

NWEA Assessment Item Illustrating 7.RP.A.2

© 2020 NWEA (EXCEPT FOR COMMON CORE STATE STANDARDS © 2010 NATIONAL GOVERNORS ASSOCIATION CENTER FOR BEST PRACTICES AND COUNCIL OF CHIEF STATE SCHOOL OFFICERS). ALL RIGHTS RESERVED. USED WITH PERMISSION FROM NWEA; VISIT <https://www.nwea.org/> FOR TERMS OF USE.

Domain: Ratios and Proportional Relationships

7.RP.A: Analyze proportional relationships and use them to solve real-world and mathematical problems.

Calculator Availability: No

This question has two parts. Use the information to answer Part A and Part B.

Shonda needs to mix cement and sand to make concrete for a large project. The strength of her concrete is determined by the ratio of cement to sand.

Shonda made several batches of cement and sand. She found the mix of 2 cubic feet (ft^3) of cement and 3 ft^3 of sand to be the ideal strength for her project.

Part A
Which batches had the ideal strength? Choose "Yes" or "No" for each batch.

Batch	Ideal Strength?
3 ft^3 cement and 4 ft^3 sand	Yes / No
4 ft^3 cement and 6 ft^3 sand	Yes / No
3 ft^3 cement and 6 ft^3 sand	Yes / No
6 ft^3 cement and 9 ft^3 sand	Yes / No

Part B
Which equation describes the relationship between the cubic feet of sand, s , and the cubic feet of cement, c , for the ideal strength?

A. $s = \frac{2}{3}c$ B. $s = \frac{3}{2}c$

C. $s = 2c$ D. $s = 3c$

Alignment: 7.RP.A.2: Recognize and represent proportional relationships between quantities.

Using proportional relationships to solve problems and model with mathematics are both foundational for future study in mathematics and science and used frequently in everyday life. In this item students recognize equivalent ratios, and then translate the relationship into an equation in two given variables. As the amount of cement increases, the amount of sand must increase. Students must identify and compare the given proportional relationships and identify the equation that represents the relationship between the number of parts of cement to the number of parts of sand.

Coherence: In grade 6, students were introduced to the concept of ratios and began calculating unit rates with whole numbers. Also in grade 6, students solved problems involving unit rate, and learned the equivalent terms *for every*, *for each*, *for each 1*, and *per* were established and used.^{6.RP.A} This grade 7 standard lays the foundation for understanding relationships as functions and prepares students to graph, compare, and interpret proportional relationships as linear functions in grade 8^{8.F.A/B} and develop an understanding of slope.^{8.EE.B}

Rigor: This item attends to conceptual understanding and application. Students must recognize equivalent ratios and identify an equation that describes the given relationship between cubic feet of cement and cubic feet of sand for the ideal concrete strength. Students must interpret the context in order to determine the concepts necessary to solve the problem.

Answer Key:

This question has two parts. Use the information to answer Part A and Part B.

Shonda needs to mix cement and sand to make concrete for a large project. The strength of her concrete is determined by the ratio of cement to sand.

Shonda made several batches of cement and sand. She found the mix of 2 cubic feet (ft^3) of cement and 3 ft^3 of sand to be the ideal strength for her project.

Part A

Which batches had the ideal strength? Choose "Yes" or "No" for each batch.

Batch	Ideal Strength?
3 ft^3 cement and 4 ft^3 sand	Yes / <input checked="" type="checkbox"/> No
4 ft^3 cement and 6 ft^3 sand	<input checked="" type="checkbox"/> Yes / No
3 ft^3 cement and 6 ft^3 sand	Yes / <input checked="" type="checkbox"/> No
6 ft^3 cement and 9 ft^3 sand	<input checked="" type="checkbox"/> Yes / No

Part B

Which equation describes the relationship between the cubic feet of sand, s , and the cubic feet of cement, c , for the ideal strength?

- A. $s = \frac{2}{3}c$
- B. $s = \frac{3}{2}c$
- C. $s = 2c$
- D. $s = 3c$

Learn More

Learn more with the [Math Assessment Item Alignment Professional Development Modules](#).

All content linked to within this resource was free for use when this resource was published in August 2020. Over time, the organizations that manage that external content may move or remove it or change the permissions. If the content is no longer available, please email info@studentsachieve.net.