Easy Disco Ball Drawing: Map Facets and Place Highlights

Original tasks 1, 2 / complete keys

Task 1

On a circle 8 cm across, mark six evenly spaced points on the horizontal center line. Draw longitude lines through them from top pole to bottom pole. Describe how the lines should curve near the equator.

Answer: The six longitude lines should meet at the top and bottom poles and bow outward near the equator, creating wider gaps at the middle than near the poles.

Reason: Longitude lines on a sphere converge at poles and spread at the equator. Curving them outward near the middle makes the grid read as wrapping around a ball.

Check: Confirm all six longitude lines meet at both poles and pass through the six evenly spaced equator points. Check that the spacing between adjacent longitude lines is widest at the equator and narrows toward the poles.

Task 2

A student places a single large white circle as the highlight on a faceted sphere. Explain why this weakens the disco ball effect and describe a better placement using three to five tiles.

Answer: A single large white circle looks like a flat spot, not many small mirrors. A better approach is to keep three to five adjacent tiles white in the quadrant facing the light, then shade surrounding tiles to create contrast.

Reason: Each facet is a tiny mirror, so the highlight appears as a cluster of bright tiles. Adjacent white tiles with shaded neighbors read as sparkle on a curved surface.

Check: Count the white highlight tiles. They should be adjacent and number three to five. Confirm surrounding tiles are shaded and the cluster sits in the chosen light direction.

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Original tasks 3, 4 / complete keys

Task 3

Draw four latitude arcs above the equator and four below on a 10 cm circle. Describe the spacing rule and give one hypothetical spacing example in centimeters.

Answer: Latitude arcs should be closer near the poles and wider near the equator. A hypothetical example on a 10 cm circle (radius 5 cm): above the equator, place arcs at 1.0 cm, 1.8 cm, 2.4 cm, and 2.8 cm from the equator toward the top pole. The gaps between consecutive arcs are 0.8 cm, 0.6 cm, and 0.4 cm, so the inter-arc gaps shrink toward the pole. The remaining distance from the last arc to the pole is 2.2 cm; that is not an inter-arc gap, so the spacing rule applies only to the gaps between arcs. Mirror the same four positions below the equator (1.0 cm, 1.8 cm, 2.4 cm, and 2.8 cm toward the bottom pole) to give four arcs above and four below, with the same gap pattern.

Reason: On a sphere, latitude lines appear compressed near the poles and spread near the equator. Wider spacing at the middle supports the curved-surface illusion.

Check: Measure the vertical gaps between consecutive arcs along the center line. Inter-arc gaps should be largest near the equator and smallest near the pole. Confirm four arcs above and four below, and that all values stay within the 5 cm radius.

Task 4

A finished drawing has grid lines extending outside the circle and shading covering two white highlight tiles. List two corrections and explain how each improves the disco ball effect.

Answer: Erase grid lines outside the circle to restore a clean spherical silhouette. Re-establish the two covered tiles as white by erasing shading on them, then shade around them to keep contrast.

Reason: A disco ball is a sphere, so the outer edge must be circular. White highlight tiles create the sparkle; covering them removes the mirror effect.

Check: Trace the outer edge to confirm it is a circle with no lines outside. Count white highlight tiles and confirm they are uncovered and adjacent.

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Source rubric / reflection

- [ ] Sphere silhouette is a clean circle with no grid lines outside it.
- [ ] Longitude lines converge at poles and curve outward near the equator.
- [ ] Latitude arcs are spaced closer near poles and wider near the equator.
- [ ] Facet tiles follow the grid curvature rather than appearing as flat squares.
- [ ] Main highlight is a cluster of adjacent white tiles facing the chosen light direction.
- [ ] Secondary highlights are smaller and placed opposite the main cluster.
- [ ] Shading darkens the lower-right area without covering white highlight tiles.
- [ ] Grid lines remain visible but do not dominate the shading.
- [ ] Valid alternatives: rounded tiles, slightly irregular tiles, or a finer grid are acceptable if curvature and highlight logic are consistent.

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