



Transition Tasks
for Mathematics
Grade 6

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Introduction

Use these engaging problem-solving tasks to help transition your mathematics program to the knowledge and skills required by the Common Core State Standards for Mathematics.

This collection of tasks addresses some of the new, rigorous content found in the Common Core State Standards (CCSS) for sixth grade. The tasks support students in developing and using the Mathematical Practices that are a fundamental part of the CCSS. You can implement these tasks periodically throughout the school year to infuse any math program with the content and skills of the CCSS.

These tasks generally take 30 to 45 minutes and can be used to replace class work or guided practice during selected class periods. Depending on the background knowledge and structure of your class, however, the tasks could take less or more time. To aid with your planning, tasks are divided into two parts. This flexible structure allows you to differentiate according to your students' needs—some classes or advanced students may need only one class period for both parts, while others may need to defer Part 2 for another day or altogether. Use your own judgment regarding the amount of time your students will need to complete Parts 1 and 2. Another strategy for compressing the time necessary to complete a task is to divide the problems or calculation associated with a task among students or small groups of students. Then students can “pool” their information and proceed with solving the task.

Each Transition Task is set in a meaningful real-world context to engage student interest and reinforce the relevance of mathematics. Each is tightly aligned to a specific standard from the Grade 6 CCSS. The tasks provide Teacher Notes with Implementation Suggestions that include ideas for Introducing, Monitoring/Facilitating, and Debriefing the tasks in order to engage students in meaningful discourse. Debriefing the tasks helps students develop and enhance their understanding of important mathematics, as well as their reasoning and communication skills. The Teacher Notes also offer specific strategies for Differentiation, Technology Connections, and Recommended Resources to access online.

Student pages present the problem-solving tasks in familiar and intriguing contexts, and require collaboration, problem solving, reasoning, and communication. You may choose to assign the tasks with little scaffolding (by removing the sequence of steps/questions after the task), or with the series of “coaching” questions that currently follow each task to lead students through the important steps of the problem.

We developed these Transition Tasks at the request of math educators and with advice and feedback from math supervisors and middle-school math teachers. Please let us know how they work in your classroom. We'd love suggestions for improving the tasks, or topics and contexts for creating additional tasks. Visit us at www.walch.com, follow us on Twitter (@WalchEd), or e-mail suggestions to customerservice@walch.com.

Building Projects with Fractions

Instruction

Common Core State Standard

Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

- 6.NS.1.** Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions. ...

Task Overview

Background

This task uses division of fractions in the real-world application of building a deck railing and bookcase. It is designed to help students visualize the process of division by fractions while also providing skill practice.

Prior to this task, students should have learned and practiced addition, subtraction, multiplication, and division of fractions. They should have familiarity with reading a word problem and translating information into a sketch.

Students may have difficulty working with fractions. Division of fractions can be particularly challenging as it is often taught as a rote skill. This activity extends the division of fractions into the real world by asking, “How many _____ are in _____?”

The task also provides practice with:

- reading and interpreting word problems
- drawing diagrams to represent a problem
- performing arithmetic operations

Implementation Suggestions

- Students should work in small groups to encourage discourse.
- Each student should complete his or her own task.
- Calculator use is discouraged for this task.
- Students may benefit from the use of fraction tiles during this task.

6.NS.1 Task • The Number System

Building Projects with Fractions

Instruction

Introduction

Ask students if they have ever built or helped build anything. Ask them to describe how they knew what to build. Ask if they used measurements, and if so, what kind. Did they use a model or sketch to represent the project? Was their model to scale? Ask students to explain why it is useful to have a sketch available when building an object.

Ask students to think about how much of a pizza they would have if they had to share half a pizza with three friends. Have students think silently and write/draw responses, then share out loud. Listen to the language used by the students. Encourage them to notice the connection between the words that describe sharing a pizza and the words used to express the operation of division.

Monitoring/Facilitating the Task

Ask questions and prompt student thinking so that they:

- Calculate the perimeter of the deck. They should label their sketch appropriately and review it as they calculate.
- Make a thoughtful choice about working with mixed numbers or improper fractions.
- Remember the procedure for dividing fractions.
- Think of the whole number or fraction being *divided*. Ask, “How many _____ are in _____?”
- Go deeper in their exploration when they calculate how many books are in a bookcase.
- Think about how the books would be placed on each shelf in order to encourage use of the proper dimensions.
- Describe how they came up with their answer and how they know they are correct.
- State and justify their solutions to one another.

Debriefing the Task

- Encourage students to present and describe the sketches they produced to represent the house and bookcase. Ask students to describe how they knew which labels to place where. Ask students to describe how the sketches were useful in their calculations.
- In Part 1, some students may have calculated the entire perimeter of the porch and then divided. Other students may have calculated the pickets on each side or section of the porch and found the sum for the house. Ask students to explore why both methods gave the same result.

6.NS.1 Task • The Number System

Building Projects with Fractions

Instruction

- In Part 2, some students may use the mixed number as given while some students may have converted to improper fractions. Ask students which form helps them visualize the problem and which form made the division a simpler task.
- Encourage discussion about construction. Have students suggest additional items that need to be designed, remaining mindful of the thought, “How many _____ are in _____?”

Answer Key

Answers may vary depending on the batch combinations decided on by each team. Likely solutions are presented below.

1. Answers may vary but must include the house, deck, railing, and railing length.
2. 504 pickets. Students may suggest 505 pickets so that the railing is symmetrical on both sides. This answer is acceptable if the student provides an explanation.
3. Answers may vary but must include the top, sides, and correct number of shelves of the bookcase.
4. 7 shelves (*Note:* Students may calculate 8 shelves, but this would not account for the depth of the wood/shelves themselves.)
5. 4 bookcases—each bookcase holds 210 books, and $700 \div 210 \approx 3.33$. Round up to 4 to accommodate all the books.

Differentiation

Asking students to consider additional or different constraints on the problem will provide a variety of related tasks. Changing the dimensions of the house, bookcase, or books will result in new problems related to the initial assignment.

Advanced students can be asked to consider the dimensions of the wood they are using. Ask students to consider the number of pickets necessary if each corner contains a 4×4 post or if a supporting post must be placed at an interval around the railing. Ask students to consider the number of shelves or books if the wood being used is $\frac{3}{4}$ -inch thick.

Technology Connection

Graphic design software could be used to “build” the railing and bookcase during the task.

6.NS.1 Task • The Number System

Building Projects with Fractions

Instruction

Choices for Students

Students can determine the necessary pickets for a railing for their own porch, or a fence to surround the school or neighborhood park. Students may also design a bookcase for their own book collection or the library.

Meaningful Context

Fractions are everywhere in our world, yet many students have difficulty connecting classroom applications with real-world purposes. This task illustrates how fractions are commonly used in the construction trades.

Recommended Resources

- Bridge Builders
www.walch.com/rr/CCTTG6FractionBridge
In this online fraction activity, students must select the correct fraction to build a bridge with a predetermined number of sections.
- Dividing Fractions
www.walch.com/rr/CCTTG6DivideFractions
Review information on dividing fractions.
- How to Build a Bookcase
www.walch.com/rr/CCTTG6BuildBookcase
This site provides background information for the teacher on building a bookcase.
- How to Build a Porch Railing
www.walch.com/rr/CCTTG6PorchRailing
This site provides background information on building a porch railing.

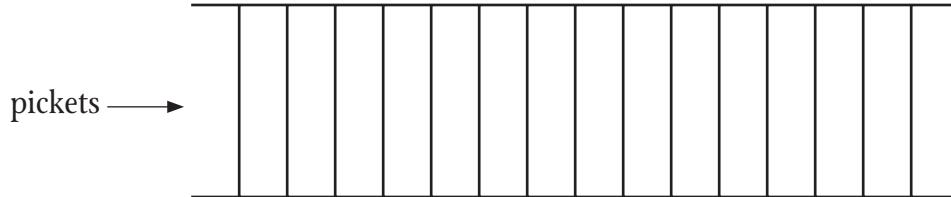
NAME: _____

6.NS.1 Task • The Number System

Building Projects with Fractions

Part 1

Your client wants your construction company to build a railing along her deck. She wants a basic picket railing like the one in the following diagram. How many pickets will you need?



You have collected the following information:

- The client's house is a square.
- Each side of the client's house is 10 feet long.
- The deck surrounds 3 sides of the client's house.
- The deck extends 9 feet from the house.

1. Sketch the aerial view of the house. Include the house, deck, and railing. Make sure to label all information and known measurements.

2. Calculate how many pickets are needed for the railing. Each picket must be spaced $\frac{1}{6}$ foot apart.

continued

6.NS.1 Task • The Number System

Building Projects with Fractions

Part 2

Your company did such excellent work on the railing that your client wants you to build a bookcase. Your client has a list of requirements. How many bookcases will you need to build to hold 700 books?

- The bookcase must be 6 feet tall.
 - The bookcase must be 4 feet wide, which includes the two wooden sides of the bookcase. The wood on each side is $1\frac{1}{2}$ inches thick, leaving $3\frac{3}{4}$ feet of space on the shelf for books.
 - The bookcase needs to hold books that are $\frac{3}{4}$ foot tall and $\frac{1}{8}$ foot wide.
 - Shelves must be evenly spaced.
 - Shelves must be 1 inch thick. The top and bottom of the bookcase are also 1 inch thick.
3. Sketch the bookcase. Include the top, sides, and shelves. Make sure to label all information and known measurements.

continued

NAME: _____

6.NS.1 Task • The Number System
Building Projects with Fractions

4. Calculate how many shelves the bookcase will hold. Correct your sketch if necessary.

5. Your client owns 700 books. How many bookcases do you need to build? Justify your response.