STRETCHLEARN · WORKBOOK

Stained Glass — Workbook

This workbook turns the course into bench time. Each section pairs hands-on cutting, foiling, and soldering drills with planning worksheets and pre-flight checklists, plus editable templates for tracking practice cuts, designing patterns, and pricing materials. Work through it at your bench with scrap glass nearby and a finished suncatcher and panel as your goals.

Cutting and Breaking Glass

Build the core cutting reflex through scored-line drills, controlled breaks, and curve practice on scrap glass.

Exercise: Ten Straight Scores Drill

On a scrap sheet of 3 millimeter glass, make ten parallel straight scores about one inch apart, then break each one with running pliers. Score once per line, never retracing. After each break, note what you observed so you can calibrate pressure and speed.

• Did each score make a steady zipping sound, or did some crunch or skip? Which felt right?

• Which breaks ran clean to both edges and which wandered or chipped, and what was different about those scores?

• How did the pressure that gave the cleanest break compare to writing hard with a pen?

• By score ten, what had your hand learned that score one did not know?

Exercise: Curve and Inside-Curve Practice

Trace one gentle outside curve and one shallow inside curve onto scrap glass. Use relief scores and grozing pliers to remove the waste in stages rather than a single snap. Repeat each curve three times.

• How many relief scores did the outside curve need before it came away cleanly?

• What happened on your first inside-curve attempt, and what did you change for the next one?

• Where did grozing help the most, and how did the final edge feel before grinding?

Worksheet: Tool and Bench Setup Record

Fill this in as you assemble and dial in your starter bench so you can reproduce the setup and replace consumables on time.

Glass cutter make/model and wheel type

Cutting oil used and where stored

Running pliers and breaking/grozing pliers on hand (yes/no)

Work surface material (homasote/cork/other)

Safety glasses, apron, and dust mask present (yes/no)

Date last swept and wheel last cleaned/replaced

Bench layout notes (where each tool lives)

Checklist: Pre-Cut Safety and Setup Check

[ ] Safety glasses on before touching the cutter
[ ] Work surface flat, clean, and free of glass chips underneath the sheet
[ ] Cutter wheel oiled and rolling freely
[ ] Pattern line marked and glass oriented to pull the score toward you
[ ] Scrap bin and brush within reach
[ ] Dust mask on if any grinding is planned this session

Copper Foil vs. Lead Came

Decide between methods for a real design, then practice wrapping foil and fitting came until both feel routine.

Worksheet: Method Decision Worksheet

Pick a project you actually want to build and work through these prompts to choose foil, came, or a combination before you cut anything.
Project name and rough size

Approximate number of pieces

Smallest piece and tightest curve in the design

Flat panel, three-dimensional, or hanging suncatcher

Chosen method (foil / came / combination)

Reason for the choice in one sentence

Foil width or came size selected

Exercise: Foil-Wrapping Repetition

Cut five small practice pieces with varied edges, including one curve. Wrap each in 7/32 inch copper foil, keeping the glass centered, then fold and burnish every wrap tight with a fid. Inspect under light for lifted edges.
• Which pieces stayed centered and which drifted, and what helped you keep them centered?

• After burnishing, were there any lifted edges or bubbles, and how did you fix them?

• How did wrapping the curved edge differ from the straight edges?

Exercise: Came Stretch-and-Fit Drill

Stretch a length of H-came in a vise or stretcher until it straightens and stiffens. Open the channel with a lathekin and fit two scrap glass pieces into it, cutting the came to length with a lead knife using a rocking press.

• How much did the came change after stretching, and how did it affect handling?

• Did your lead-knife cuts shear cleanly or crush the channel, and what improved them?

• How snugly did the glass seat in the channel, and what would you adjust?

Checklist: Edge-Prep Readiness Check

[ ] All glass edges ground smooth and wiped free of dust
[ ] Edges fully dry before foil is applied
[ ] Correct foil width or came size selected for the glass thickness
[ ] Foil centered on each edge with even front and back overhang
[ ] Every foil wrap folded and burnished tight, no lifted edges
[ ] Came stretched and channels opened before fitting glass

Soldering and Assembly

Dial in heat and flux, then practice tinning, beading, and joining until your seams are smooth and your panel is solid.

Worksheet: Iron and Solder Settings Log

Record the settings and materials that produce your best beads so you can return to them every session instead of re-guessing.

Iron make/model and wattage

Temperature setting (degrees F)

Tip shape and size

Solder type used (60/40, 63/37, lead-free)

Flux type used

Ventilation/fan setup in use (yes/no)

Best bead settings discovered this session

Exercise: Tin and Bead a Practice Seam

Foil two scrap pieces together. Flux and tin the seam front and back, then re-flux and run a rounded bead down the line, leading with the iron and feeding wire behind it. Do this on three seams and compare results.

• What pace gave the smoothest, most even dome, and what happened when you went faster or slower?

• Did any solder drip through, and where - was it at an intersection or mid-seam?

• Could you tell a cold joint from a good one by sight, and how did you fix the cold spots?

• What did re-fluxing before beading change about the flow?

Exercise: Came Joint and Reinforcement Pass

On a small leaded layout in a right-angle jig, flux and solder each came intersection into a small flat joint, front and back. Then add a U-came border and solder a hanging loop or a reinforcement bar. Pick up the piece and test for flex.

• How little solder did a clean came joint actually need before the lead started to melt?

• After framing and reinforcing, did the panel flex at all when lifted, and where?

• What would you reinforce differently on a larger panel?

Checklist: Pre-Solder and Finish-Solder Check

[ ] Work area ventilated and fan pulling fumes away from your face
[ ] Every seam or joint fluxed immediately before soldering
[ ] Foiled work fully tinned front and back before beading
[ ] Iron held to temperature, no parking the tip on glass
[ ] Came joints kept small and quick to avoid melting the lead
[ ] Hanging loops and reinforcement bars soldered, not glued
[ ] Both faces inspected for gaps, pinholes, and missed joints

Design, Finishing, and Display

Plan a buildable pattern with proper allowances, finish the metal, and set up a backlight that does the piece justice.

Worksheet: Pattern and Color Plan

Complete this before cutting a real project so your pieces fit the frame and your colors read correctly against light.

Design name and full-size cartoon prepared (yes/no)

Number of pieces and any slivers or deep inside curves to avoid

Method allowance applied (foil center-line / came heart) (yes/no)

Glass colors and types chosen (cathedral/opalescent/textured)

Grain or streak direction noted per key piece

Colors checked together against a window (yes/no)

Pieces numbered and templates cut

Exercise: Finish a Piece End to End

Take one fully soldered piece through finishing. Neutralize and wash off all flux residue, apply your chosen patina to clean solder lines, rinse, dry, then buff on a finishing wax. Compare the before and after.

• Did any solder stay shiny or blotchy after patina, and what did that tell you about your cleaning?

• Which patina color suited the glass best, and would you choose differently next time?

• How much did the final wax and buff change the look of the whole piece?

Exercise: Backlight and Color-Temperature Test

View your finished piece under at least two light sources, such as a window at different times and an LED panel or light box. Try warm and cooler light if you can, and note how the colors shift.

• How did the same piece look under transmitted backlight versus front-only reflected light?

• Which colors came alive under warm light, and which preferred neutral or cool light?

• What backlight and color temperature will you use to display this piece, and why?

Checklist: Finished-Piece and Display Check

[ ] All flux residue neutralized, washed off, and the piece fully dry
[ ] Patina applied evenly with no shiny or blotchy solder spots
[ ] Finishing wax buffed over the whole panel for shine and protection
[ ] Panel solid with no flex, rattling glass, or visible solder gaps
[ ] Backlight even and diffused, with no hot spots or bare bulbs
[ ] Color temperature chosen to flatter the dominant glass colors
[ ] Hanging or display hardware rated for the weight of the piece

Your Action Plan

1. Assemble the starter bench: cutter, running and grozing pliers, oil, flat surface, safety gear.
2. Run the ten-score drill and curve practice on scrap until your breaks are consistently clean.
3. Choose foil or came for a simple first design and prepare a full-size cartoon with proper allowance.
4. Cut and grind all pieces, checking the fit over your master cartoon before assembly.
5. Foil and burnish every edge, or stretch and fit came, depending on your chosen method.
6. Dial in your iron temperature and flux, then tin and bead (or join came) one section at a time.
7. Add the border, hanging loops, and any reinforcement bars, then inspect both faces for gaps.
8. Neutralize the flux, apply patina, rinse, and buff on a protective finishing wax.
9. Set up an even, diffused backlight at a color temperature that suits the piece's colors.
10. Photograph and log the project, note what to improve, and plan a slightly harder next piece.