Spindle Drawing: Shaft Proportions and Whorl Placement

Original tasks 1, 2, 3 / complete keys

Task 1

A spindle drawing uses shaft length 15 cm, whorl center at 0.40 SL from the bottom tip, and whorl diameter 0.30 SL. Compute the center height, diameter, and radius.

Answer: Center height = 6 cm; diameter = 4.5 cm; radius = 2.25 cm.

Reason: Multiply each fraction by the shaft length: 0.40 times 15 = 6; 0.30 times 15 = 4.5; radius is half the diameter, 2.25.

Check: Divide the computed center height by 15 to get 0.40, and the diameter by 15 to get 0.30.

Task 2

You draw a spindle with shaft length 8 cm and whorl diameter 2 cm. What is the whorl diameter fraction, and what radius should you mark on each side of the shaft?

Answer: Diameter fraction = 0.25; radius = 1 cm on each side.

Reason: 2 divided by 8 equals 0.25. Radius is half the diameter, so 1 cm.

Check: Multiply 0.25 by 8 to recover 2 cm, and double the 1 cm radius to recover the diameter.

Task 3

A drawing has shaft length 10 cm and whorl center 2.5 cm from the bottom tip. A second drawing has shaft length 14 cm. What center height preserves the same placement fraction?

Answer: 3.5 cm from the bottom tip.

Reason: First fraction is 2.5 divided by 10 = 0.25. Multiply by the new shaft length: 0.25 times 14 = 3.5 cm.

Check: Divide 3.5 by 14 to confirm 0.25, matching the first drawing.

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Original tasks 4 / complete keys

Task 4

A student draws a whorl of diameter 3 cm on a shaft of length 12 cm, but places its center 6 cm from the bottom tip. State the placement fraction and diameter fraction, and explain one adjustment that would make the spindle look more balanced using the lesson convention.

Answer: Placement fraction = 0.50; diameter fraction = 0.25. One adjustment is to lower the whorl center to 0.30 SL, which is 3.6 cm from the bottom tip, keeping the diameter fraction at 0.25.

Reason: 6 divided by 12 = 0.50 and 3 divided by 12 = 0.25. The lesson convention uses a lower placement fraction such as 0.30, so moving the center to 0.30 times 12 = 3.6 cm restores a more typical balance.

Check: Divide the new center height 3.6 by 12 to confirm 0.30, and keep the diameter check at 3 divided by 12 = 0.25.

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Source rubric / reflection

- [ ] Shaft is drawn as a straight line with clearly marked top and bottom tips.
- [ ] Whorl center height divided by shaft length matches the stated placement fraction within a small drawing error.
- [ ] Whorl diameter divided by shaft length matches the stated diameter fraction within a small drawing error.
- [ ] Whorl is drawn as a flattened disc with even thickness, not a sphere.
- [ ] Shaft remains visible above and below the whorl.
- [ ] Two drawings at different sizes preserve the same fractions.
- [ ] Construction marks are light or erased, leaving a clean final drawing.
- [ ] Valid alternative styles are accepted if the ratios and placement are consistent.

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