Grid Tooth Drawing: Silhouette and Shading Exercises

Original tasks 1 / complete keys

Task 1

Plot a tooth on a 6 by 8 unit grid. The crown is the top 4 units, the neck is 4 units wide, and the two roots taper to 0.5 units each at the bottom. Describe where you place the top curve start and end, the widest crown points, and the root tips.

Answer: Top curve starts 1 unit from the left and ends 1 unit from the right. Widest crown points touch the left and right edges of the rectangle about 3 units down from the top, giving a full 6-unit crown width. Below that, the sides curve inward so the neck is 4 units wide at about 4 units down. Each root is about 1.5 units wide at the top: the left root spans 1.25 to 2.75 units from the left edge, the gap is about 0.5 units (from 2.75 to 3.25), and the right root spans 3.25 to 4.75 units from the left edge. At the bottom, each root tapers to about 0.5 units wide: the left tip is 2.25–2.75 and the right tip 3.25–3.75. Each tip center is 0.5 unit inward from its root-top center (2 to 2.5 on the left, 4 to 3.5 on the right), while the pair remains centered at x=3.

Reason: Counting from the rectangle corners keeps the outline centered. The neck width of 4 units leaves 1 unit on each side. The root tops span 1.25 to 4.75 units from the left edge, leaving 1.25 units of space on each side. The left root-top center is (1.25+2.75)/2=2 and its tip center is (2.25+2.75)/2=2.5; the right root-top center is (3.25+4.75)/2=4 and its tip center is (3.25+3.75)/2=3.5. Thus each tip shifts 0.5 unit inward toward the tooth centerline at x=3; neither is centered directly under its own root top. The pair stays centered overall. The tip row totals 6 units: 2.25 units of space + 0.5-unit tip + 0.5-unit gap + 0.5-unit tip + 2.25 units of space = 6.0.

Check: Measure the neck width in grid units; it should be about 4. Measure each root tip; it should be about 0.5 units wide. Confirm the left top and tip centers are 2 and 2.5, and the right top and tip centers are 4 and 3.5; each tip shifts 0.5 unit inward toward x=3. Confirm the tip row totals 6 units: 2.25 + 0.5 + 0.5 + 0.5 + 2.25 = 6.0, and confirm the tooth is centered overall.

Grid Tooth Drawing: Silhouette and Shading Exercises

Original tasks 2, 3 / complete keys

Task 2

A tooth outline is 6 units wide at the crown and 5 units wide at the neck. The roots are 2 units wide total at the top and taper to 1 unit total at the tips. Is this consistent with the lesson convention? Explain one adjustment.

Answer: It is not consistent with the lesson convention. The 5-unit neck is wider than the 4-unit convention and leaves only a 1-unit difference from the 6-unit crown. The roots are also too narrow at the top: the lesson uses two 1.5-unit root tops (3 units total) plus a 0.5-unit gap, while the prompt gives only 2 units total for the root tops. The 1-unit total tip width does match two 0.5-unit tips. Narrow the neck to about 4 units and widen each root top to about 1.5 units while keeping the 0.5-unit gap and 0.5-unit tips.

Reason: Compare each stated dimension with the drawing convention: crown 6, neck about 4, two root tops 1.5 each with a 0.5 gap, and two 0.5-unit tips. The prompt’s tip total matches, but its neck and root-top totals do not.

Check: Check the crown-neck difference: $6-4=2$ units. Check the root-top section: $1.5+0.5+1.5=3.5$ units. Check the tips: $0.5+0.5=1$ unit total, with the stated gap separately unshaded.

Task 3

You shade a tooth with light from the upper left. You apply dark tone on the left side and light tone on the right side. What is wrong, and how do you fix it without redrawing the outline?

Answer: The shading is reversed. Erase the dark tone on the left and the light tone on the right. Reapply light tone on the left and top-left, medium tone on the right and lower crown, and dark tone along the far right edge and right root.

Reason: With light from the upper left, the left side receives more light and should be lighter. The right side is farther from the light and should be darker.

Check: Compare the left and right sides. The left should be lighter. Check that the darkest band is on the far right edge.

Grid Tooth Drawing: Silhouette and Shading Exercises

Original tasks 4 / complete keys

Task 4

On a 6 by 8 unit grid, the crown occupies the top 4 units and the roots occupy the bottom 4 units. You want the roots to be 1.5 units wide each at the top with a 0.5-unit gap. How many units wide is the root section at the top, and does it fit inside the 6-unit width?

Answer: The root section is 1.5 + 0.5 + 1.5 = 3.5 units wide at the top. It fits inside the 6-unit width with 1.25 units of space on each side if centered.

Reason: Add the two root widths and the gap. Compare the total to the grid width. Centering leaves equal space on both sides.

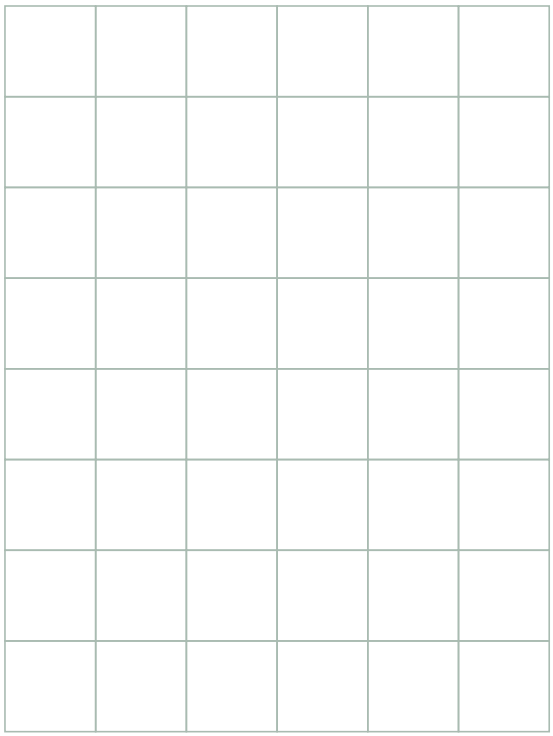
Check: Add 1.5, 0.5, and 1.5 to get 3.5. Subtract from 6 to get 2.5, then divide by 2 to get 1.25 units per side.

Grid Tooth Drawing: Silhouette and Shading Exercises

Task 1 / square-cell layout example

Task 1: 6 columns x 8 rows; one character per square cell.

Schematic cell size; task does not specify physical cell dimensions.



Reading-direction example: down each column, with columns ordered from right to left. Empty cells are deliberate: supply your own characters, one per cell.

Grid Tooth Drawing: Silhouette and Shading Exercises

Source rubric / reflection

- [ ] Tooth outline fits inside the chosen grid rectangle and reads as a tooth with a crown and two roots.
- [ ] Crown, neck, and root widths follow the stated proportions within about 1 grid unit.
- [ ] Shading uses at least three distinct tones and matches the stated light direction.
- [ ] Shading stays inside the outline and the gap between roots is unshaded.
- [ ] Final drawing is centered and free of stray guide marks.
- [ ] Valid alternatives are accepted if proportions and shading logic remain consistent.

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