Addition: Partial Sums

17,683
+ 3,254

7 → 3 ones + 4 ones = 7 ones
130 → 8 tens + 5 tens = 13 tens *or* 1 hundred and 3 tens
800 → 6 hundreds + 2 hundreds = 8 hundreds
10,000 → 7 thousands + 3 thousands = 10 thousands
+ 10,000 → 10 thousand + 0 thousands = 10 thousands
20,937

I can start by adding the ones place first or the thousands place first.

17,683
+ 3,254

10 thousand + 0 thousands = 10 thousands ← 10,000
7 thousands + 3 thousands = 10 thousands ← 10,000
6 hundreds + 2 hundreds = 8 hundreds ← 800
8 tens + 5 tens = 13 tens *or* 1 hundred and 3 tens ← 130
3 ones + 4 ones = 7 ones ← + 7
20,937

Addition: Standard Algorithm

then regroup 10 thousands into 1 ten-thousand → **1 1** ← *first, regroup 10 tens into 1 hundred*

17,683
+ 3,254
20,937

7 thousands + 3 thousands gives me 10 thousands or 1 ten-thousand

8 tens + 5 tens gives me 13 tens or 1 hundred and 3 tens

Addition: (Compensation)

1,348 + 527 =

If I take from one addend to give to the other addend, I can create an equivalent problem that is easier to solve.

1,348 + 2 **527** - 2
1,350 + 525 = **1,875**

1,348 + 2 = 1,350
+ 527 - 2 = 525
1,875

Subtraction: Making "Friendlier" Numbers

Instead of regrouping, I can adjust my equation and make friendlier numbers to subtract with.

779,000
- 23,584

779,000 - 23,584 =
-1 -1
778,999 - 23,583 = **755,416**

The difference between my new equation and my original equation is the same but now I don't need to regroup.

New "friendlier" equation
778,999
- 23,583
755,416

SO...

Original equation
779,000
- 23,584
755,416

Subtraction: Standard Algorithm

463,529 - 81,256 =

then regroup 1 hundred- thousand into 10 thousands → **3 16** **4 12** ← *first, regroup 1 hundred into 10 tens*

~~4~~~~6~~3,~~5~~~~2~~9
- 81,256
382,273

Multiplication: Doubling and Halving

18 x 45 =

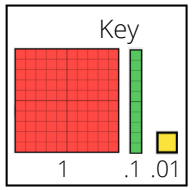
I can **double** one factor (45) and **halve** the other (18). My product is will be the same. This will make my problem easier to work with.

45	45	45	45	90
18	9	9	9	9
18 x 45	9 x 45	9 x 45	9 x 45	9 x 90 = 810
	9 x 45			

18 x 45 = 9 x 90

Multiplication (Decimals): Area Model

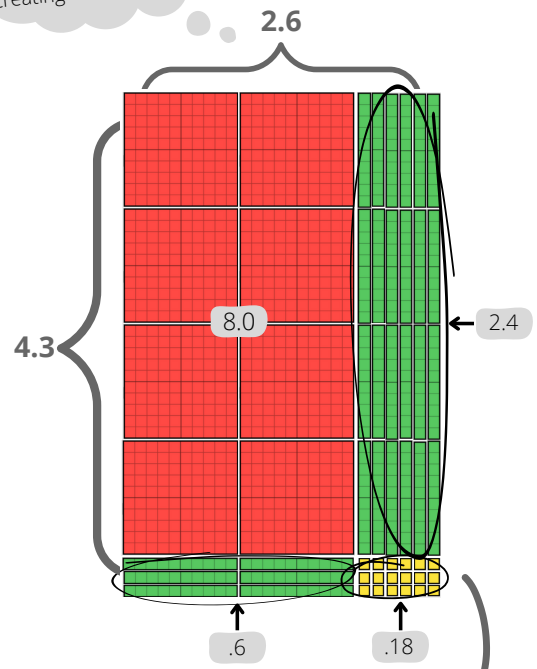
4.3 x 2.6 =



4	
1	4
0.1	0.4
0.5	2.0
0.6	2.4

A ratio table can help me find partial groups of 4.

I can think of this as 4.3 groups of 2.6 when creating an area model.



move to this model from manipulative model

	2	**+ .6**
4	(4 x 2) = 8	(4 x .6) = 2.4
+ .3	(.3 x 2) = .6	(.3 x .6) = .18

8 + 2.4 + .6 + .18 = **11.18**

Multiplication (Decimals): Distributive Property

4.3 x 2.6 =

4 .3 2 .6

(4 x 2) + (4 x .6) + (.3 x 2) + (.3 x .6) =

8 + 2.4 + .6 + .18 =

8 + 3 + .18 = **11.18**

4	
1	4
0.1	0.4
0.5	2.0
0.6	2.4

A ratio table helps me find partial groups of 4.

Multiplication (Decimals): Partial Products

4.3 x 2.6 =

4 .3 2 .6

4 + .3
x 2 + .6

(.6 x .3) = 0.18
(.6 x 4) = 2.40
(2 x .3) = 0.60
(2 x 4) = + 8.00
4.3 x 2.6 = 11.18

I notice that the order I choose to multiply doesn't matter since I will be adding the product of each smaller equation to find the product of the original equation.

Division: Expanded Notation

3624 ÷ 12 =

I can add the partial quotients together to find the final quotient.

```
   2
 300
12 | 3624
   - 3600
     24
   - 24
      0
```

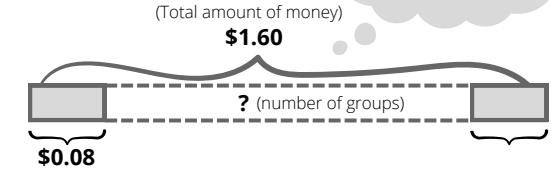
A ratio table helps me find identify groups of 12.

12	
1	12
2	24
10	120
20	240
30	360
300	3600

Division: (Decimals)

Haley has $1.60 with which to buy some ribbon. The ribbon is on sale for $0.08 per foot. How many feet of ribbon can Haley buy?

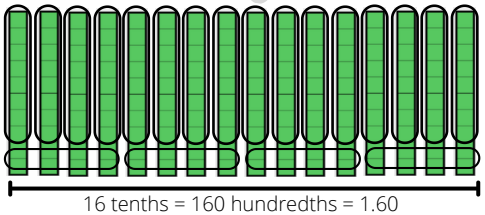
I can picture this using a bar model.



$1.60 ÷ $0.08 =

(Total amount of money) ÷ (size of one group) = (total number of groups)

I can "think multiplication". How many 8 hundredths (.08) are there in 160 hundredths (1.60) **OR** how many groups of .08 are there in 1.60.



Division: (Decimals): Scaling

I can scale my problem up or down to make a friendlier number and my quotient stays the same.

3.2 ÷ 0.4 =

$\frac{3.2}{0.4}$ **x 10** = $\frac{32}{4}$ = **8**
x 10

0.56 ÷ 0.08 =

$\frac{0.56}{0.08}$ **x 100** = $\frac{56}{8}$ = **7**
x 100

GILBERT PUBLIC SCHOOLS

Grade 5
Models and Strategies

- **Addition**
- **Subtraction**
- **Multiplication**
- **Division**

This brochure highlights some of the models and strategies used to develop computational fluency through a deep understanding of place value, number sense, and properties of operations.

By learning multiple strategies, students think flexibly, make connections, and choose the most effective and efficient strategy for problem solving.