

The Playground Problem Teacher's Instructions

Pre-Class

Draw your own solution to *The Playground Problem*.

Introduction

Set up by talking about playgrounds and solving problems with space. Explain that there are two neighborhoods with the same space for a playground, but that they have different ideas about how to use that space. This problem asks you to compare those two plans.

Point out the plain and graph paper at everyone's table, along with various markers. These supplies will be used to picture solutions to the problem. Ask that everyone work in pairs or groups of three on the problem.

Distribute copies of *The Playground Problem*.

Be prepared to help those who are stuck with how to diagram the problem. Ask: "How would you draw the lots? How will you show the fraction parts that are used as playground and the parts that are not?"

When most people have completed the work, share several solutions.

Work at picturing the solution first, so that people can see that the space covered was the same in each community. Make sure everyone can 'see' how the picture works to represent the problem. Most will end up working with common denominators (20ths); some may not. Once the picture is clear to all and you have reasoned through to an answer, as well, start to connect the calculations to the picture.

You might close this activity by summarizing student findings. Write the following equation and ask students to identify which side of the equation represents which community (Jamaica Plain or Roxbury) and what each of the numbers stands for in the equation.

$$\frac{2}{3} \times \frac{3}{4} = \frac{3}{4} \times \frac{2}{3}$$

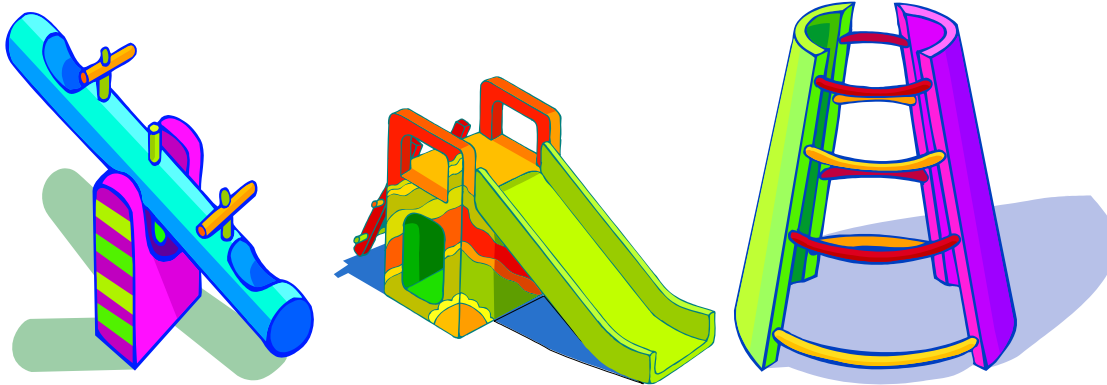
Make the connection to the drawings and the connection to the commutative property introduced (hopefully) when working with whole numbers ($5 \times 4 = 4 \times 5$).

A further discussion about why the two situations might appear to yield different outcomes helps to surface lingering misconceptions.

The Playground Problem

The *Playground Problem* is adapted from a problem (p.459) in the following resource:

Imm, Kara Louise, Stylianou, Despina A., and Chae, Nabin (2008). "Student Representations as the Center: Promoting Classroom Equity," *Mathematics Teaching in the Middle School*, NCTM, Reston, VA, Vol 13, No. 8, April 2008, pp.458-463



The Problem

Two communities in Boston, Jamaica Plain and Roxbury, each gather to make plans for an empty lot in their neighborhood. The lots are identical in size, measuring 50 yards x 100 yards. In Jamaica Plain Gardens, the community group decides to allocate $\frac{3}{4}$ of the empty lot to playground and cover $\frac{2}{3}$ of this playground with blacktop. The Roxbury neighborhood will devote $\frac{2}{3}$ of the lot to playground, and $\frac{3}{4}$ of the playground will be covered in blacktop. If you like to skateboard or play basketball, you want lots of blacktop. In which park is the blacktop area greater?

Draw your solution to this problem on a piece of graph paper. Show calculations, as well.