Dragonfly Wing Venation: Symmetry Drawing Practice

Original tasks 1, 2 / complete keys

Task 1

On a blank wing outline, draw five longitudinal veins from the base to the tip. Mark a nodus on the leading edge two-thirds of the way from base to tip. Describe where your first cross-vein should go and why.

Answer: The first cross-vein should connect two adjacent longitudinal veins just behind the leading edge, near the nodus, creating a narrow rectangular cell. This establishes the narrow-cell pattern along the leading edge before broader cells are added toward the trailing edge.

Reason: The leading edge has the narrowest cells in a dragonfly wing. Starting cross-veins there sets the correct cell distribution and provides anchor points for the rest of the network.

Check: Verify that the cross-vein connects two longitudinal veins and encloses a cell. Check that the cell is narrower than the spaces you plan for the trailing edge.

Task 2

A symmetry template has a vein junction 4 cm left of the check line and 6 cm above the wing base. A second junction is 2 cm left of the check line and 3 cm above the base. State the mirrored positions and explain how you would verify them.

Answer: The first mirrored junction is 4 cm right of the check line at 6 cm above the base. The second is 2 cm right of the check line at 3 cm above the base. Verify by measuring the horizontal distance from the check line to each original junction and marking the same distance on the opposite side at the same height.

Reason: Bilateral symmetry reflects each point across the midline, so horizontal distance is preserved and height remains unchanged.

Check: Fold the paper along the check line or use a ruler to confirm that each mirrored junction is equidistant from the line and at the same height as its original.

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Original tasks 3, 4 / complete keys

Task 3

You have drawn a wing with ten cells. Three cells near the trailing edge are isolated: their veins do not connect to the main network. Describe two ways to fix this and state which is preferable.

Answer: Option one: extend a vein from each isolated cell until it meets the nearest longitudinal vein. Option two: remove the isolated cell boundaries and redraw cross-veins that connect to the main network. Extending veins is preferable because it preserves the cell pattern and adds connectivity without erasing work.

Reason: A connected network is a core requirement of the venation pattern. Extending veins maintains the intended cell shapes while satisfying connectivity.

Check: Trace each cell boundary with a finger to confirm it reaches a longitudinal vein or the wing margin. Count the number of isolated cells; it should be zero.

Task 4

Draw a freehand wing with at least eight cells. Use medium lines for longitudinal veins and light lines for cross-veins. Then check symmetry by describing how you would compare your drawing to a mirrored version.

Answer: After drawing, mark the symmetry check line at the body midline. For each vein junction, measure its horizontal distance from the line. On a separate sheet or by folding, confirm that the mirrored junction would fall at the same distance on the opposite side. The nodus and wing tip should be equidistant from the line.

Reason: Symmetry is a positional property: each junction has a mirror counterpart at the same distance from the midline and the same height. Measuring and folding are reliable checks.

Check: Use a ruler to measure three junctions on each side of the check line. Confirm that each pair has equal horizontal distance and equal height. Check that the nodus and tip align across the fold.

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Source rubric / reflection

- [ ] Wing outline is present and includes a leading edge, trailing edge, tip, and nodus.
- [ ] Longitudinal veins run from base toward tip and are distinguishable from cross-veins by line weight.
- [ ] Cells are enclosed by veins and connected to the overall network; no isolated cells.
- [ ] Cells along the leading edge are narrower than cells toward the trailing edge.
- [ ] The mirrored half aligns with the completed half across the symmetry check line: nodus, tip, and major junctions are equidistant.
- [ ] Valid alternatives: slight variation in vein thickness, irregular cell shapes, and minor outline differences are acceptable if the network is connected and symmetry is maintained.

Reflection: What did you check, what did you change, and what will you try next?