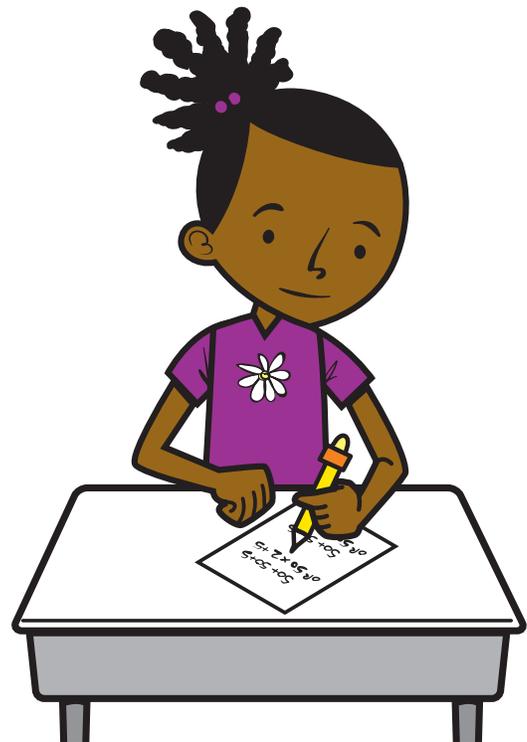## Bridges in Mathematics
Grade 4 Unit 6

Multiplication & Division, Data & Fractions

In this unit your child will:

▪ Multiply multi-digit numbers

▪ Divide a multi-digit number by a 1-digit number

▪ Solve problems about the area and perimeter of rectangles

▪ Review equivalent fractions, and add and subtract fractions and mixed numbers

Your child will learn and practice these skills by solving problems like those shown below. Use the free Math Vocabulary Cards app for additional support: mathlearningcenter.org/apps.

PROBLEM	COMMENTS
One piece of paper is 6 inches by 14 inches. The other is 12 inches by 7 inches. Sasha says they have the same area. Do you agree or disagree? Why? *Yes. If you double one side and halve the other, the area stays the same. 12 is double 6, and 7 is half of 14. So the two pieces of paper have the same area.* What is the perimeter of each piece of paper? *6 + 6 + 14 + 14 = 40 inches* *12 + 12 + 7 + 7 = 38 inches*	In solving problems related to area and perimeter, students review these concepts, which were addressed in the previous unit. They also use their multiplication and division skills. This particular problem touches on doubling and halving (doubling one factor while halving the other), which students have used to make multiplication problems simpler and easier to solve. It also highlights the fact that rectangles with the same area but different dimensions have different perimeters.
Solve 161 ÷ 7 using a ratio table or an array. 	Students have used the ratio table and array model to solve multiplication problems in the past. They can also use them to solve division problems. Doing so gives them considerable flexibility, because they can use the combinations that are most comfortable for them. Both models also reinforce the fact that division is the inverse of multiplication.

PROBLEM	COMMENTS
Write two fractions that are equal to $\frac{3}{10}$. $\frac{6}{20}$ and $\frac{30}{100}$ are both equal to $\frac{3}{10}$.	Students generate equivalent fractions by multiplying the numerator and denominator by the same number. There are many equivalent fractions, and any response is correct as long the numerator and denominator have been multiplied (or divided) by the same number.
Subtract these mixed numbers. $8\frac{2}{7} - 3\frac{5}{7}$ $(8 + \frac{2}{7}) - (3 + \frac{5}{7})$ $8 + \frac{2}{7} - 3 - \frac{5}{7}$ $8 - 3 + \frac{2}{7} - \frac{5}{7}$ $7 + 1 - 3 + \frac{2}{7} - \frac{5}{7}$ $7 + \frac{7}{7} - 3 + \frac{2}{7} - \frac{5}{7}$ $7 - 3 + \frac{7}{7} + \frac{2}{7} - \frac{5}{7}$ $7 - 3 + \frac{9}{7} - \frac{5}{7}$ $4 + \frac{4}{7}$ $4\frac{4}{7}$	Mixed numbers are made up of a whole number and a fraction. The symbolic notation in this example is not what we expect to see from students. Instead, it illustrates students' likely thinking process, which involves breaking each mixed number into a whole and fractional part and then finding the difference between the parts. In this case, the student has to take 1 in the form of $\frac{7}{7}$ from 8 and add the $\frac{7}{7}$ to the $\frac{2}{7}$ so that $\frac{5}{7}$ can be subtracted from $\frac{9}{7}$.

FREQUENTLY ASKED QUESTIONS ABOUT UNIT 6

Q: The graphs with the Xs I see in some of my student's work or in the classroom aren't familiar to me. What are they and how do they work?

A: These graphs are called *line plots,* and they are heavily emphasized in current math standards. The line is, essentially, a number line. In this example, the line is marked in eighths of an inch. Each X represents a worm with a given length, so, for example, there was one worm with a length of $4\frac{2}{8}$ inches and three worms with a length of $5\frac{3}{8}$ inches each. There were no worms in this sample that measured $4\frac{3}{8}$ inches. Line plots show how data is distributed. Based on this line plot, for example, you could say that all 12 of the worms in this sample were between $4\frac{2}{8}$ and $5\frac{7}{8}$ inches long and that most were somewhere between $4\frac{7}{8}$ and $5\frac{4}{8}$ inches long.

LENGTHS OF EARTHWORMS IN OUR GARDEN