor, sensory, and mobility needs (e.g., clamps, jigs, adaptive grips, seated work when appropriate).
- Provide alternative formats for demonstrations and assessments (oral, visual, or recorded responses as appropriate to the IEP/504).
- Pre-teach and re-teach key vocabulary (safety terms, tool names) with visuals.

Multilingual Learners (MLL/ELL)

- Pre-teach essential vocabulary with images, labeled diagrams, and word banks posted in the shop.
- Use clear, concise language and model directions with demonstrations.
- Provide bilingual glossaries, sentence starters, and graphic organizers for reflections and written tasks.
- Allow students to demonstrate understanding through visuals, demonstrations, or brief oral explanations instead of lengthy written responses.
- Encourage peer support and structured partner work, pairing multilingual learners with supportive classmates.
- When possible, provide key documents (safety contract, major project overviews) in the student's home language or with translated summaries.

At-Risk Students

- Establish predictable routines and clear expectations for safety, cleanup, and participation.
- Provide frequent check-ins and positive feedback for on-task behavior and safe choices.
- Offer flexible deadlines when appropriate and provide in-class time to complete key tasks.
- Use highly structured roles and checklists during projects to support organization and follow-through.
- Connect projects to real-world applications (careers, theater productions, home use) to increase engagement.
- Coordinate with counselors/support staff as needed to monitor progress and address barriers to success.

Gifted and Advanced Students

- Offer optional extension tasks (more complex joinery, added design details, or leadership roles in group builds).
- Encourage students to propose small design modifications or custom elements within safety and time limits.
- Allow advanced students to mentor peers on specific skills (measuring, layout, machine setup) under teacher supervision.
- Provide opportunities for deeper research (materials, professional woodworking, set design) and brief presentations or written reflections.
- Differentiate project rubrics to recognize higher levels of complexity, precision, and independence.

Note: All modifications and accommodations should be aligned with students' IEPs, 504 Plans, and district policies, and can be applied flexibly across all units in this course.

Computer Sci Design Thinking

CS.9-12.8.2.12.ED.1	Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.
CS.9-12.8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.
CS.9-12.8.2.12.ED.3	Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis.
CS.9-12.8.2.12.ED.4	Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.
CS.9-12.8.2.12.ED.5	Evaluate the effectiveness of a product or system based on factors that are related to its requirements, specifications, and constraints (e.g., safety, reliability, economic

	considerations, quality control, environmental concerns, manufacturability, maintenance and repair, ergonomics).
CS.9-12.8.2.12.ED.6	Analyze the effects of changing resources when designing a specific product or system (e.g., materials, energy, tools, capital, labor).
CS.9-12.ED	Engineering Design
	Engineering design evaluation, a process for determining how well a solution meets requirements, involves systematic comparisons between requirements, specifications, and constraints.
	Engineering design is a complex process in which creativity, content knowledge, research, and analysis are used to address local and global problems. Decisions on trade-offs involve systematic comparisons of all costs and benefits, and final steps that may involve redesigning for optimization.

Career Readiness, Life Literacies and Key Skills Practice

9.2.12.CAP.4	Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.
9.2.12.CAP.5	Assess and modify a personal plan to support current interests and post-secondary plans.
9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.
9.2.12.CAP.7	Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest.
9.2.12.CAP.8	Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.
9.2.12.CAP.9	Locate information on working papers, what is required to obtain them, and who must sign them.
9.2.12.CAP.10	Identify strategies for reducing overall costs of postsecondary education (e.g., tuition assistance, loans, grants, scholarships, and student loans).
9.2.12.CAP.11	Demonstrate an understanding of Free Application for Federal Student Aid (FAFSA) requirements to apply for postsecondary education.
	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.