Final Applications and Review

Lesson 4 Connecting Models and Explanations

Standards 6.G.A.1, 6.G.A.2, 6.G.A.4, 6.SP.A.2, 6.SP.A.3, 6.SP.B.5a, 6.SP.B.5b, 6.SP.B.5c, 6.SP.B.4, 6.SP.B.5d

Learning target I can select models and explain geometric and statistical results.

Materials Coordinate grids, rulers, fractional cube models, data plotting paper.

Lesson Flow 50 Minutes

0–5 Activate prior knowledge. Read the learning target. Ask students what they already know about connecting models and explanations. Use a quick model or estimate to make their starting ideas visible.

5–17 Teach and model. Read the requested quantity first and identify the relevant model. Two matching triangles form a parallelogram, so A = (base × perpendicular height)/2. A slanted side is not necessarily the height. Label area in square units. Explain why the units and the final value fit the situation. Work through the two examples on the attached instruction page. Have students name the first step before showing it.

17–22 Guided practice. Revisit worked Example 2 with its solution covered. Students propose the next step and explain why it is valid; uncover and compare with the worked solution.

22–45 Independent classwork. Assign the attached 10 questions in order. Check items 1–3 for entry-level understanding, 4–6 for connected procedures, 7–8 for representation and explanation, and 9–10 for application or justification. Ask students to use the instruction-page notes area or extra grids for longer work.

45–50 Check understanding. Use classwork question 10 as an exit discussion: Reading times in minutes are 2, 3, 3, 4, 5, 14. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures. Compare the result with the answer key and ask a student to defend the method.

Support and Extension

Support Model item 1 together with the listed tools, then have students attempt item 2 independently. Watch choosing the correct geometric measure and tying statistical statements to units and context.

Extension Ask students to solve a final item another way, draw a second representation, or create a related problem with a checked answer.

Next step Record which students can explain the target independently. Begin the next teaching session with a brief correction for any recurring error.

Name _____ Date _____

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Learning target I can select models and explain geometric and statistical results.

Learn and Discuss

Read the requested quantity first and identify the relevant model. Two matching triangles form a parallelogram, so A = (base × perpendicular height)/2. A slanted side is not necessarily the height. Label area in square units. Explain why the units and the final value fit the situation.

Example 1 A rectangular prism has edges 2, 3, and 4 cm. Sketch it and find its volume.
Solution 24 cm³. B = 2 × 3 = 6 cm²; V = B × 4 = 24 cm³.
Example 2 Reading times in minutes are 3, 4, 4, 5, 6, 15. Find the five-number summary and draw a labeled box plot. State the IQR.
Solution (3, 4, 9/2, 6, 15); IQR 2 min. Box runs from 4 to 6, median line at 9/2, whiskers to 3 and 15.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 4 Connecting Models and Explanations

Name _____ Show calculations, models, and units.

1. Sketch a triangle with base 16 cm and perpendicular height 5 cm. Find its area.

2. A rectangular prism has edges 5, 2 1/2, and 2 cm. Sketch it and find its volume.

3. A 5 cm by 4 cm base and 5 cm height form a closed box. Draw its net and find the material area. Ignore tabs and overlap.

4. Reading times in minutes are 6, 9, 9, 12, 12, 15. Describe a typical value, range, shape, and any striking value.

5. Reading times in minutes are 6, 9, 9, 12, 12, 15. Report n, units, and mean.

6. Reading times in minutes are 8, 13, 13, 18, 18, 23. Find Q1, Q3, IQR, and range.

7. Reading times in minutes are 6, 7, 7, 8, 9, 18. Calculate the mean and MAD. Show all absolute deviations. Interpret MAD in a sentence.

8. Reading times in minutes are 2, 3, 3, 4, 5, 14. Find the five-number summary and draw a labeled box plot. State the IQR.

9. Reading times (min): Group A [6, 7, 7, 8, 9, 18], Group B [8, 9, 9, 10, 11, 20]. Compare median and IQR. Which group reads longer typically? Which is more consistent?

10. Reading times in minutes are 2, 3, 3, 4, 5, 14. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures.

Connecting Models and Explanations

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1. 40 cm²
Reasoning A = bh/2 = 16 × 5 ÷ 2 = 40. Two such triangles make a parallelogram.

2. 25 cm³
Reasoning B = 5 × 5/2 = 25/2 cm²; V = B × 2 = 25 cm³.

3. 130 cm²
Reasoning Closed surface area = 2(20+25+20) = 130.

4. Center near 21/2 min; range 9 min; roughly symmetric; no isolated extreme
Reasoning The values balance around the middle. Range = 15 - 6.

5. n = 6; minutes; mean 21/2 min
Reasoning Sum = 63; mean = 63 ÷ 6 = 21/2.

6. Q1 13, Q3 18; IQR 5 min; range 15 min
Reasoning Lower half [8, 13, 13] has median 13; upper half [18, 18, 23] has median 18. Subtract Q1 from Q3.

7. Mean 55/6 min; MAD 53/18 min; a typical distance from the mean is 53/18 min
Reasoning Distances: 19/6, 13/6, 13/6, 7/6, 1/6, 53/6; sum 53/3; divide by 6 = 53/18.

8. (2, 3, 7/2, 5, 14); IQR 2 min
Reasoning Box runs from 3 to 5, median line at 7/2, whiskers to 2 and 14.

9. A median 15/2, B median 19/2 min; both IQR 2 min. B is typically 2 min higher; equal middle-half variability.
Reasoning Adding 2 shifts all values and the median by 2, but does not change Q3 - Q1.

10. 6 observations of reading time in minutes. Median 7/2 min, IQR 2 min; right-skewed with a high value 14 min, so median/IQR resist that value.
Reasoning Calculate the center and spread before interpreting them in context. Other accurate, justified summaries are acceptable.