Addition: Expanded Place Value

I can expand each number by its place value and then add.

```
   4,537
 + 2,942
```

```
   4,000 +  500 + 30 + 7
 + 2,000 +  900 + 40 + 2
```

6,000 + **1,400** + 70 + 9

regroup 10 hundreds into 1 thousand

7,000 + 400 + 70 + 9

7,479

Addition: Partial Sums

```
   4,537
 + 2,942
       9  →  7 ones + 2 ones = 9 ones
      70  →  3 tens + 4 tens = 7 tens
   1,400  →  5 hundreds + 9 hundreds = 14 hundreds or 1 thousand + 4 hundreds
 + 6,000  →  4 thousands + 2 thousands = 6 thousands
   7,479
```

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

```
                                                                         4,537
                                                                       + 2,942
4 thousands + 2 thousands = 6 thousands                          →       6,000
5 hundreds + 9 hundreds = 14 hundreds or 1 thousand + 4 hundreds →       1,400
3 tens + 4 tens = 7 tens                                         →          70
7 ones + 2 ones = 9 ones                                         →     +     9
                                                                         7,479
```

Addition: Standard Algorithm

regroup 10 hundreds into 1 thousand →

```
    1
   4,537
 + 2,942
   7,479
```

5 hundreds + 9 hundreds gives me 14 hundreds or 1 thousand + 4 hundreds

Subtraction: Expanded Place Value

```
   5,463
 - 2,815
```

I can regroup 1 thousand into 10 hundreds and add it to my hundreds place, giving me 14 hundreds to subtract from.

I can regroup 1 ten into 10 ones and add it to my ones place, giving me 13 ones to subtract from.

```
   4,000      1,400      50    13
   ~~5,000~~ +  ~~400~~ + ~~60~~ + 3
 - 2,000 +    800 + 10 + 5
   2,000 +    600 + 40 + 8
```

2,648

Subtraction: Making "Friendlier" Numbers

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

```
   5,000
 - 3,481
```

```
 5,000   -   3,481 =
    -1          -1
 4,999   -   3,480 = 1,519
```

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

New "friendlier" equation		Original equation
4,999		5,000
- 3,480	so...	- 3,481
1,519		**1,519**

Subtraction: Standard Algorithm

then regroup 1 thousand into 10 hundreds

first regroup 1 ten into 10 ones

```
   4  14 5 13
   ~~5,463~~
 - 2,815
   2,648
```

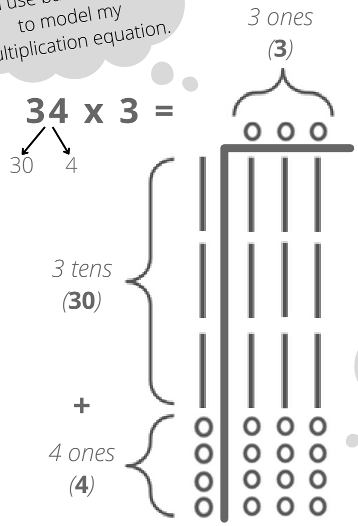
Multiplication: Base Ten

2-Digit by 1-Digit

I can use base ten blocks to model my multiplication equation.

34 x 3 =

30 4



When I multiply 3 tens by 3 ones I get 9 tens or **90**.

When I multiply 4 ones by 3 ones I get 12 ones or **12**.

```
(30 x 3) =   90
 (4 x 3) = + 12
            102
```

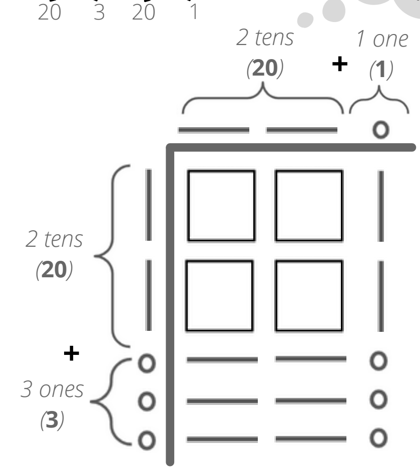
Multiplication: Array

2-Digit by 2-Digit

I can break apart each factor by its place value and then create an array to model my equation.

23 x 21=

20 3 20 1



To find my answer, I need to add up all the pieces that are in my multiplication array.

```
4 hundreds =   400
    8 tens =    80
    3 ones = +   3
 23 x 21 =     483
```

Multiplication: Area Model

23 x 21 =

20 3 20 1

	20	**+ 1**
20	20 x 20 = **400**	20 x 1 = **20**
+ 3	3 x 20 = **60**	3 x 1 = **3**

(20 + 3) x (20 + 1) =

Using the distributive property allows me rewrite my equation in smaller parts.

20 x 20 = 400
3 x 20 = 60
20 x 1 = 20
3 x 1 = + 3
23 x 21 = 483

Multiplication: Partial Products

23 x 21 =

20 3 20 1

20 + 3
x 20 + 1

(1 x 3) = 3
(1 x 20) = 20
(20 x 3) = 60
(20 x 20) = + 400
23 x 21 = 483

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.

Multiplication: Doubling and Halving

16 x 25 =

I can **double** one factor (25) and **halve** the other (16). My product is will be the same. This will make my problem easier to work with.

16 | 16 x 25 (25)

8 | 8 x 25
8 | 8 x 25 (25)

8 | 8 x 25 | 8 x 25 (25, 25)

8 | 8 x 50 = 400 (50)

16 x 25 = 8 x 50

Division: Equal Groups

150 ÷ 6 =

I can create 6 equal groups and share 150 equally among the groups.

10, 10, 5	10, 10, 5	10, 10, 5
10, 10, 5	10, 10, 5	10, 10, 5

150
- 60
90
- 60
30
- 30
0

I can subtract from my total to determine how much I have left to equally share.

Division: Partial Quotients

150 ÷ 6 =

I can break this up into smaller parts by looking at the multiples of 6.

6) 150
- 60 → 10
90
- 60 → + 10
30
- 30 → + 5 = 25
0

Division: Expanded Notation

150 ÷ 6 =

I can keep track of the equal groups of 6 above the problem and then add the total to find my final quotient.

5
20 = 25
6) 150
- 120
30
- 30
0

Division: Area Model

150 ÷ 6 =

	10	**+ 10**	**+ 5**
6	150 - 60 = 90	90 - 60 = 30	30 - 30 = 0

=

	25
6	150

GILBERT PUBLIC SCHOOLS

Grade 4
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.