4th Grade Math

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The New Math

The math curriculum has changed from what it used to be and may seem a bit harder to understand. Our math curriculum is designed to get students to think outside the box and learn how to solve problems using a variety of methods. Many of the methods may seem crazy to you at first, however they are beneficial in that they help students to be able to do the math mentally. Students will learn how to use their knowledge of place value and basic multiplication and division facts to solve much harder equations. Through the methods they will learn various ways to solve problems. Only after they have demonstrated that they understand each method, they can choose to use the method they like best. Please allow your child to use these new methods and skills in solving problems, even if they seem new or confusing to you.

Let your child be a Teacher

Please give your child the opportunity to be a teacher and teach you what he or she is learning. Be open minded to learning a new method of solving problems, and encourage your child to teach you what he or she is learning. Teaching is the best way to solidify what your child has learned and will help your child retain this information much more than just practicing the skill. One of the best days this year was when a student announced to the class "My dad finally gets it!". This student was so proud and excited because he had been trying to explain to his father what he was learning. Give your child this kind of opportunity, let them get excited about teaching their parents a new skill. Challenge them to do their best and pay attention in class, so that they can teach you what they learned that day. If you're excited to learn from them, they will be excited to teach you and will be more engaged in learning.

Chapter 4 Vocabulary

Compatible Numbers - Numbers that are easy to compute mentally.

Multiple - a number that is a product of a given number and a counting number

Quotient - the answer to a division problem.

Dividend - the number that is divided in a division problem

Divisor - the number that divides the dividend.

Remainder - A part, number, or quantity left over.

$$24 \div 4 = 6$$

Dividend   Divisor   Quotient

4.1 Estimate Quotients Using Multiples

Students use the relationship between multiplication and division to estimate quotients. This method is helpful when students divide by 1-digit divisors. Estimation helps students check that their answers are reasonable.

Find two numbers the quotient of 142 ÷ 5 is between. Then estimate the quotient.

You can use multiples to estimate. A **multiple** of a number is the product of a number and a counting number.

Step 1 Think: What number multiplied by 5 is about 142? Since 142 is greater than 10 × 5, or 50, use counting numbers 10, 20, 30, and so on to find multiples of 5.

Step 2 Multiply 5 by multiples of 10 and make a table.

Counting Number	10	20	30	40
Multiple of 5	50	100	150	200

Step 3 Use the table to find multiples of 5 closest to 142.

$20 \times 5 = \underline{100}$

$30 \times 5 = \underline{150}$

← 142 is between $\underline{100}$ and $\underline{150}$.

142 is closest to $\underline{150}$, so 142 ÷ 5 is about $\underline{30}$.

4.2 Investigate Remainders

Students solve division problems by drawing pictures or using beans and cups to physically divide numbers. This helps students understand what it means to actually divide numbers equally.

$7 \div 2 = 3\ R\ 1$
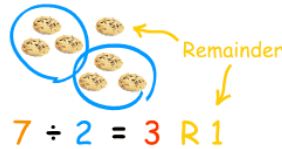
Divide. Draw a quick picture to help.

$7\overline{)66}$

• Use 66 counters to represent the dividend, 66.

• Since you are dividing 66 by 7, draw 7 circles. Divide 66 counters into 7 equal-sized groups.

• There are 9 counters in each circle, so the quotient is 9. There are 3 counters left over, so the remainder is 3.

$$\overset{9\ r3}{7\overline{)66}}$$

4.3 Interpret the Remainder

In the real world the answer to division problems are not always as simple as finding the quotient and the remainder. Depending on the situation or the question being asked the results may be different: (1) The quotient and the remainder may need to be written as a fraction; (2) the remainder may not be necessary; (3) you might have to add one to the quotient; or (4) you might only need the remainder.

$$19 \div 5 = 3\ R\ 4 = 3\tfrac{4}{5}$$

Remainder

Way 1: Write the remainder as a fraction.
Callie has a board that is 60 inches long. She wants to cut 8 shelves of equal length from the board and use the entire board. How long will each shelf be?

Divide. 60 ÷ 8 $\underline{7\ r4}$

The remainder, 4 inches, can be divided into 8 equal parts.

$\dfrac{4}{8}$ ← remainder
      ← divisor

Write the remainder as a fraction.

Each shelf will be $\underline{7\tfrac{4}{8}}$ inches long.

Way 2: Drop the remainder.
Callie has 60 beads. She wants to make 8 identical bracelets and use as many beads as possible on each bracelet. How many beads will be on each bracelet?

Divide. 60 ÷ 8 $\underline{7\ r4}$

The remainder is the number of beads left over. Those beads will not be used. Drop the remainder.

Callie will use $\underline{7}$ beads on each bracelet

Way 3: Add 1 to the quotient.
Callie has 60 beads. She wants to put 8 beads in each container. How many containers will she need?

Divide. 60 ÷ 8 $\underline{7\ r4}$

The answer shows that Callie can fill 7 containers but will have 4 beads left over. She will need 1 more container for the 4 leftover beads. Add 1 to the quotient.

Callie will need $\underline{8}$ containers.

Way 4: Use only the remainder.
Callie has 60 stickers. She wants to give an equal number of stickers to 8 friends. She will give the leftover stickers to her sister. How many stickers will Callie give to her sister?

Divide. 60 ÷ 8 $\underline{7\ r4}$

The remainder is the number of stickers left over. Use the remainder as the answer.

Callie will give her sister $\underline{4}$ stickers.

4.4 Divide Tens, Hundreds, and Thousands

Students use their understanding of place value and basic facts to solve division problems.

$2,800 \div 7 = \underline{\hspace{2cm}}$

$7 \times \underline{4} = \underline{28}$

$\underline{28}00 \div 7 = \underline{4}00$

Divide. $240 \div 3$ **Use place value.**

Step 1 Identify the basic fact to use.

Use $\underline{24 \div 3}$.

Step 2 Use place value to rewrite 240 as tens.

$240 = \underline{24}$ tens

Step 3 Divide.

24 tens $\div$ 3 = $\underline{8}$ tens
$= \underline{80}$

Write the answer.

$240 \div 3 = \underline{80}$

4.5 Estimate Quotients Using Compatible Numbers

Estimate. $6\overline{)216}$

Step 1 Think of these multiples of 6:

6   12   18   24   30   36   42   48   54

Find multiples that are close to the first 2 digits of the dividend. $\underline{18}$ tens and $\underline{24}$ tens are both close to $\underline{21}$ tens. You can use either or both numbers to estimate the quotient.

Step 2 Estimate using compatible numbers.

$216 \div 6$ $216 \div 6$
$\downarrow$ $\downarrow$
$180 \div 6 = 30$ $240 \div 6 = 40$

So, $216 \div 6$ is between $\underline{30}$ and $\underline{40}$.

Step 3 Decide whether the estimate is closer to 30 or 40.

$216 - 180 = 36$ $240 - 216 = 24$

216 is closer to 240, so use $\underline{40}$ as the estimate.

Compatible Numbers are numbers that are easy to compute mentally. One compatible number divides evenly into the other.

Once again we use basic multiplication and division facts to estimate quotients. It is essential that students know their basic multiplication facts and their inverse division facts ($6 \times 3 = 18$, $18 \div 6 = 3$). Using these basic facts and what we have learned about place value, estimating quotients becomes much easier.

4.6 Division and the Distributive Property

By using the distributive property students can break larger numbers into numbers that are easier to divide. This skill can become a valuable tool in solving problems mentally.

$232 \div 4 = \underline{\hspace{2cm}}$

What can add up to total 232 that is easily divisible by 4?

$(200 + 32) \div 4 = (\underline{200} \div 4) + (32 \div 4)$

$\underline{200} \div \underline{4} = \underline{50}$ $\underline{32} \div 4 = 8$

$232 \div 4 = 58$

Divide. $78 \div 6$

Use the Distributive Property and quick pictures to break apart numbers to make them easier to divide.
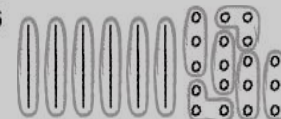
Step 1 Draw a quick picture to show 78.

Step 2 Think about how to break apart 78. You know 6 tens $\div$ 6 = 10, so use $78 = 60 + 18$. Draw a quick picture to show 6 tens and 18 ones.

Step 3 Draw circles to show 6 tens $\div$ 6 and 18 ones $\div$ 6. Your drawing shows the use of the Distributive Property.
$78 \div 6 = \underline{(60 \div 6)} + \underline{(18 \div 6)}$

Step 4 Add the quotients to find $78 \div 6$.

$78 \div 6 = (60 \div 6) + (18 \div 6)$
$= \underline{10} + \underline{3}$
$= \underline{13}$

4.7 Divide Using Repeated Subtraction

Repeated subtraction is subtracting the divisor over and over again until the dividend is less than the divisor. This method is yet another skill that students can add to their division toolbox.

You can use repeated subtraction to divide. Use repeated subtraction to solve the problem.

Nestor has 27 shells to make bracelets. He needs 4 shells for each bracelet. How many bracelets can he make?

Divide. $27 \div 4$

Write $4\overline{)27}$.

Step 1

Subtract the divisor until the remainder is less than the divisor. Record a 1 each time you subtract.

$$\begin{array}{r} 4\overline{)27} \\ -4 \\ \hline 23 \\ -4 \\ \hline 19 \\ -4 \\ \hline 15 \\ -4 \\ \hline 11 \\ -4 \\ \hline 7 \\ -4 \\ \hline 3 \end{array}$$

Step 2

Count the number of times you subtracted the divisor, 4.

4 is subtracted six times with 3 left.

So, Nestor can make 6 bracelets. He will have 3 shells left.
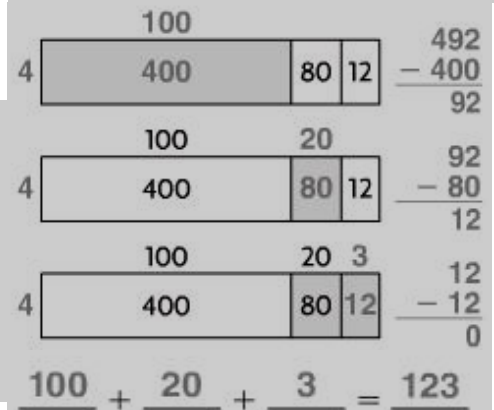
$27 \div 4$

$\underline{6\ r3}$

4.8 Divide Using Partial Quotients

Partial quotients is one of the best ways to solve division problems, especially if you do not know all of your multiplication facts. With this method students can use whichever multiple of the divisor they are comfortable with as long as it is less than the dividend. Then they subtract the multiple they chose from the dividend, and repeat until the remainder is zero or less than the divisor.

Divide. $492 \div 4$

Step 1 Subtract greater multiples of the divisor. Repeat if needed.

Step 2 Subtract lesser multiples of the divisor. Repeat until the remaining number is less than the divisor.

Step 3 Add the partial quotients.

$$\begin{array}{r} 4\overline{)492} \\ -400 \\ \hline 92 \\ -80 \\ \hline 12 \\ -12 \\ \hline 0 \end{array}$$

Partial quotients

$100 \times 4 \quad 100$
$20 \times 4 \quad 20$
$3 \times 4 \quad +3$
$\overline{\qquad 123}$

Use rectangular models to record partial quotients.

100		
4	400	80 | 12

$$\begin{array}{r} 492 \\ -400 \\ \hline 92 \end{array}$$

100	20	
4	400	80 | 12

$$\begin{array}{r} 92 \\ -80 \\ \hline 12 \end{array}$$

100	20 3	
4	400	80 | 12

$$\begin{array}{r} 12 \\ -12 \\ \hline 0 \end{array}$$

$\underline{100} + \underline{20} + \underline{3} = \underline{123}$

4.9 Model Division with Regrouping

Models help students to visualize what they are doing when they solve division problems. Base-ten models can help build a student's mastery of division facts and form a foundation for understanding the concept of division.
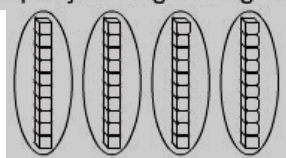
HUNDRED | TENS | ONES
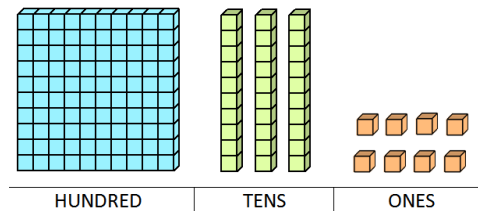
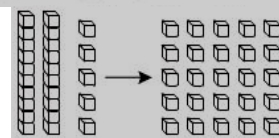**Use base-ten blocks to find the quotient $65 \div 4$.**

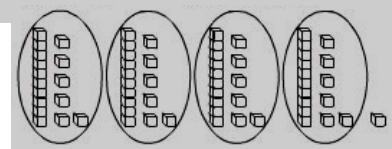**Step 1** Show 65 with base-ten blocks.
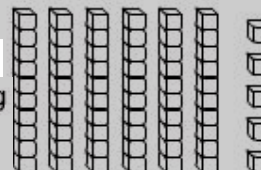
Step 2 Draw 4 circles to represent dividing 65 into 4 equal groups. Share the tens equally among the 4 groups.

Step 3 Regroup leftover tens as ones.

Step 4 Share the ones equally among the 4 groups.

There are __1__ ten(s) and __6__ one(s) in each group with __1__ left over.

So, the quotient is __16 r1__.

4.10 Place the First Digit & 4.11 Divide by 1-Digit Numbers

Finally, the standard algorithm in which many adults prefer to use, mostly because it was one of the only ways they were taught.

Step 1   Divide. 763 ÷ 3 = ■

$$2$$
$$3\overline{)763}$$ ← Divide 7 hundreds by 3.
$$-6$$ ← Multiply. 3 × 2 hundreds
$$1$$ ← Subtract.

Step 2 Bring down the tens digit. Then divide the tens.

$$2$$
$$3\overline{)763}$$
$$-6\downarrow$$
$$16$$ ← Bring down the 6.

$$25$$ ← Divide 16 tens by 3.
$$3\overline{)763}$$
$$-6$$
$$16$$
$$-15$$ ← Multiply. 3 × 5 tens
$$1$$ ← Subtract.

Step 3 Bring down the ones digit. Then divide the ones.

$$25$$
$$3\overline{)763}$$
$$-6$$
$$16$$
$$-15\downarrow$$

$$254$$ ← Divide 13 ones by 3.
$$3\overline{)763}$$
$$-6$$
$$16$$
$$-15$$
$$13$$
$$-12$$ ← Multiply. 3 × 4 ones
$$1$$ ← Subtract.

13 ← Bring down the 3.

quotient → 5
divisor → 3$\overline{)16}$
dividend ↗ 15
remainder → 1

Step 4 Check to make sure that the remainder is less than the divisor. Write the answer.

$$254 \text{ r}1 \qquad 1 < 3$$
$$3\overline{)763}$$

4.12 Multistep Division Problems

Problem situations usually involve lots of information and more than one operation to solve. When students draw bar models or pictures to visualize the problem it makes the problem easier to solve.

Steps for Solving Multistep Problems

♦ Read the question.
♦ Use a pencil to circle the information needed.
♦ Use a pencil to underline what the question is asking for.
♦ Create a plan to find the answer.
♦ Solve the problem.
♦ Reread the question to make sure you answered the question completely.

There are 72 third graders and 84 fourth graders going on a field trip. An equal number of students will ride on each of 4 buses. How many students will ride on each bus?

Read the Problem	Solve the Problem
What do I need to find? I need to find the number of <u>students</u> who will ride on each bus.	I can model the number of students in all using a bar diagram. | 72 | 84 | 156
What information do I need to use? There are __72__ third graders and __84__ fourth graders. There will be __4__ buses.	I can model the number of buses and divide to find the number of students on each bus.
How will I use the information? I will make a bar diagram for each step. I will add _72 and 84_ to find the total number of students. I will divide by __4__ to find how many students will ride on each bus.	| 39 | 39 | 39 | 39 | 156 So, __39__ students will ride on each bus.

More resources can be found on our classroom website

www.TwinPeaks4-5Grades.weebly.com