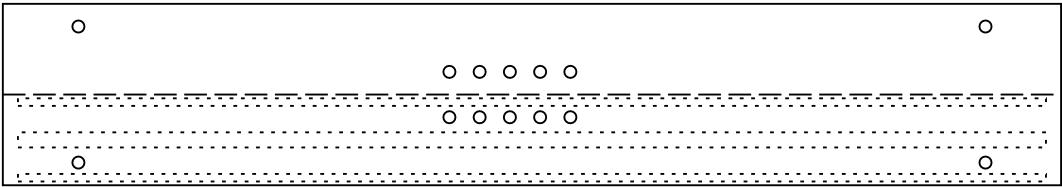


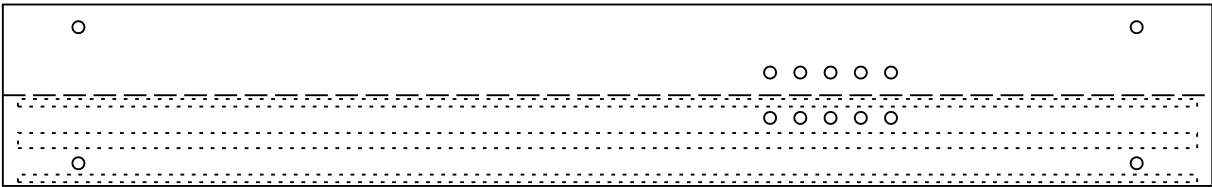
Facet Equilibrium Mobile

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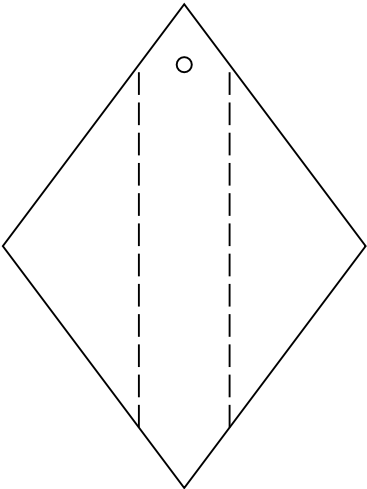
B2 | cut 1
140.00 x 24.00 mm



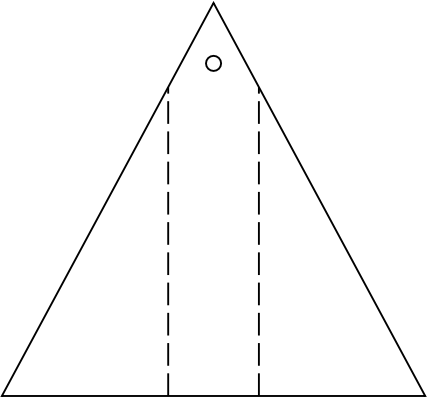
B1 | cut 1
160.00 x 24.00 mm



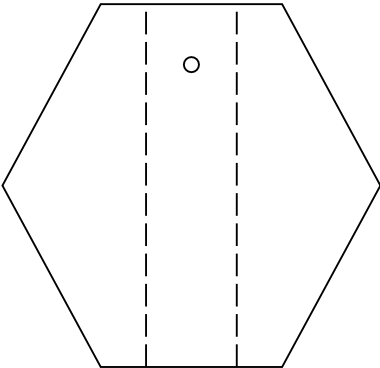
O1 | cut 1
48.00 x 64.00 mm



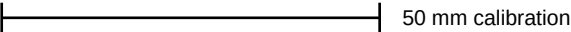
O3 | cut 1
56.00 x 52.00 mm



O2 | cut 1
50.00 x 48.00 mm



Solid: cut | Dashed: valley | Dash-dot: mountain | Dotted: glue



Print at 100% / Actual size. Do not fit to page. Original paper craft template.

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Finished size: Nominal illustrated paper envelope: 243.2 wide x 18.3 deep x 244.5 high mm (XYZ), including gaps between the five pieces; external threads and hook excluded. With 200 mm free overhead thread, hook-to-lowest-paper span is approximately 441.5 mm; balancing changes the pose and envelope

Materials: Uniform 220 gsm cardstock for all five pieces; Scissors and craft knife; cutting mat; Scoring tool and ruler; Fine PVA glue and flat drying weights; Fine nonstretch sewing thread: five pieces, 784 mm total including knot allowances; Needle or 1.6 mm punch for beam holes; 2 mm punch for ornament holes; Secure overhead hook (external, not supplied)

Original exact cut nets with rigid face correspondence. Five paper instances; external thread and hook are not paper parts.

THREAD IS OMITTED from GLB and thumbnail. Separated pieces are suspended, never glued across air. The preview is a static nominal equilibrium, not a dynamics simulation.

Beams are 160 x 24 and 140 x 24 mm nets folded to double-layer 12 mm-deep webs. The integral return panel is the full 12 mm glue lap; ornaments have two 45-degree wing folds and no seams or glue tabs.

Uniform 220 gsm paper; net areas (holes removed): O1 1532.939, O2 1772.939, O3 1452.939, B2 3332.569, B1 3812.569 mm². Mass in grams = area x 0.000220. Lower pivot $x=67.081$ mm; upper pivot $x=109.503$ mm, measured from the left cut edge. End-load holes are $x=10$ and $L-10$. Each pivot obeys $A_{\text{left}}(10-p)+A_{\text{right}}(L-10-p)+A_{\text{beam}}(\text{centroid}_x-p)=0$. Upper right load includes the ENTIRE lower beam plus O2 and O3. Five upper holes are $p-8, p-4, p, p+4, p+8$; start at the middle hole. Glue and thread mass, paper thickness and airflow are excluded from nominal balance.

Thread schedule: T0 hook to B1 middle pivot, 200 mm free / cut 240; T1 B1 left end to O1, 120 / 160; T2 B1 right end to B2 middle pivot, 84 / 124; T3 B2 left end to O2, 80 / 120; T4 B2 right end to O3, 100 / 140. All lengths mm; 40 mm per piece is a knot/tail allowance, not part of the free span.

Free span means hole-center to hole-center after tying. Hole-edge contact and knot size change actual distances slightly. Pass through BOTH aligned beam layers; tie small loops, leave adjustment tails until balanced.

Beam holes are actual 16-sided cut openings of 1.6 mm diameter; ornament holes are 2 mm. Folded paired beam holes coincide exactly. Paper thickness and glue thickness are idealized as zero; the coincident beam layers are intentional.

Balance lower tier first, then upper. If the left side drops, move the pivot left, toward the heavy side; if the right drops, move right. Use adjacent holes, then a loose sliding loop around the beam between holes for fine adjustment; tighten and spot-glue the thread only after level. Recheck after glue dries.

If paper bows or holes tear, stop and remake with uniformly heavier cardstock rather than adding unmodelled asymmetric reinforcement. Display indoors away from drafts and out of child/pet reach; decorative mobile, not a crib toy.

Automated geometry checks do not establish beam stiffness or hanging stability. Physical printing, cutting, bonding, knotting and practical balancing remain pending.

Part inventory (cut each instance once):

B1: Upper folded beam

B2: Lower folded beam

O1: Folded diamond

O2: Folded hexagon

O3: Folded triangle

1. Print, cut and open every hole [B1, B2, O1, O2, O3]: Print at 100% and check the 50 mm ruler. Use the same 220 gsm stock throughout. Cut all five outlines and all holes while flat: fourteen holes per beam and one per ornament. Score dashed creases without

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cutting through. Do not cut along dotted glue boundaries.

2. Fold and laminate the two beams [B1, B2]: Valley-fold each beam 180 degrees at $y=12$ mm so the two 12 mm webs meet back-to-back and the paired holes align. Put a very thin film of PVA only on the three dotted bands of the first panel; bond to the matching return panel. Keep all holes clear. Dry flat under weights. The fold is the top edge; two end holes are 3 mm above the bottom, five pivot holes 9 mm above the bottom. Use the middle of the five pivot holes initially.

3. Form three faceted pendants [O1, O2, O3]: On each ornament valley-fold both vertical dashed lines 45 degrees toward the same face: central panel stays flat, each wing has a 135-degree internal angle to it. Do not close to 90 degrees. No ornament glue is needed. The single hole belongs at the top. Each pendant will tip slightly under gravity; the preview includes this ideal paper-area centroid tilt.

4. Hang the lower ornaments [B2, O2, O3]: Cut $T3=120$ mm and $T4=140$ mm. Tie T3 through both layers of B2 left end hole and O2 hole, adjusting to 80 mm free hole-center span. Tie T4 through both layers of B2 right end hole and O3 hole, with 100 mm free span. Use secure small loops, leaving tails. These are external thread connections, not glue joints.

5. Balance the lower tier first [B2, O2, O3]: Cut $T2=124$ mm. Pass its lower loop through both layers of the B2 middle pivot at $x=67.081$ mm. Temporarily hold its other end up and let the tier settle. Move the support toward whichever side hangs low, using the five holes at 4 mm pitch. Fine-tune with a sliding loop around the beam between holes if needed. Retie without crushing the web. Keep T2 available to attach to B1; do not trim tails yet.

6. Connect the upper tier [B1, B2, O1]: Tie T2 upper end through both layers of B1 right end hole: target 84 mm free span to B2 pivot. Cut $T1=160$ mm and tie B1 left end hole to O1 hole with 120 mm free span. The lower tier is supported ONLY by T2, with no glued or rigid connection to B1. Keep all five paper pieces clear of one another.

7. Suspend, adjust and finish [B1, B2, O1, O2, O3]: Cut $T0=240$ mm; tie the secure external hook to both layers of B1 middle pivot at $x=109.503$ mm, leaving 200 mm free span. Balance B1 by moving its pivot toward the low/heavy side, then use a sliding loop for finer tuning. Changing a pivot may shift the lower tier horizontally from the nominal preview. Check B2 again, check knot security and clearance through gentle rotation, then secure adjustment loops with a tiny glue spot, dry and trim excess tails. Confirm no beam bowing or hole tearing. Real assembly and hanging tests are still pending.