Draw and Label the Planets in Order: Size Comparison Worksheet

Original tasks 1, 2 / complete keys

Task 1

Draw a row of eight circles. Write the planet names below them in correct order from the Sun. Then shade each circle using the band system: one-quarter height for smaller than Earth, one-half height for about Earth-sized, three-quarters height for larger than Earth but smaller than Jupiter, and full height for Jupiter-sized or larger. Use the relative diameters Mercury 0.38, Venus 0.95, Earth 1.00, Mars 0.53, Jupiter 11.2, Saturn 9.4, Uranus 4.0, Neptune 3.9 as hypothetical examples.

Answer: Order: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune. Bands: Mercury smaller than Earth; Venus about Earth-sized; Earth about Earth-sized; Mars smaller than Earth; Jupiter Jupiter-sized or larger; Saturn larger than Earth but smaller than Jupiter; Uranus larger than Earth but smaller than Jupiter; Neptune larger than Earth but smaller than Jupiter.

Reason: The order follows distance from the Sun. The bands follow the relative diameter values: values below 1 are smaller than Earth; values near 1 (about 0.95 to 1.00) are about Earth-sized; values greater than 1 and less than 11.2 are larger than Earth but smaller than Jupiter; values 11.2 and above are Jupiter-sized or larger.

Check: Recite the memory phrase to check order. For each circle, confirm the shaded height matches the band height (one-quarter, one-half, three-quarters, or full) and that the band label matches the relative diameter value.

Task 2

A student writes the order as Mercury, Venus, Earth, Jupiter, Mars, Saturn, Uranus, Neptune. Identify the mistake and write the correct order.

Answer: The mistake is that Jupiter and Mars are swapped. The correct order is Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune.

Reason: Mars is fourth from the Sun and Jupiter is fifth. The student placed Jupiter before Mars, which breaks the distance order.

Check: Count positions: position four should be Mars and position five should be Jupiter. Recite the phrase and match the first letters.

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Original tasks 3, 4 / complete keys

Task 3

Draw four circles labeled Mercury, Earth, Jupiter, and Neptune. Shade each circle to show its band using the four-height convention. Explain why Jupiter gets full-height shading and Mercury gets one-quarter-height shading.

Answer: Mercury: one-quarter height (smaller than Earth). Earth: one-half height (about Earth-sized). Jupiter: full height (Jupiter-sized or larger). Neptune: three-quarters height (larger than Earth but smaller than Jupiter). Jupiter gets full-height shading because its relative diameter is 11.2, which is Jupiter-sized or larger. Mercury gets one-quarter-height shading because its relative diameter is 0.38, which is smaller than Earth.

Reason: The band system maps relative diameter to shaded height. Jupiter's value is the largest in the set, so it receives the fullest shading. Mercury's value is the smallest, so it receives the lightest shading.

Check: Compare each shaded height to the four band heights and confirm the band label matches the relative diameter value. Check that the same shading style is used for all four circles.

Task 4

A worksheet shows a size-comparison bar with four bands. A student shades Saturn to full height and Uranus to full height. Is this correct? Explain using the relative diameters Saturn 9.4 and Uranus 4.0.

Answer: Saturn at full height is incorrect because 9.4 is larger than Earth but smaller than Jupiter, so it should be shaded to three-quarters height. Uranus at full height is also incorrect because 4.0 is larger than Earth but smaller than Jupiter, so it should be shaded to three-quarters height.

Reason: The band for Jupiter-sized or larger includes values 11.2 and above. Saturn's value 9.4 and Uranus's value 4.0 both fall between 1 and 11.2, so both belong to the larger-than-Earth-but-smaller-than-Jupiter band.

Check: Read the band thresholds from the size-comparison bar. Confirm that Saturn and Uranus are both shaded to three-quarters height, not full height.

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Source rubric / reflection

- [ ] Order: all eight planets placed in correct sequence from the Sun (4 points).
- [ ] Size bands: each circle shaded to the correct band using the four-height shading convention (one-quarter, one-half, three-quarters, or full height) (4 points).
- [ ] Labels: every circle has a legible planet name and band name (2 points).
- [ ] Consistency: one shading style used across all circles (1 point).
- [ ] Valid alternatives: any legible handwriting and any consistent shading style accepted (1 point).

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