



Scrap to Shelf: A STEAM-Based Approach to Transforming Waste into Knowledge Hubs

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The Core Concept: STEAM in Action



- **Science:** Understanding wood properties and environmental decomposition.
- **Technology & Engineering:** Mastering tool use and structural integrity.
- **Arts:** Design aesthetics, finishing, and creative expression.
- **Math:** Precise measurement, geometry, and load-bearing calculations.

The Goal: Moving beyond disposal: training the next generation to see the potential in community scrap and the power of DIY manufacturing.



The Environmental "Why"



- **The Problem:** Tons of wood waste end up in landfills or are burned, releasing CO₂.
- **The Opportunity:** Reclaimed wood reduces the demand for deforestation.
- **The Impact:** By upcycling, we extend the life of a natural resource and lower our carbon footprint.

Materials Needed



3. Construction & Assembly Tools

- **Handsaws:** For cutting wood to the required lengths.
- **Hammers:** For joining pieces together.
- **Nails & Screws:** Various sizes (1-inch to 2.5-inch are standard for basic shelving).
- **Wood Glue:** To reinforce joints for long-term stability.
- **C-Clamps:** To hold pieces in place while the glue sets.

4. Finishing & Safety Supplies

- **Sandpaper:** Different grits (60-grit for rough edges, 120-grit for a smooth finish).
- **Paint & Brushes:** Non-toxic acrylic or wood stains for decoration.
- **Work Gloves:** To protect hands from splinters.
- **Safety Goggles:** Essential for eye protection during sawing and sanding.
- **Dust Masks:** To prevent inhalation of fine wood dust.

Safety Tools



Steel-Toed Boot



Work gloves



Protective Glasses



Tool Belt



First Aid kits



Reflective Jacket

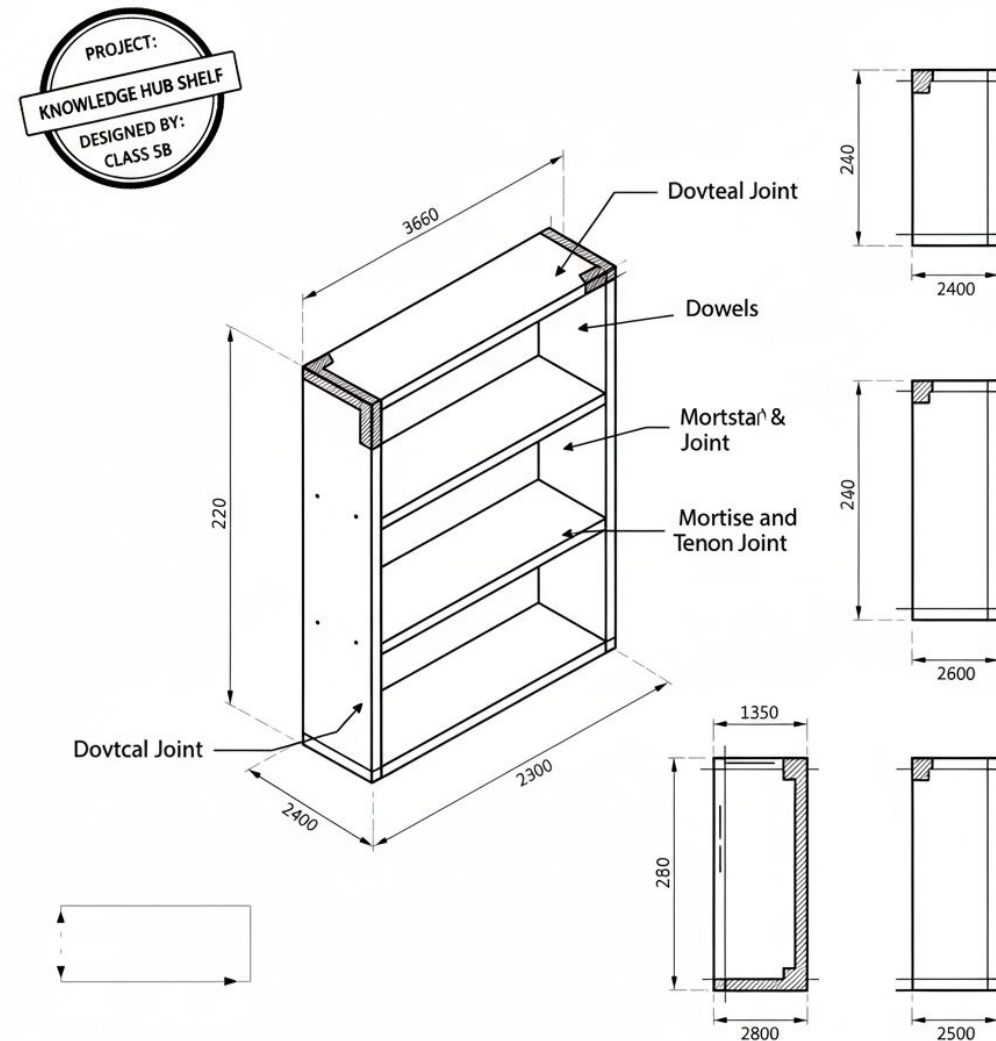
Evaluating Our Raw Materials



- Sorting: Distinguishing between plywood, hardwood, and treated wood.
- Inspection: Checking for rot, nails, or warping.
- Suitability: Which pieces are for the "frame" (strength) and which are for the "shelves" (surface)?

Technical Note: Safety starts with knowing your materials.

The Blueprint Phase: Engineering & Design Thinking



- **Sketching:** Drawing 2D and 3D perspectives of the shelf.
- **Precision:** "Measure twice, cut once."
- **Load Bearing:** How much weight can our design hold?

Visual Suggestion: A technical drawing or blueprint showing dimensions and joint types.

The Transformation: From Scrap to Structure



Key Steps:

1. **Preparation:** Sanding down rough edges.
2. **Assembly:** Joining the base, sides, and shelves.
3. **Reinforcement:** Ensuring the shelf is level and sturdy.
4. **Aesthetics:** Painting and decorating to match the classroom vibe.

Safety First: Precision & Protection



The Golden Rule: "Respect the tool, respect your team."

Core Safety Protocols:

- **Personal Protective Equipment (PPE):** Always wear gloves and eye protection when sawing or sanding.
- **The Work Zone:** Keep your workspace clear of scrap wood and debris to avoid trips.
- **Tool Handling:** Carry sharp tools (saws, chisels) pointed downward. Never "play-fight" with equipment.
- **Communication:** Shout "Sawing!" or "Hammering!" so your teammates know to give you space.

The "Stop" Rule: If a tool feels loose or broken, stop immediately and alert the Facilitator.

Reflection and commitment

- The finished shelf isn't just wood; it's a home for books and a symbol of sustainability.
- **Self-Reflection:** What was the hardest part of the build? How did we overcome it?
- **The Pledge:** Where else can we apply "Scrap to Shelf" thinking in our lives?

"Sustainability is the ultimate act of leadership."

Thank You!

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