Draw a Matcha Whisk: Bamboo Tines and Handle Construction

Original tasks 1, 2, 3 / complete keys

Task 1

A student draws a whisk with a total height of 15 cm and a handle height of 5 cm. What is the tine height, and is the handle-to-tine ratio within the accepted range?

Answer: Tine height is 10 cm. The ratio is 5:10, or 1:2, which is within the accepted 1:2 to 1:3 range.

Reason: Subtract the handle height from the total height: 15 cm minus 5 cm equals 10 cm. Compare the handle and tine heights as a ratio: 5 to 10 simplifies to 1 to 2.

Check: Re-add the handle and tine heights to confirm the total: 5 cm plus 10 cm equals 15 cm. Confirm the ratio 1:2 lies between 1:2 and 1:3.

Task 2

A drawing uses 90 tines split into three equal groups. How many tines are in each group? If the total height is 18 cm and the handle is 6 cm, what is the tine height?

Answer: Each group has 30 tines. The tine height is 12 cm.

Reason: Divide 90 by 3 to get 30 tines per group. Subtract the handle height from the total height: 18 cm minus 6 cm equals 12 cm.

Check: Multiply 30 by 3 to confirm 90 tines. Add 6 cm and 12 cm to confirm 18 cm total.

Task 3

A whisk drawing has a handle-to-tine ratio of 1:3 and a tine height of 9 cm. What is the handle height and the total height?

Answer: Handle height is 3 cm; total height is 12 cm.

Reason: A 1:3 ratio means the handle is one-third of the tine height. One-third of 9 cm is 3 cm. Add the handle and tine heights: 3 cm plus 9 cm equals 12 cm.

Check: Confirm the ratio 3:9 simplifies to 1:3. Re-add 3 cm and 9 cm to get 12 cm.

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Original tasks 4 / complete keys

Task 4

A student draws 100 tines with 40 central, 30 left, and 30 right. The total height is 20 cm and the handle is 5 cm. State the tine height, the handle-to-tine ratio, and whether the tine count and grouping are acceptable.

Answer: Tine height is 15 cm. The ratio is 5:15, or 1:3, which is acceptable. The tine count of 100 is within 60 to 120, and the groups sum to 100, so the grouping is acceptable.

Reason: Subtract 5 cm from 20 cm to get 15 cm. Simplify 5:15 to 1:3. Check that 100 is between 60 and 120 and that 40 plus 30 plus 30 equals 100.

Check: Re-add 5 cm and 15 cm to confirm 20 cm. Confirm 1:3 is within the accepted range. Re-add the group counts to confirm 100.

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Source rubric / reflection

- [ ] Total height, handle height, and tine height are labeled and use the same unit.
- [ ] Handle-to-tine height ratio is between 1:2 and 1:3.
- [ ] Tine count is between 60 and 120 and is stated on the drawing.
- [ ] Tines are drawn as smooth curves with no crossings.
- [ ] Tine tips lie on a shallow arc and are evenly spaced within groups.
- [ ] Handle is a narrow cylinder with a rounded top and a binding band at its base.
- [ ] Drawing is balanced and internally consistent; valid alternative styles are accepted.

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