

"Just a darn minutel — Yesterday you said that X equals **two**!"

3-5 Math Curriculum Presented by Beth Finkelstein, Mathematics Professional Developer (K-5) October 17, 2022 Thank you to Dr. Tom Callahan, Director of Math and Sciences K-12 Our goal is not for students to just memorize number facts and procedures, rather, we want our students to have a strong number sense. We want them to understand the mathematics and to learn about the "how?" and "why?" of solving problems.



Mathematics Framework (Ministry of Education since 1990)

Concrete Pictorial Abstract (CPA)

<u>2-5</u>

213 x 4



Try this problem:

259 + 37



Adding by Place Value 200 50 + 30 =80 9 + 7 = 16 200 + 80 + 16 = 296 <u>Compensation</u> (making friendly numbers) 259 + 1= 260 260 + 37 = 297 297 - 1 = 296

<u>Incremental Adding</u> 259 + 30 = 289 289 + 7 =296



What does math look like during the class lesson?

What does math look like to practice in the Student Edition?





What does math look like in the classroom today?



What does math look like in the classroom today?





Adding and Subtracting Using Place Value Strategies

3,529 + 2,615



Concrete: Building with Base Ten Blocks Concrete: Building with Place Value Chips

Expanded Form

Adding and Subtracting Using Place Value Strategies

3,529 + 2,615

$$3,000+500+20+9$$

$$2,000+600+10+5$$

$$5,000+1,100+30+14=6,144$$

Expanded Form



Partial Sums Algorithm (End of 4th Grade Standard)

Adding and Subtracting with Regrouping

3,529 + 2,615



3,529 + 2,615= 6,144

Standard US Algorithm

Concrete: Building with Base Ten Blocks (Gr. 3-4) or Place Value Chips (Gr. 4-5)

Try this problem:

8 x 28

8 x 28

Multiplying by Place Value 8 x 20 = 160 8 x 8 = 64 160 + 64 = 224

Using Known Facts

(decomposing numbers) 8 x 25 = 200 8 x 3 = 24

200 + 24 = 224

Compensation (making friendly numbers) $8 \times 30 = 240$ $240 - (8 \times 2) = 224$

Standard Algorithm (sky writing)



Models for learning multiplication facts: 3 x 4

Array Model

Area Model



3 x 4









Distributive Property

Commutative Property

Goal: To build an understanding of what happens when we multiply.

Let's explore: 213 x 4

213 x 4

Place Value Chips



Repeated Addition



Base Ten Blocks

Place Value Break each part down by place value and multiply each part. Then add the parts.



$$\frac{213 \times 4}{3 \times 4} = 12$$

10 x 4 = 40
200 x 4=800
852

$$\begin{array}{r}
213 \\
\underline{X \ 4} \\
12 \ -3 \ x \ 4 \\
40 \ -10 \ x \ 4 \\
\underline{800} \ -200 \ x \ 4 \\
852
\end{array}$$

Partial Products

Multiply with Regrouping with a Standard Algorithm (End of 5th Grade Standard)



Step 1: Multiply the ones by 4. 3 ones x 4 = 12 ones = 1 ten 2 ones

Step 2: Multiply the tens by 4. 1 ten x 4 =4 tens 4 tens + 1 ten = 5 tens

Step 3: Multiply the hundreds by 4. 2 hundreds x 4 = 8 hundreds

Goal: To build an understanding of what happens when we divide.

Let's explore: 525 ÷ 3

Partial Quotients Algorithm 525 ÷ 3



Model division with Place Value Chips:

525 ÷ 3



Step 1

Divide the hundreds by 3.

5 hundreds \div 3 = 1 hundred with 2 hundreds left over



Hundreds	Tens	Ones
	$\bullet \bullet \bullet \bullet$	$\circ \circ \circ \circ \circ$
•		
	$\bullet \bullet \bullet \bullet$	

Regroup the hundreds. 2 hundreds = 20 tens

Add the tens. 20 tens + 2 tens = 22 tens

$$\begin{array}{r}
1 \\
3) 5 2 5 \\
\hline
3 0 0 \\
\hline
2 2 5
\end{array}$$



Step 2

Divide the tens by 3.

22 tens \div 3 = 7 tens with 1 ten left over

Regroup 1 ten =	th th	e tei) on	n. es			
Add the 10 ones	on 5 +	es. 5 o	nes	=	15	ones
	1	7				
3)	5	2	5			
_	3	0	0			
	2	2	5			
12	2	1	0			
		1	5			

Step 3 Divide the ones by 3. 15 ones \div 3 = 5 ones

	1	7	5
3)	5	2	5
	3	0	0
	2	2	5
	2	1	0
		1	5
		1	5
			0

Use the Standard Algorithm for Division



525 ÷ 3

Developing number sense is worked into problem solving.

Read the problem aloud without the numbers.

- Can you tell us what is happening in this story?
- What do we know about what is going on? What don't we know?
- What are we trying to figure out?
- Can you draw a picture to match the story?

Comparison Model: Multiplication and Division

A museum has carvings in its collection. It has more pieces of pottery than carvings. It has times as many paintings as pieces of pottery. How many paintings does the museum have?



Comparison Model: Multiplication and Division

A museum has 75 carvings in its collection. It has 10 more pieces of pottery than carvings. It has 3 times as many paintings as pieces of pottery. How many paintings does the museum have?



Developing Number Sense at Home

Play games: Card games, dice games, board games.

Wonder about numbers:

- "How many more would I need to get from 3 to 10?...from 58 to 100?...from 358 to 1000?"
- "How much bigger is 27 than 14?...327 than 214?" "How do you know?"

When your child is working on homework:

- Don't just tell them how to solve a problem, pose questions instead:. What is something you know about the problem? What do you notice about the numbers? Can you draw a model? Can you break the numbers up?
- Put in smaller numbers....then try with original numbers.

When working on story problems:

- First read the problem aloud without the numbers. Can you tell us what is happening in this story? What do we know about what is going on? What don't we know? What are we trying to figure out?
- Read the problem again with the numbers. Can you draw a picture of what is happening? Can you think of an equation to match your picture?

Convey your enthusiasm toward math..even when there is a struggle (even if you have to fake it). "Oooh...this is a good one! Let's think what we know about the problem. Let's think of a good tool to use? What should we start with?"

Graham Fletcher Progression Videos



How to scan the QR Code:

1. Open the camera app.

2. Select the rear-facing camera in Photo mode.

3. Center the QR code you want to scan on the screen and hold your phone steady for a couple of seconds.

4. Tap the notification that pops up to open the link. (You will need to be connected to the internet to do this.)

Additional Math Tools, Games, Online Practice, and Math Challenges

