Draw Overlapping Dragon Scales with Consistent Shading

Original tasks 1, 2 / complete keys

Task 1

Draw a 3-row by 3-column patch of scales with upward overlap (lower rows overlap upper rows). Add shading under each overlapping edge. Describe your result.

Answer: With upward overlap, row 3 scales cover row 2 scales, and row 2 scales cover row 1 scales. Shading bands sit on the scale being covered, just below the covering edge: row 1 scales receive shading under the bottom edges of row 2 scales, and row 2 scales receive shading under the bottom edges of row 3 scales. Row 3 is the bottom row and is not covered from below, so it receives no shading under its bottom edge.

Reason: Upward overlap means the lower row covers the upper row. The shaded band always sits on the scale being covered, just below the covering edge.

Check: Verify that every scale in rows 1 and 2 is partially covered by a scale below it, and that shading appears only on the covered scales just under the covering edges. Row 3 is the bottom row and is not overlapped from below, so it has no shading under its bottom edge.

Task 2

A learner draws 4 scales in row 1 and 4 scales in row 2 directly below without offset. The bottom edges of row 1 scales cover the top edges of row 2 scales. Is the overlap consistent? Explain.

Answer: Yes, the overlap direction is consistent (upper row covers lower row), but the lack of horizontal offset means each row 2 scale is covered by only one row 1 scale directly above. This is valid but produces a column-like pattern rather than a brick pattern. Consistency of direction is maintained.

Reason: Offset is a spacing choice, not a requirement for consistent overlap direction. The key is that upper scales cover lower scales.

Check: Check that each row 2 scale is partially hidden by the scale directly above and that no row 2 scale is fully visible.

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Original tasks 3, 4 / complete keys

Task 3

You have a grid with cells 3 cm wide and 2 cm tall. You want scales about half the cell width. What scale width and shading band width would you use? Use hypothetical values and state units.

Answer: Scale width about 1.5 cm (half of 3 cm). Scale height about 1 cm (half of 2 cm). Shading band width about 2 mm (hypothetical example).

Reason: Halving the cell width gives the scale width. A shading band of about 2 mm is a small fraction of the scale height, suitable for a light shadow.

Check: Measure your drawn scales against the grid cells to confirm they are about half the cell width, and check that the shading band is narrow and even.

Task 4

In a 4-row patch with downward overlap, which rows should have shading under their bottom edges? Assume every scale except those in the bottom row is overlapped by a scale above.

Answer: Under downward overlap, row 1 scales cover row 2 scales, row 2 covers row 3, and row 3 covers row 4. Shading bands sit on the scale being covered, just below the covering edge: row 2 scales receive shading under the bottom edges of row 1 scales, row 3 scales receive shading under the bottom edges of row 2 scales, and row 4 scales receive shading under the bottom edges of row 3 scales. Row 1 is the top row and is not covered from above, so it receives no shading.

Reason: Shading marks the shadow cast by an overlapping scale onto the scale below. Only scales that are overlapped receive this shadow, so the lower rows (2 through 4) get shading while the top row does not.

Check: Confirm shading appears on rows 2, 3, and 4, placed just under the bottom edges of rows 1, 2, and 3 respectively, and that row 1 has no shading.

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Source rubric / reflection

- [ ] Overlap direction is consistent across all rows (upper rows overlap lower rows).
- [ ] Each scale in a lower row is partially covered by at least one scale above.
- [ ] Scale outlines are distinct, with small gaps between scales in the same row.
- [ ] Shading appears as a narrow band under each overlapping edge, not across the whole scale.
- [ ] Shading width and darkness are consistent across the patch.
- [ ] Scale sizes within a row are approximately uniform.
- [ ] Valid alternatives: scale shape may vary (rounded, shield-like, teardrop) as long as the bottom edge is clear and the overlap convention is followed.

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