

Home Connection

In third grade students learned to divide numbers of up to three digits by one digit using the standard algorithm. They also learned mental math strategies for simpler division problems. In fourth grade, students will expand to division of 4-digit numbers and apply this skill to a variety of word problems.

Mental Math for Division

Multiples of tens, hundreds, and thousands can easily be solved by thinking of simple one-digit and two-digit computations. For example, $420 \div 3$ can be thought of as 42 tens $\div 3 = 14$ tens or 140. Or it can be decomposed to a friendly ten such as in this example.

Standard Division Algorithm

When looking at a problem like $4642 \div 3$, students were formally taught to think “How many times does 3 go into 4,642?” INSTEAD, students should think, “What value will be in each group if 4,642 is divided into 3 groups?” As you can see in the example problem, the algorithm looks the same, but the way students will think about division is different. **This is critical to developing a student’s concrete understanding that division is splitting the dividend into equal groups rather than the divisor “going into” the dividend.** Read through each bullet point as you look at the example. (Hint: it helps to read it out loud).

- Students should think, 4 thousands divided into 3 equal groups is 1 thousand in each group with 1 thousand remaining. Write the digit 1 in the thousands place in the quotient. Of the 4 thousands, 3 have been divided ($1 \times 3 = 3$). Write the 3 below the 4 in the thousands place and find the difference, which is the thousand that still needs to be divided.
- Regroup the remaining 1 thousand as 10 hundreds. Write a 6 in the hundreds place next to the remaining thousands. Now you have 16 hundreds. Divide 16 hundreds into 3 groups. Each group will get 5 hundreds with 1 hundred remaining. Write the digit 5 in the hundreds place in the quotient.
- Of the 16 hundreds, 15 were divided equally into groups ($5 \times 3 = 15$). Write the 15 below 16 and find the difference, which is the number of hundreds that still needs to be divided. Regroup the remaining 1 hundred as 10 tens. Write the 4 tens next to the remaining hundred. There are now 14 tens.
- 14 tens divided into 3 equal groups is 4 tens in each group with 2 tens remaining. Write the digit 4 in the tens place in the quotient. Of the 14 tens, 12 were divided ($4 \times 3 = 12$). Write the 12 below the 14 to find that there are 2 tens remaining. Regroup the remaining 2 tens as 20 ones. There are now 22 ones.

	T	H	T	O
	1	5	4	7
3)	4	6	4	2
	3			
	1	6		
	1	5		
		1	4	
		1	2	
			2	2
			2	1
				1

- Divide 22 ones into 3 equal groups. Each group will receive 7 ones with 1 one remaining. Write the digit 7 in the quotient. Of the 22 ones, 21 were divided equally ($7 \times 3 = 21$). Write 21 below 22 and subtract to find the difference, which is the ones that will not be divided further at this point. $4,642 \div 3$ is 1,547 R. 1. We can check our answer using multiplication: $3 \times 1547 + 1 = 4,642$

Using Division in Bar Models

Part-Whole models:

This type of bar model extends the understanding of multiplicative relationships to division. Each part is an equally sized group and is considered a “unit.”

Example problem:

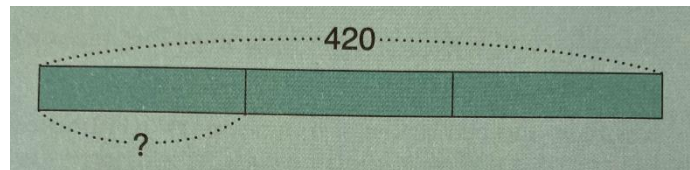
3 identical smart speakers cost \$420 altogether.

How much does each smart speaker cost?

3 units \rightarrow \$420

1 unit \rightarrow $\$420 \div 3 = \140

Each speaker costs \$140.



Comparison models:

This type of bar model allows students to compare quantities. They are particularly useful in representing multi-step problems.

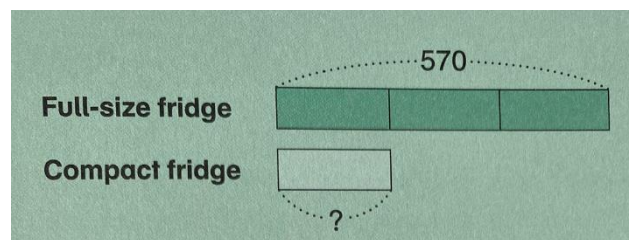
Example problem:

A full-size fridge cost \$570. It costs 3 times as much as a compact fridge. How much does the compact fridge cost?

3 units \rightarrow \$570

1 unit \rightarrow $\$570 \div 3 = \190

The compact fridge costs \$190.



What can we do at home?

Automatic recall of multiplication facts is critical for fluency in division of 2, 3, and 4 digit numbers. At this point in fourth grade your child should have mastered all multiplication and division facts up to 12×12 . Multiplication War is a fun way to continue practice multiplication facts.

Multiplication War

Multiplication Facts

Materials: Regular Deck of Playing Cards (remove Kings, use Jacks as 11 and Queens as 12)

Directions:

- Play with two players.
- The object of the game is to get all the cards from your opponent.
- Deal all the cards between the two players.
- At the same time, each player turns one card over in front of them.
- The players multiply the two cards and say the product out loud.
- The first player to say the product of the two cards keeps both cards.

- The first player to get all their opponents cards wins the game.

Directions and a video of other variations of this game are located on the TCA website.

<https://www.tcatitans.org/Domain/200> Be sure to scroll down to the Multiplication and Divisions folder.