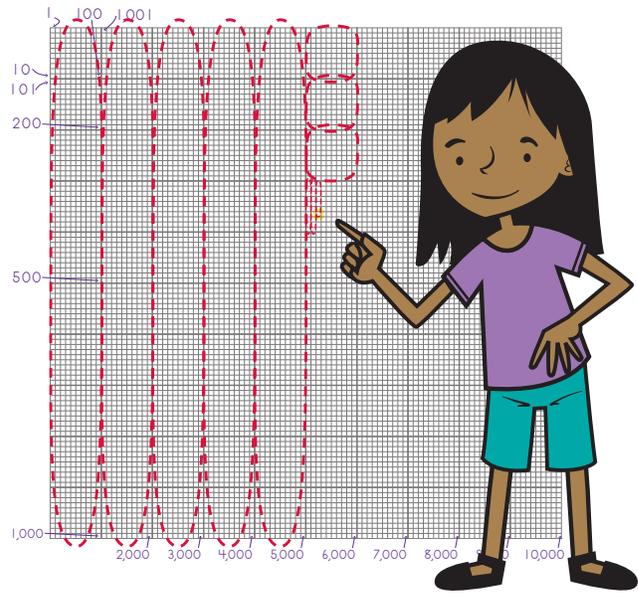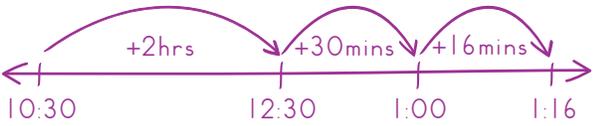# Bridges in Mathematics
Grade 4 Unit 4

Addition, Subtraction & Measurement

In this unit your child will:

- Compare multi-digit numbers and identify the value of the digits in such numbers

- Use the standard algorithms for addition and subtraction

- Measure length, distance, liquid volume, time, mass, and weight

- Convert measurements from one unit to another within the same system (e.g., centimeters to meters but not centimeters to inches)

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
Gina and her mom are driving to see Gina's grandmother. They have to drive 703 miles altogether. So far they have driven 386 miles. How many more miles do they need to drive? $303 + 14 = 317$ $386 + 317 = 703$ They need to drive 317 more miles.	The context of this problem lends itself nicely to a strategy that uses the number line to add up from the miles traveled so far to the total distance. Notice how the student added 14 to get to 400 and then saw that he could add 303 to get to 703. Students could certainly use the standard algorithm to arrive at the same answer. $\begin{array}{r} 7\overset{6\ 9\ 1}{\cancel{0}}3 \\ -\ 386 \\ \hline 317 \end{array}$
Use an open number line to solve this problem. Manuel started a race at 10:30 am. He ran for 2 hours and 46 minutes. What time did he finish the race? He finished at 1:16 pm.	The open number line can be a really useful tool for adding amounts of time. Students can use the number line to get to different landmark times (such as 12:30 and 1 in this example). Strategies like this help them keep track of the whole hours and the minutes.

PROBLEM	COMMENTS
Lance used the standard algorithm to solve the problem below. $\begin{array}{r} 564 \\ +\ \ 837 \\ \hline 13911 \end{array}$ Did he use the algorithm correctly? Explain. No he didn't. He didn't carry when he added 4 and 7. He just wrote 11 and that messed up the place values. He should have done it like this. $\begin{array}{r} {}^{1}\ {}^{1} \\ 564 \\ +\ \ 837 \\ \hline 1401 \end{array}$	Students are expected to be able to use the algorithm fluently. Part of developing that fluency is understanding when and how the algorithm has been used incorrectly. Students can explain in a variety of ways how they know Lance used the algorithm incorrectly. Some might see that his answer must be wrong—and therefore that he did not use the algorithm correctly—because they estimated a reasonable answer (about 1400) and can see that Lance's final answer is quite unreasonable. Others might apply the algorithm and then compare their own work to Lance's.

FREQUENTLY ASKED QUESTIONS ABOUT UNIT 4

Q: If they need to master the standard algorithms for adding and subtracting larger numbers, why do students use other methods, including the number line?

A: The standard algorithms are reliable, efficient, and elegant methods for adding and subtracting multi-digit numbers. They work every time, no matter what pair of numbers you're adding or subtracting, as long as they are performed correctly. Problems arise when students attempt to use the algorithms without having mastered the basic addition and subtraction facts, when they don't understand why the algorithms work, when they forget the steps, and when they can carry out the steps yet are unable to use their estimation skills to judge whether their final answer is reasonable.

Using models (as in the number line example above) and other methods helps students see why different strategies, including the algorithm, work. This understanding, along with mastery of basic facts and a good sense of place value, ensures that students carry out the algorithms accurately and with understanding. The unit also involves a lot of place value work so that students can make good estimates and decide whether their answers are reasonable.