

LETTER HOME

Division

Dear Family Member:

In this unit, your child will learn to divide large numbers by one-digit divisors. Students estimate quotients (the answer to a division problem) and use their knowledge of multiplication facts and multiples of ten to find answers to problems such as $378 \div 6$.



$6 \times 60 = 360$ and $6 \times 70 = 420$.
 378 is between 360 and 420 , but it is closer to 360 . So the answer must be between 60 and 70 , but probably closer to 60 .

Students explore division using equal sharing and area models. Both ways of looking at division build their understanding of the operation before they learn a paper-and-pencil algorithm. When students have a solid understanding of division, they make fewer mistakes, retain their learning longer, and can think more flexibly to solve problems.

The paper-and-pencil method taught by *Math Trailblazers*TM for long division is somewhat different from the way long division is traditionally taught in the United States. This method, called the partial quotients division method, builds on a conceptual understanding of division. It is often easier for students to learn and is more flexible than the traditional method. Both methods involve making estimates, but the partial quotients method allows underestimates so it does not involve as much erasing and recalculating as the traditional method sometimes does. This increases accuracy. This method can easily be extended to solve problems with larger divisors.

$\begin{array}{r} 7 \overline{) 294} \\ - 140 \\ \hline 154 \\ - 140 \\ \hline 14 \\ - 14 \\ \hline 0 \end{array}$	$\begin{array}{l} 20 \text{ (Estimate } 294 \div 7) \\ 20 \text{ (Estimate } 154 \div 7) \\ +2 \text{ (} 14 \div 7) \\ \hline 42 \end{array}$	$\begin{array}{r} 42 \\ 7 \overline{) 294} \end{array}$
		The answer is 42.

The partial quotients division method is often easier for children to learn.

As we work together in class, these are some ways that you can help your child at home:

Play the Division Digits Game. In this game students draw numbers from a set of Digit Cards 0–9 and place the digits on a division playing board. The winner makes the largest quotient. Directions are in the *Student Activity Book*.

$$\square \overline{) \square \square}$$

$$\square \overline{) \square \square \square}$$

$$\square \square \square \div \square$$

Compare Strategies. Encourage your child to show you how he or she is learning division. Show him or her your method for division. Compare them.

Learn the Partial Quotients Method. This method is often called the Forgiving Method because you can underestimate and still solve the problem efficiently. The partial quotient method is described here.

Partial Quotients Method

As an example, let's divide 95 by 3. Think of dividing 95 objects, such as marbles, into groups of 3. How many groups will there be? (Or, think of putting the objects into 3 groups. How many will be in each group?)

$$\begin{array}{r} 3 \overline{)95} \quad 20 \\ -60 \\ \hline 35 \end{array}$$

Now divide the remaining 35 marbles by 3. Let's estimate that $35 \div 3$ is about 10. Since $3 \times 10 = 30$, write

$$\begin{array}{r} 3 \overline{)95} \quad 20 \\ -60 \\ \hline 35 \\ -30 \\ \hline 5 \end{array} \quad 10$$

Since 3 "goes into" 5 one time, write

$$\begin{array}{r} 3 \overline{)95} \quad 20 \\ -60 \\ \hline 35 \\ -30 \\ \hline 5 \\ +1 \\ \hline 31 \\ -3 \\ \hline 2 \end{array}$$

Since 2 divided by 3 does not give us a whole number, there are 2 marbles left over. This is the remainder.

Add up the number of 3s we took away:
 $20 + 10 + 1 = 31$. So, 95 divided by 3 is 31 with remainder 2. We write this one top of the problem, as in the traditional division method.

$$\begin{array}{r} 31R2 \\ 3 \overline{)95} \quad 20 \\ -60 \\ \hline 35 \\ -30 \\ \hline 5 \\ +1 \\ \hline 31 \\ -3 \\ \hline 2 \end{array}$$

As students become familiar with the partial quotients method, they make better estimates to keep the number of steps at a minimum. Below is another way to do this problem using this method. Note that this time, making the highest possible estimates (without overestimating) results in the same number of steps as the traditional method. If the highest estimate is made each time, the two methods are essentially the same.

$$\begin{array}{r} 31R2 \\ 3 \overline{)95} \quad 30 \\ -90 \\ \hline 5 \\ +1 \\ \hline 31 \\ -3 \\ \hline 2 \end{array}$$

The partial quotients method allows students to underestimate as they develop their estimation skills. However, when students overestimate, they have to erase, just as with the traditional method.

Math Facts and Mental Math

This unit concludes the systematic review and assessment of the division facts in fourth grade.

Division Facts. Students review the division facts for all the groups to maintain and increase fluency and to learn to apply multiplication and division strategies to larger numbers.

You can help your child review these facts using the flash cards that are sent home or by making a set of flash cards from index cards or scrap paper. Study facts in small groups each night. As your child goes through the flash cards, put the cards in three stacks: Facts I Know Quickly, Facts I Can Figure Out, and Facts I Need to Learn.

For the Facts I Need to Learn, work on strategies for figuring them out. Good strategies include:

Start with the multiplication fact. If your child does not know the multiplication fact related to the division fact, start by developing strategies to solve that multiplication fact.

Turn-around facts. To solve $28 \div 7$. I know $7 \times 4 = 28$. So, $28 \div 7 = 4$.

Reasoning from known facts. To solve $32 \div 4$. I know $32 \div 2 = 16$. So, $32 \div 4$ is half of 16.
 $32 \div 4 = 8$.

For Facts I Can Figure Out, use the flash cards to practice the facts for fluency.

For Facts I Know Quickly, help your child use mental math strategies to multiply 10s and 100s:
 $2400 \div 60 = 40$, $480 \div 6 = 80$, $24,000 \div 400 = 60$.

Sincerely,