Draw a Sopwith Camel Biplane: Wings, Struts, and Cockpit

Original tasks 1, 2, 3 / complete keys

Task 1

In a 16 cm by 10 cm scale box, draw a centerline and a fuselage 12 cm long. Mark a lower wing 1.5 cm below the midline and an upper wing 2.5 cm above it. State the margin at each end of the fuselage.

Answer: The fuselage is centered on the 16 cm width, so each end margin is (16 - 12) / 2 = 2 cm. The lower wing is 1.5 cm below the midline; the upper wing is 2.5 cm above it.

Reason: Centering the fuselage divides the remaining width equally. The wing heights are measured from the midline as given.

Check: Measure the left and right margins; both should be 2 cm. Measure wing heights from the midline; they should be 1.5 cm and 2.5 cm.

Task 2

A lower wing spans 14 cm total. You want two strut pairs per side at one-third and two-thirds of the span from the centerline. Calculate the distance from the centerline to each strut on one side.

Answer: Half the span is 7 cm. One-third of 7 cm is about 2.33 cm; two-thirds is about 4.67 cm. So the struts on one side sit approximately 2.33 cm and 4.67 cm from the centerline.

Reason: Strut positions are fractions of the half-span measured from the centerline. Multiply the half-span by each fraction.

Check: Add the two distances: 2.33 + 4.67 = 7 cm, which equals the half-span. Mirror the same distances on the other side.

Task 3

Your upper wing is 16 cm long and the lower wing is 14 cm long, both centered. How far does the upper wing extend beyond the lower wing on each side?

Answer: Half of 16 cm is 8 cm; half of 14 cm is 7 cm. The upper wing extends 8 - 7 = 1 cm beyond the lower wing on each side.

Reason: Compare half-spans because both wings are centered on the same centerline.

Check: Measure from the centerline to each wingtip on one side; the difference should be 1 cm. Repeat on the other side.

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Original tasks 4 / complete keys

Task 4

You place the cockpit 1 cm behind the upper wing leading edge on the centerline. The upper wing leading edge is 5 cm forward of the midline. Where is the cockpit relative to the midline?

Answer: The cockpit is 5 - 1 = 4 cm forward of the midline, on the centerline.

Reason: Moving 1 cm rearward from a point 5 cm forward of the midline reduces the forward distance by 1 cm.

Check: Measure from the midline forward to the cockpit; it should be 4 cm. Confirm the cockpit lies on the vertical centerline.

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Source rubric / reflection

- [ ] Scale box and centerline are present and labeled with measured dimensions.
- [ ] Fuselage is centered on the vertical centerline and tapered toward the tail.
- [ ] Lower and upper wings are both drawn, with the upper wing slightly longer and roughly parallel.
- [ ] Two strut pairs connect the wings, evenly spaced and mirrored across the centerline.
- [ ] Cockpit is on the centerline between the wings and includes a simple windscreen.
- [ ] Line-weight convention is stated and followed; construction lines remain light.
- [ ] Symmetry checks are recorded with measured distances and a stated tolerance.

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