Upside-Down Boat Drawing: Orientation Practice with Hull and Keel Cues

Original tasks 1, 2, 3 / complete keys

Task 1

In a 10 cm by 7 cm frame, draw an inverted boat with an upward-opening hull arc peaking 2 cm above the midline and a straight keel line 1 cm above the peak. Add a reflection cue at the top edge. Describe your check.

Answer: Frame drawn; hull arc opens upward peaking 2 cm above midline; keel line 1 cm above peak; cue at top edge. Check: rotate 180 degrees; hull opens downward and keel sits below.

Reason: The proportions keep the hull and keel separated, and the cue marks inverted down. Rotating confirms orientation.

Check: Measure the arc peak and keel gap with a ruler; rotate the paper and compare to a normal boat outline.

Task 2

A student draws a hull arc opening downward and a keel line above it. Identify the orientation error and state the fix.

Answer: The hull arc should open upward for an inverted boat. Fix: redraw the arc so its highest point is above the midline, keeping the keel line above the arc.

Reason: Inversion flips the hull curve; the keel position alone does not make the boat upside down.

Check: Compare the arc's peak to the frame midline; the peak must be above it.

Task 3

Draw an inverted boat in a blank frame using a gently curved keel instead of a straight one. Keep the keel above the hull and add a reflection cue. Explain why this is valid.

Answer: The curved keel stays above the hull and parallel to the top edge; the cue is at the top. This is valid because the orientation cues remain correct even though the keel shape differs.

Reason: The rubric allows valid alternatives when orientation logic holds; keel shape is not fixed.

Check: Confirm the keel does not cross the hull and the cue is near the top edge; rotate to verify.

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Original tasks 4 / complete keys

Task 4

Your reference frame is 12 cm wide by 8 cm tall, with a chosen 1 cm gap from hull apex to keel. A new frame is 14 cm wide by 9 cm tall. Using the stated height-based proportion, calculate the new gap and describe the orientation check.

Answer: Use frame height as the basis: 1 cm × 9/8 = 1.125 cm, which rounds to about 1.13 cm. Measure the gap from the hull apex to the keel line. Add the reflection cue near the top edge, then rotate the paper 180 degrees to confirm that the hull opens downward and the keel sits below it.

Reason: The lesson defines the example gap as one-eighth of the 8 cm reference-frame height. The new frame height is 9 cm, so the same ratio gives 9/8 cm = 1.125 cm, or about 1.13 cm. Frame width is not used in this chosen convention.

Check: Check that the prompt identifies 8 cm as the reference height, multiply 1 cm by 9/8, and measure about 1.13 cm from hull apex to keel. Rotate the page to verify the inverted orientation.

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Source rubric / reflection

- [ ] Orientation: hull arc opens upward and keel line sits above the hull.
- [ ] Cue placement: reflection cue is near the top edge and clearly marked.
- [ ] Line clarity: hull and keel are distinct, with no unintended crossings.
- [ ] Proportion: hull arc height and keel gap match the reference within a reasonable margin.
- [ ] Valid alternatives: curved keel or different cue shape accepted if orientation logic holds.

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