

# KINDERGARTEN & FIRST-GRADE STRATEGIES

## Kindergarten Goals (according to IN state standards):

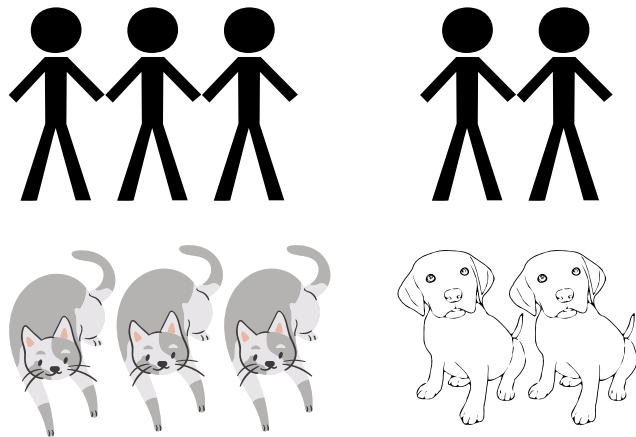
- Understanding numbers within 10.
- Count up to 20 using a line, array or circle.
- Counting to 100 by ones and by tens.
- Representing scenarios with objects, drawings, pictures, etc.
- Knowing what one more than and one less than a whole number is.

## Manipulatives to Use:

- Teddy Bear Counters
- Unifix Cubes
- Pictures
- Ten Frames
- Tiles
- People
- Pattern Blocks
- Tiles
- Bottle Caps
- Legos
- Mini Erasers
- Dominos

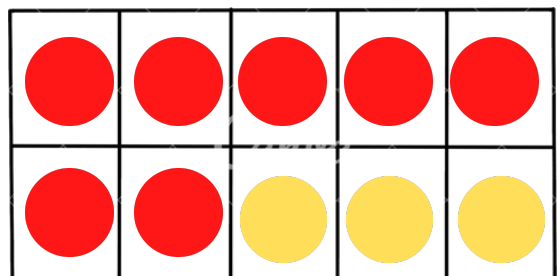
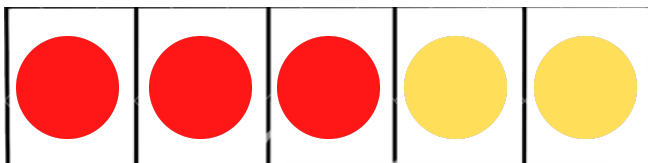
## Adding and Subtracting Strategy:

### Representing with Pictures

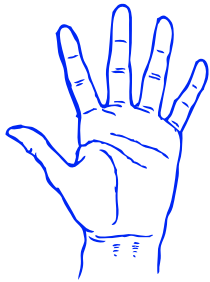


## Adding and Subtracting Strategy:

### Ten Frames [Make 5 or 10]



## Adding and Subtracting Strategy: Counting with Fingers



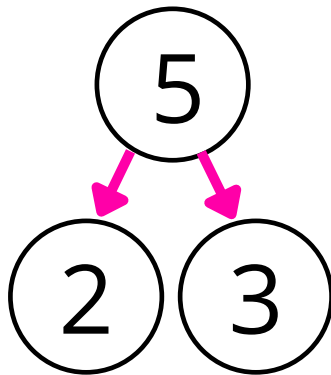
"Show me 3. Add 2 more. Now, how many do you have?"

"Show me 7. Take away 5. How many do you have left?"

"What is one more/less than 7?"



## Addition Strategy: Number Bonds

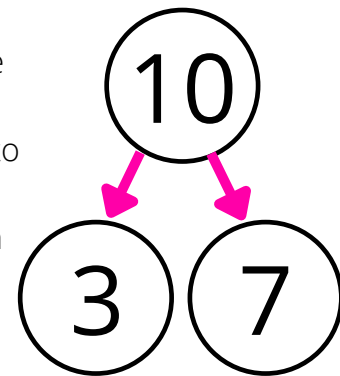


"What other number bonds can we make that equal 5?"

"What does  $3 + 4$  equal if you were to use a number bond?"

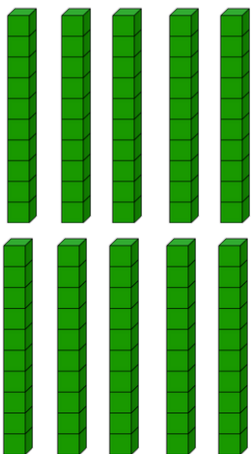
"Which two digits are you adding in this number bond?"

"Which is the sum in this number bond?"

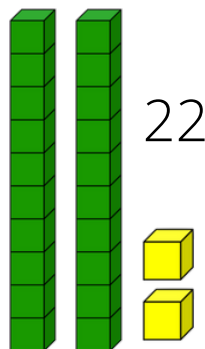


100

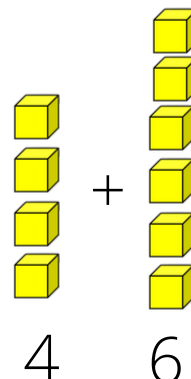
## Adding and Subtracting Strategy: Base Ten Blocks



Counting by 10s



Representing Numbers



4

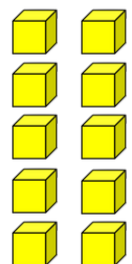
6

=



10

or



Addition within 10

## First-Grade Goals (according to IN state standards):

- Adding and subtracting fluently within 20.
- Adding and subtracting within 100, specifically two-digit plus one-digit.
- Counting to at least 120 by ones, fives, and tens.
- Comparing two-digit numbers using place value and  $<$ ,  $>$ , and  $=$  symbols.
- Solving real-world problems (measurement, coins, etc) and finding number patterns.
- Identify objects as 2D or 3D shapes and attributes of them.

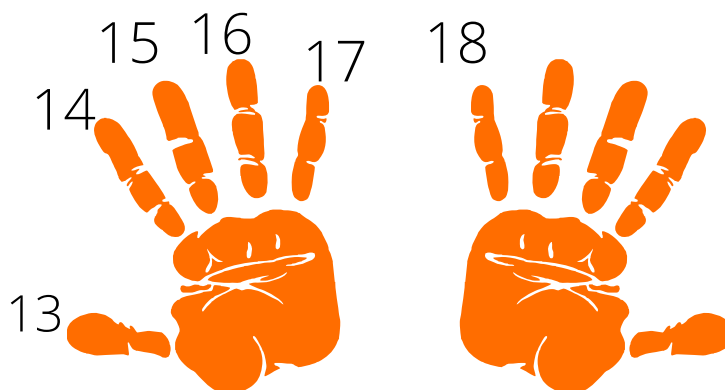
## Common Student Strategies:

- Using manipulatives such as unifix cubes, base ten blocks, etc.
- Number Line
- Tally marks
- Using hands to count
- Counting on from a number
- Making ten
- Using doubles

## Adding and Subtracting Strategy:

### Counting On

$$12 + 6 =$$

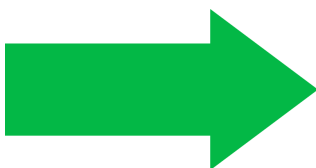


## Adding and Subtracting Strategy:

### Make 10

$$7 + 8 =$$
A diagram showing the number 7 being decomposed into 5 and 2. Two arrows point from the 7 down to the numbers 5 and 2.

First, 7 is decomposed into 5 and 2.



$$8 + 2 = 10$$

Next, 8 and 2 are used to make 10.

$$10 + 5 = 15$$

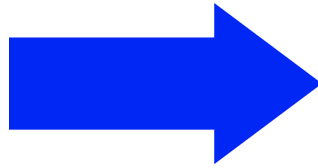
Last, the remaining 5 is added to get the sum.

## Adding and Subtracting Strategy:

### Doubles

$$\begin{array}{c} 9 + 8 = \\ \swarrow \searrow \\ 1 \quad 8 \end{array}$$

First, 9 is decomposed into 1 and 8.



$$8 + 8 = 16$$

Next, doubles are used to add part of the problem.

$$16 + 1 = 17$$

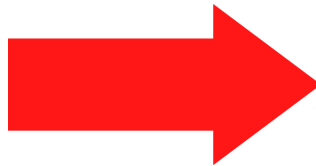
Last, the remaining 1 is added to get the sum.

## Adding and Subtracting Strategy:

### Using a Known Fact

$$\begin{array}{c} 9 + 4 = \\ \swarrow \searrow \\ 8 \quad 1 \end{array}$$

First, 9 is decomposed into 8 and 1.



$$8 + 4 = 12$$

Next, the student knows  $8+4$  is 12 so they use this to get part of the sum.

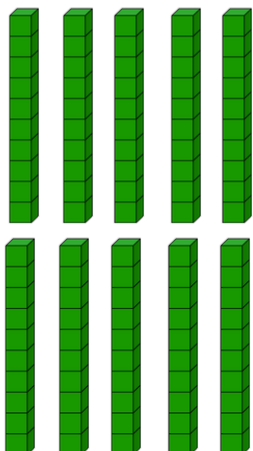
$$12 + 1 = 13$$

Last, the remaining 1 is added to get the sum..

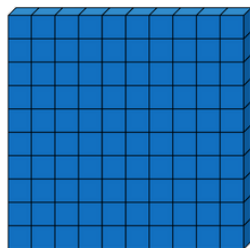
100

## Adding and Subtracting Strategy:

### Base Ten Blocks

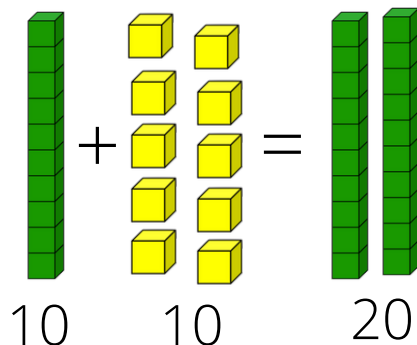


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Representing 100s

Adding within 20

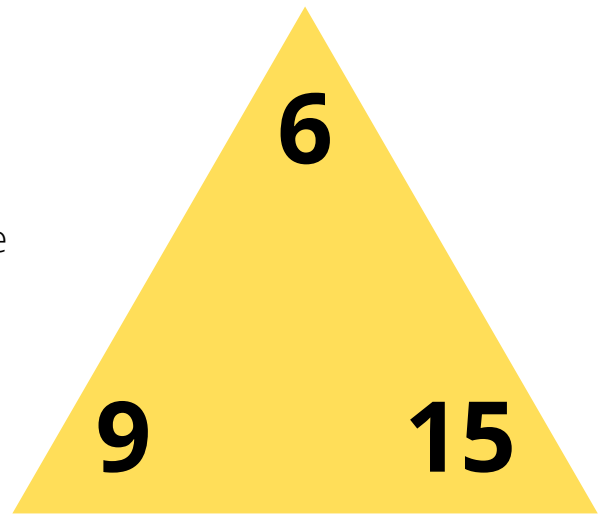


## Adding and Subtracting Strategy:

### Fact Families

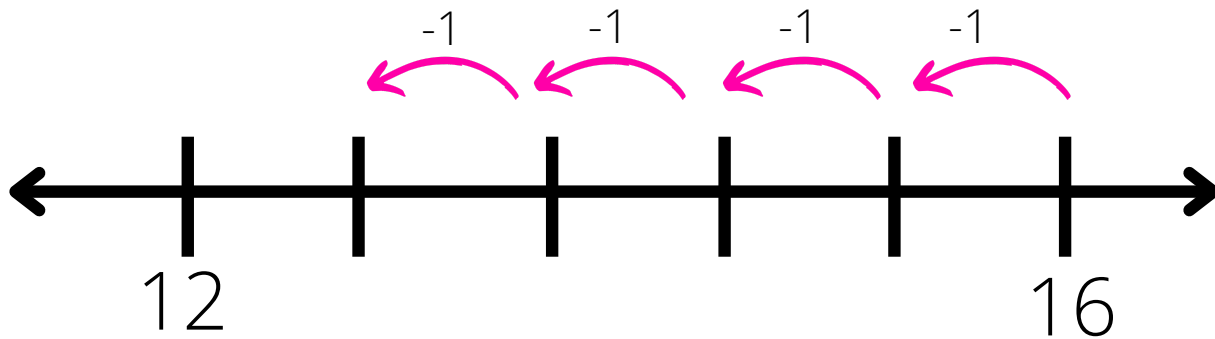
Cover up one number to complete the addition or subtraction problem within the fact family.

Students will become familiar with related numbers in fact families.



## Adding and Subtracting Strategy:

### Number Line



## Multiplying and Dividing Strategy:

### Skip Counting

10	20	30	40	50	60
3	6	9	12	15	18

# SECOND & THIRD GRADE STRATEGIES

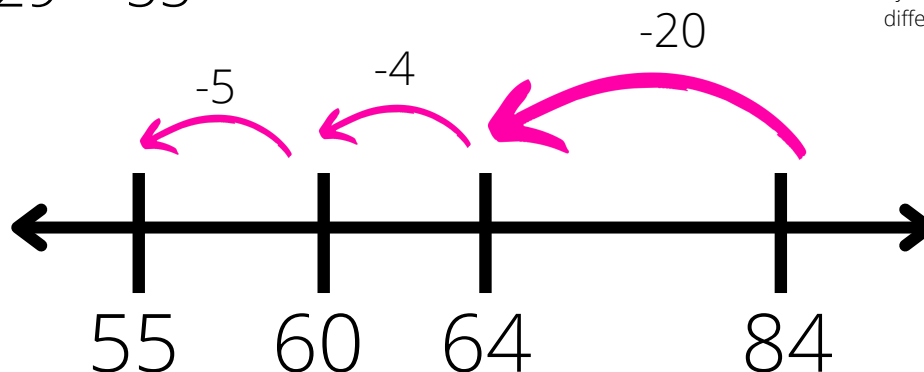
## Second-Grade Goals (according to IN state standards):

- Count by 1s, 5s, 10s, and 100s up to 1000.
- Understand place value up to the hundreds place.
- Add and subtract fluently within 100.
- Find the value of pennies, nickels, dimes, quarters and dollars.
- Continuing 1st grade strategies to work with larger numbers.

## Adding and Subtracting Strategy:

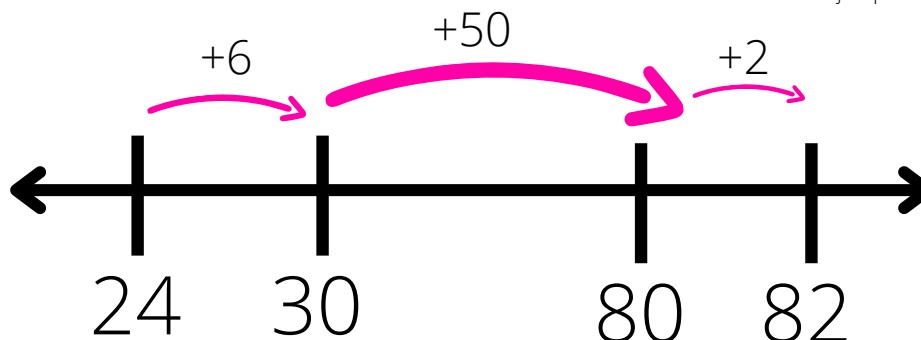
### Number Line

$$84 - 29 = 55$$



In this strategy, the first jump is the largest chunk of the number being subtracted. This is followed by smaller jumps to get to difference.

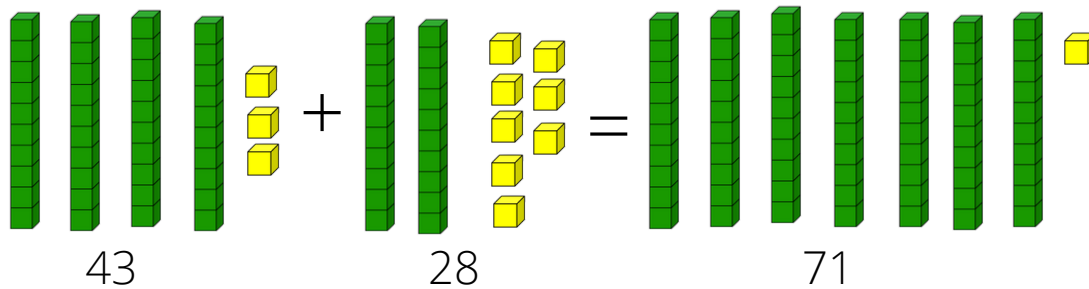
$$24 + 58 = 82$$



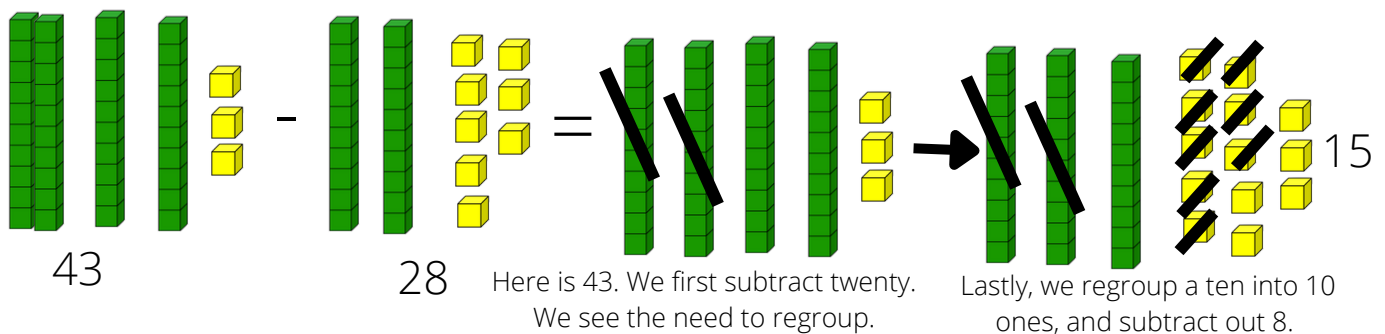
In this strategy, the first jump is small to get to a number that is a multiple of ten. This is followed by a large jump and then by smaller jumps to get to the sum.

## Adding and Subtracting Strategy: Base Ten Blocks

Adding within 100



Subtracting within 100



## Adding and Subtracting Strategy: Arrow Strategy

$$33 + 12 =$$

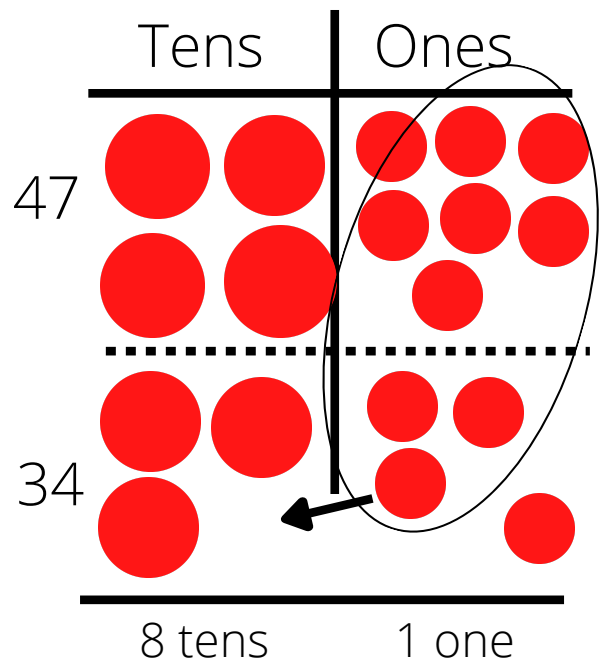
$$33 \xrightarrow{+10} 43 \xrightarrow{+2} 45$$

$$33 - 12 =$$

$$33 \xrightarrow{-10} 23 \xrightarrow{-2} 21$$

## Adding and Subtracting Strategy: Place Value Disks

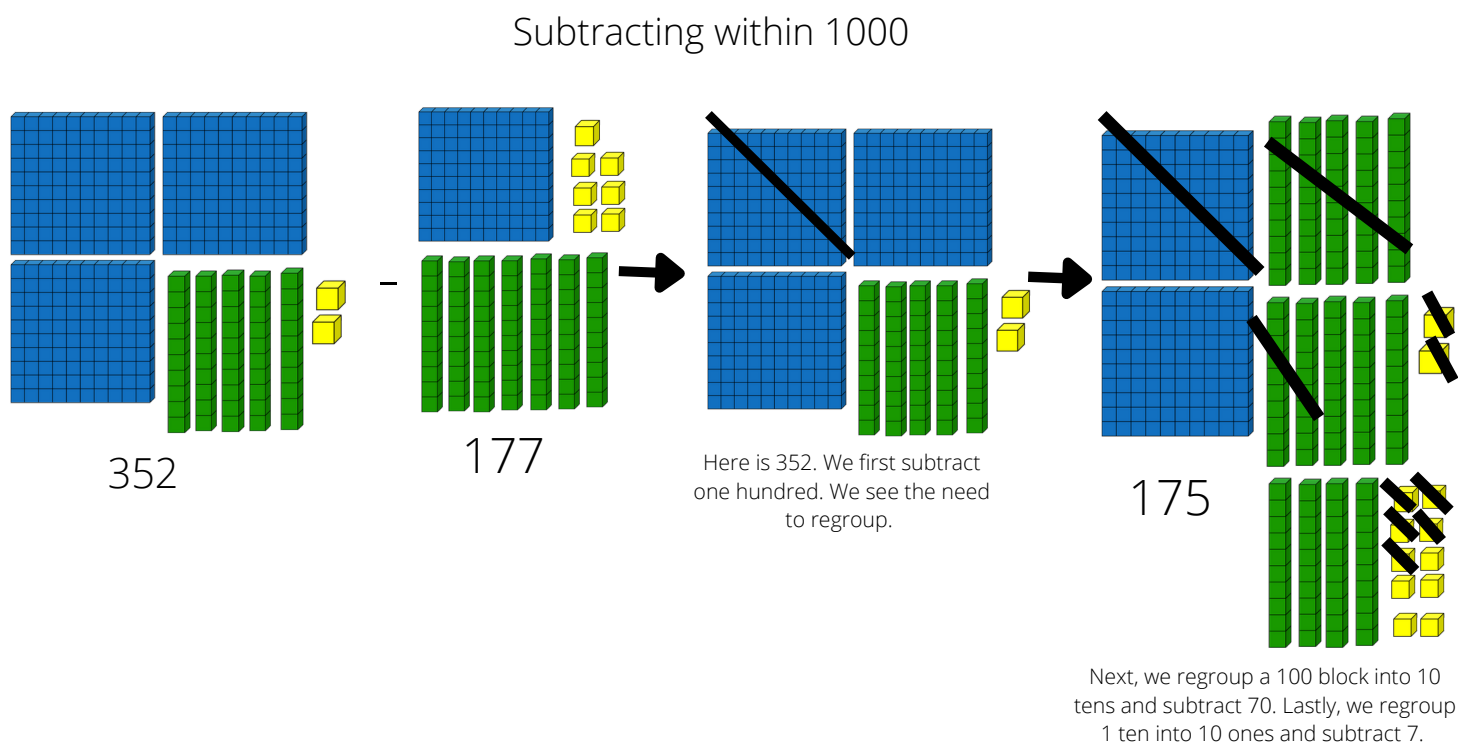
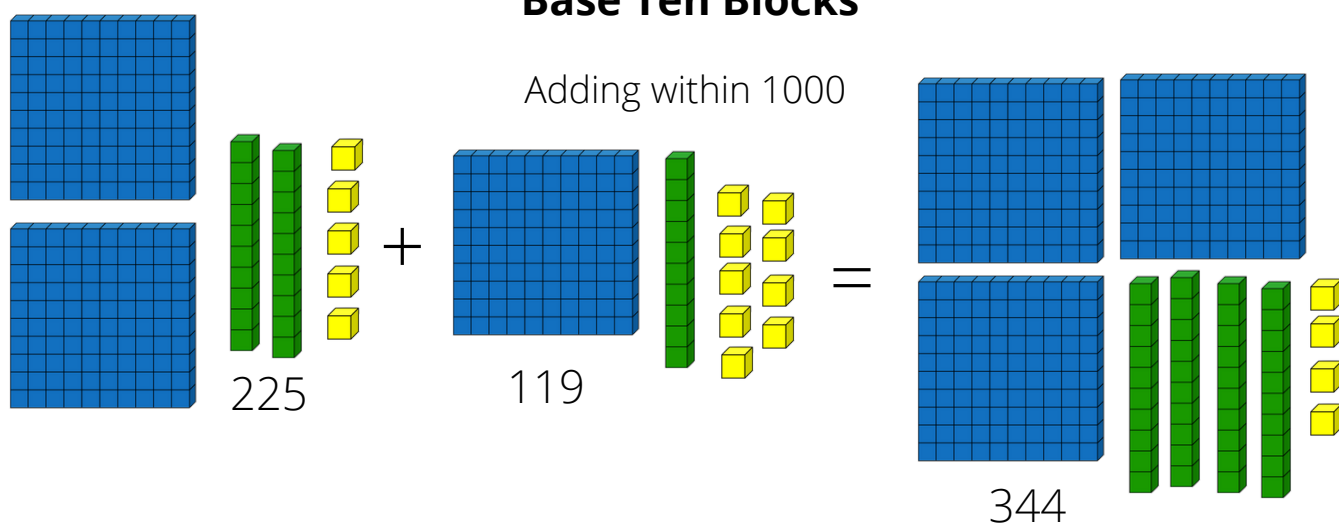
$$47 + 34 =$$



## Third-Grade Goals (according to IN state standards):

- Add and subtract within 1000.
- Multiply and divide numbers from 0 to 10.
- Understand fractions such as halves, thirds, fourths, sixths, and eighths.
- Round numbers to the correct place value.
- Find the area and perimeter of certain shapes.

### Adding and Subtracting Strategy: Base Ten Blocks

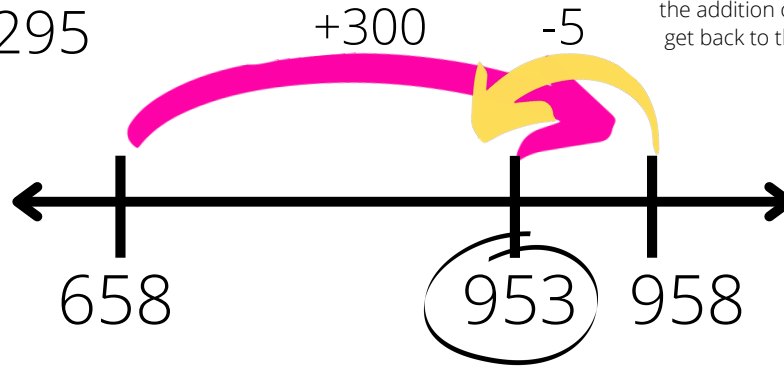




## Adding and Subtracting Strategy:

### Number Line

$$658 + 295$$



In this strategy, the first jump rounds the addition problem to the nearest hundred. After the addition of this, we must subtract five to get back to the original subtraction of 295.

## Adding and Subtracting Strategy: Pull Down Method

$$\begin{array}{r} 246 + 631 = 877 \\ \text{800 70 7} \end{array}$$

$$\begin{array}{r} 813 - 542 = 271 \\ \text{300 -30 1} \end{array}$$

Make sure students know you CAN subtract 10 from 40. It just gives you a negative difference!

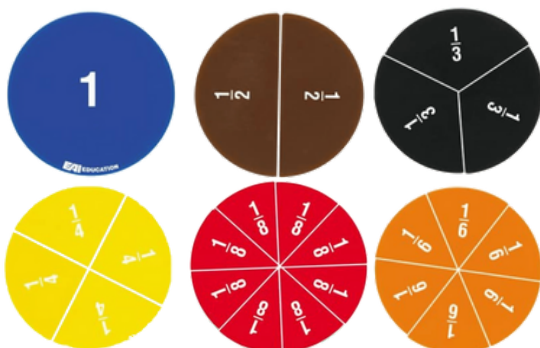
## Adding and Subtracting Strategy: Partial Sums and Differences

$$\begin{array}{r} 246 \\ + 631 \\ \hline 800 \\ + 70 \\ \hline 7 \\ \hline 877 \end{array}$$

$$\begin{array}{r} 813 \\ - 542 \\ \hline 300 \\ + -30 \\ \hline 1 \\ \hline 271 \end{array}$$

This strategy sets up the problem like the traditional algorithm but focuses on adding or subtracting each place value. Students do not need to learn the traditional algorithm until 4th grade.

## Fraction Strategy: Using Visuals



## Multiplying and Dividing Strategy:

### Half Then Double

$$\begin{array}{l} 6 \times 5 = 3 \times 5 = 15 \\ 3 \times 5 = 15 \end{array}$$

First, break one of the numbers in half.  
Then double the product.

$$15 + 15 = 30$$

### Multiplying and Dividing Strategy:

#### Partial Products

$$\begin{array}{r} 7 \times 5 = 4 \times 5 = 20 \\ \swarrow \searrow \\ 4 \quad 3 \\ 3 \times 5 = 15 \end{array}$$

First, decompose one of the number.  
Then, use known facts to multiply.  
Add the two products together.

$$20 + 15 = 35$$

### Multiplying and Dividing Strategy:

#### Inverse Thinking

$$? \times 8 = 56$$

How many groups of 8 make 56?  
56 divided by 8 leaves me how many groups?

$$56 / 8 = ?$$

How many groups of 8 are in 56?  
What multiplied by 8 equals 56?

### Multiplying and Dividing Strategy:

#### Skip Counting and Repeated Addition or Subtraction

$$7 \times 5$$

7 groups of 5

**Skip Count Forward:**  
5, 10, 15, 20, 25, 30, 35

**Repeated Addition**  
 $5 + 5 = 10$ ,  $10 + 5 = 15$ ,  $15 + 5 = 20$   
 $20 + 5 = 25$ ,  $25 + 5 = 30$ ,  $30 + 5 = 35$

$$35 / 5$$

35 divided into 7 groups

**Skip Count Backward:**  
35, 30, 25, 20, 15, 10, 5, 0

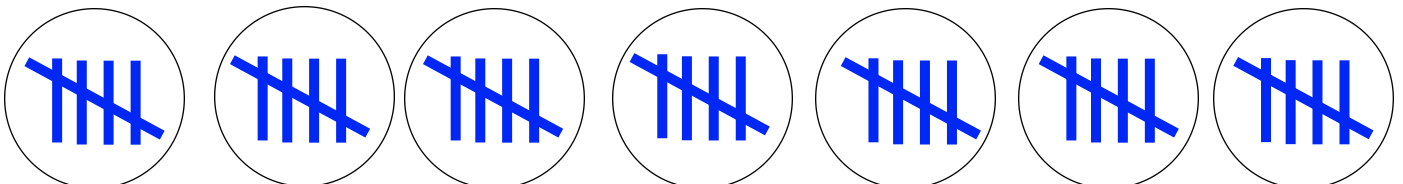
**Repeated Subtraction**  
 $35 - 5 = 30$ ,  $30 - 5 = 25$ ,  $25 - 5 = 20$   
 $20 - 5 = 15$ ,  $15 - 5 = 10$ ,  
 $10 - 5 = 5$ ,  $5 - 5 = 0$

$$7 \times 5 =$$

### Multiplying and Dividing Strategy:

#### Tally Marks

$$35 / 7 =$$

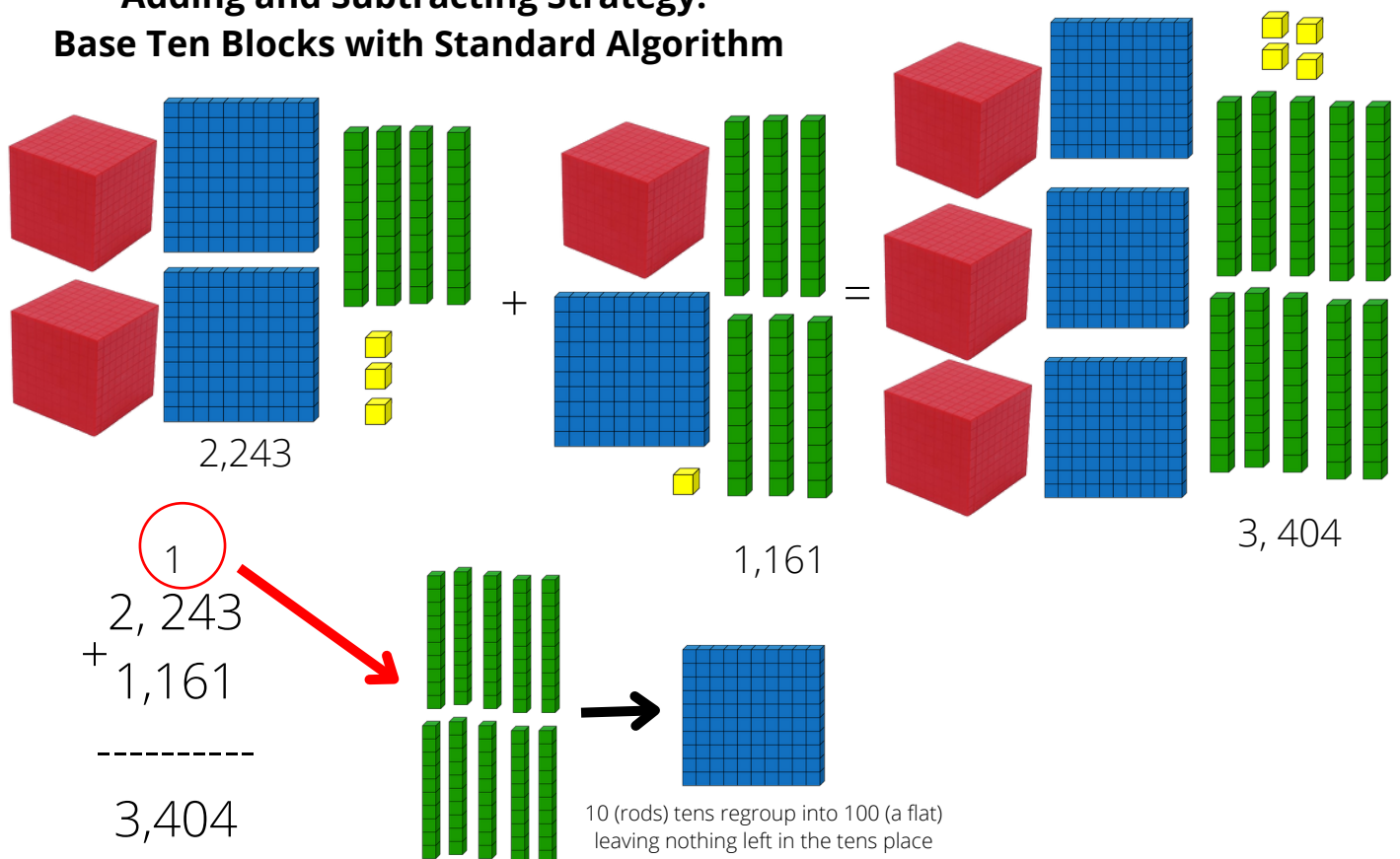


# FOURTH & FIFTH GRADE STRATEGIES

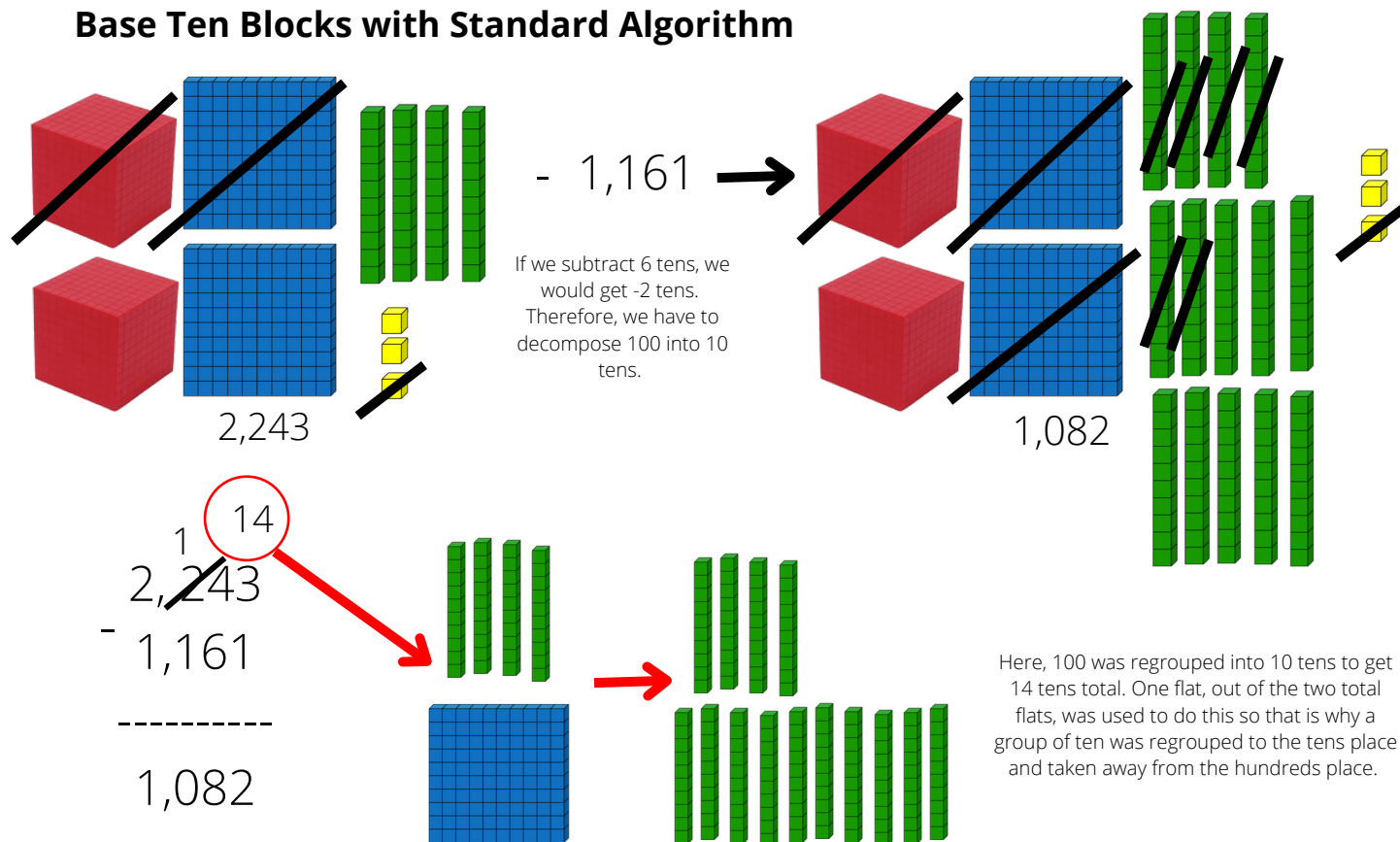
## Fourth-Grade Goals (according to IN state standards):

- Finding and comparing equivalent fractions to a given fraction
- Comparing and representing decimals as a visual
- Rounding multi-digit numbers
- Adding and subtracting using the standard algorithm
- Multiplying a four-digit by one-digit and a two-digit by two-digit
- Utilizing the commutative and associative property
- Identifying, drawing, and measuring geometric shapes such as a rhombus, trapezoid, and parallelogram
- Understand and use the metric system in given problems
- Calculating area and perimeter of both simple and complex shapes
- Measure angles using a tool such as a protractor

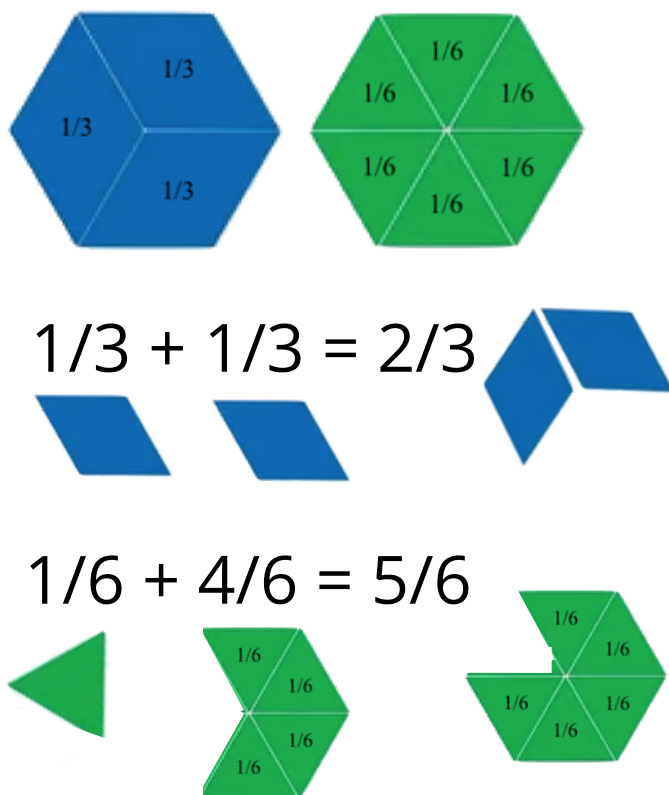
### Adding and Subtracting Strategy: Base Ten Blocks with Standard Algorithm



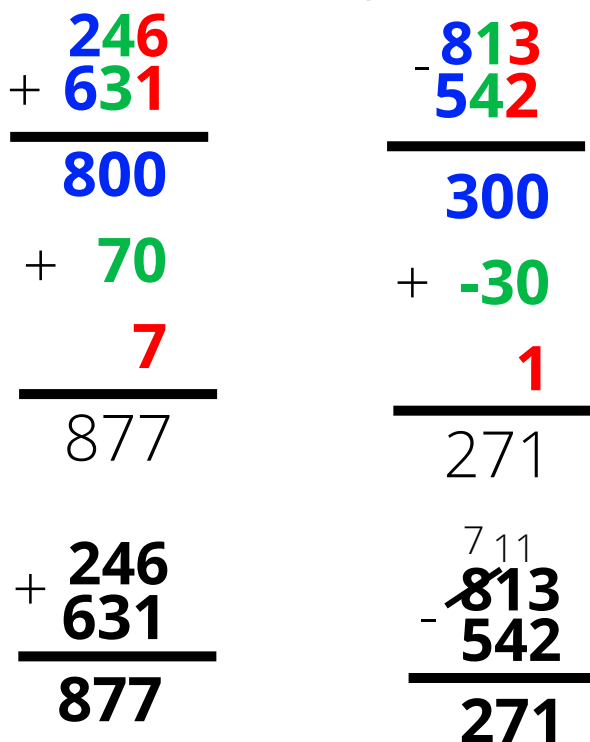
## Adding and Subtracting Strategy: Base Ten Blocks with Standard Algorithm



## Adding and Subtracting Strategy: Adding Fractions with Common Denominators



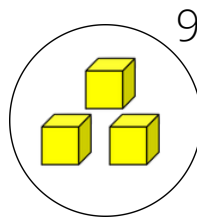
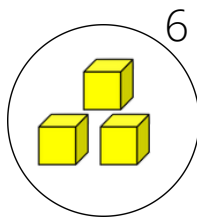
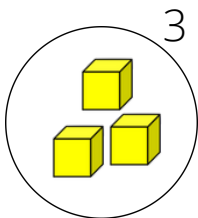
## Adding and Subtracting Strategy: Partial Sums and Differences with Standard Algorithm



Use previous knowledge to teach the standard algorithm.

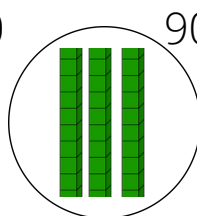
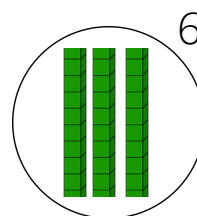
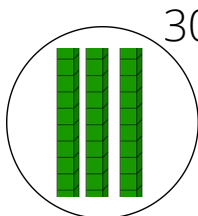
## Multiplying and Dividing Strategy: Equal Groups and Using Patterns

$$3 \times 3 = 9$$



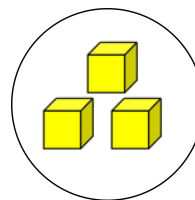
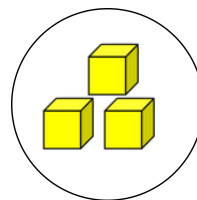
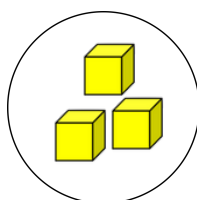
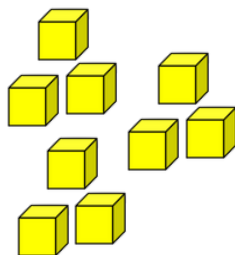
You can count the total or skip count.

$$3 \times 30 = 90$$



$$9 \div 3 = 3$$

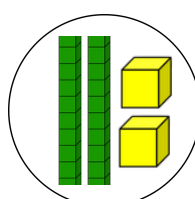
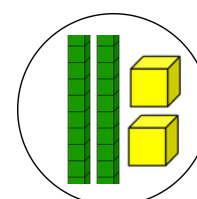
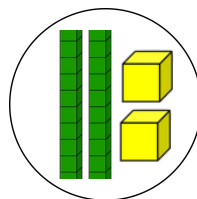
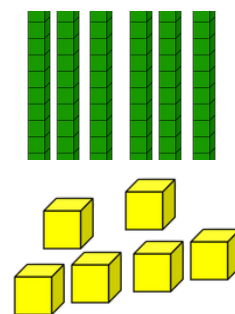
9 split into 3 groups



Evenly distribute across the number of groups.

$$66 \div 3 = 22$$

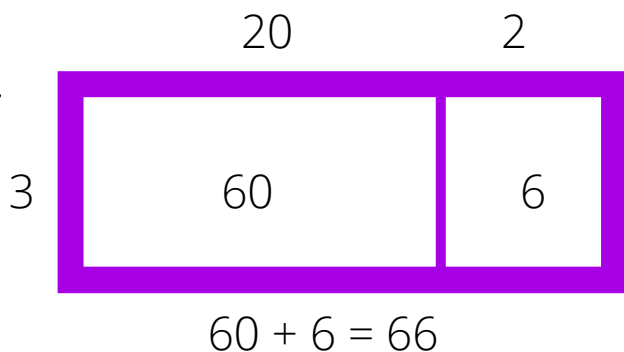
66 split into 3 groups



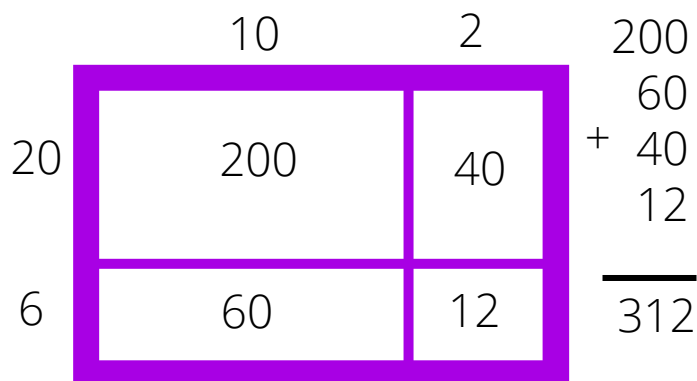
## Multiplying Strategy:

Area Model / Box Method

$$3 \times 22 = 66$$



$$12 \times 26 = 312$$



### Multiplying Strategy:

#### Partial Products

$$3 \times 22 = 66$$

$$3 \times 20 = 60$$

$$3 \times 2 = 6$$

Use parts of the product to multiply. Then, add.

$$\begin{array}{r} \text{X} \quad 22 \\ \quad 3 \\ \hline 60 \\ + 6 \\ \hline 66 \end{array}$$

### Multiplying and Dividing Strategy:

#### Ratio Table

$$3 \times 22 = 66$$

Groups	1	2	3
Total	22	44	66

$$36 \div 12 = 3$$

Groups	1	2	3
Total	12	24	36

### Multiplying Strategy:

#### Distributive Method

$$12 \times 26 = 312$$

F - First

O - Outside

I - Inside

L - Last

F.  $10 \times 20 = 200$

O.  $10 \times 6 = 60$

I.  $2 \times 20 = 40$

L.  $2 \times 6 = 12$

$$200 + 60 + 40 + 12 = 312$$

### Multiplying Strategy:

#### Break Apart

$$12 \times 26 = 312$$

$$\begin{array}{c} 12 \\ \swarrow \searrow \\ 10 \quad 2 \end{array}$$

$$\begin{array}{c} 26 \\ \swarrow \searrow \\ 20 \quad 6 \end{array}$$

$$10 \times 20 = 200$$

$$10 \times 6 = 60$$

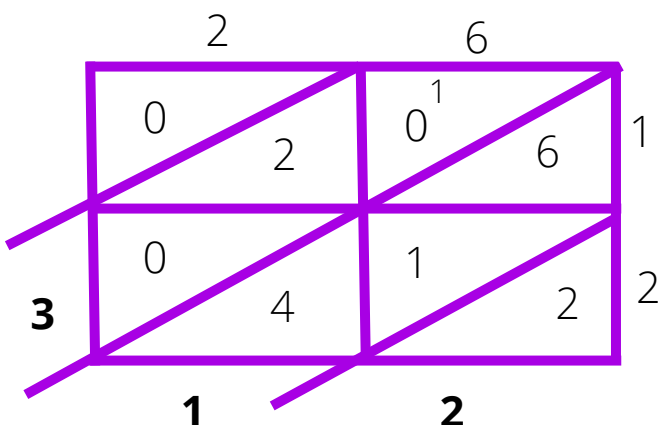
$$2 \times 20 = 40$$

$$2 \times 6 = 12$$

$$200 + 60 + 40 + 12 = 312$$

### Multiplying Strategy:

#### Lattice Multiplication



### Important Things to Remember

What you say is very important!

- You do not always need to start in the ones place.

- Use correct place value terminology when speaking about numbers.

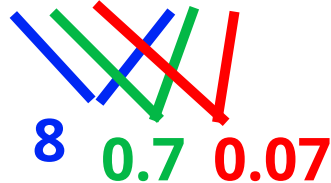
- You can take a "big number" from a "small number." It will just become negative.

## Fifth-Grade Goals (according to IN state standards):

- Ordering and comparing fractions, mixed numbers, and decimals
- Add and subtract fractions with unlike denominators or mixed numbers
- Understanding place value in numbers and decimals
- Calculate division problems with remainders
- Use visual fraction models to multiply or divide a fraction by a fraction or a fraction by a whole number
- Using the order of operations to compute
- Graphing points on a coordinate plane
- Identify, describe, measure and draw types of triangles and their angles
- Identify, describe and find the area of types of quadrilaterals
- Calculate the volume of rectangular prisms
- Understand and use mean, median, and mode

### Adding and Subtracting Strategy: Pull Down Method

$$2.46 + 6.31 = 8.77$$



$$8 + 0.7 + 0.07 = 8.77$$

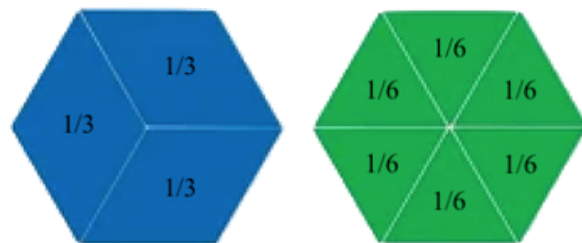
$$8.13 - 5.42 = 2.71$$



$$3 + (-0.3) + 0.01 = 2.71$$

Make sure students have a solid understanding of ones, tenths, and hundredths.

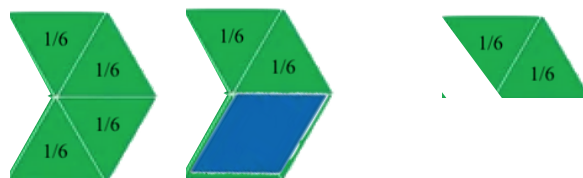
### Adding and Subtracting Strategy: Adding Fractions with Unlike Denominators



$$1/3 + 2/6 = 4/6 \text{ or } 2/3$$

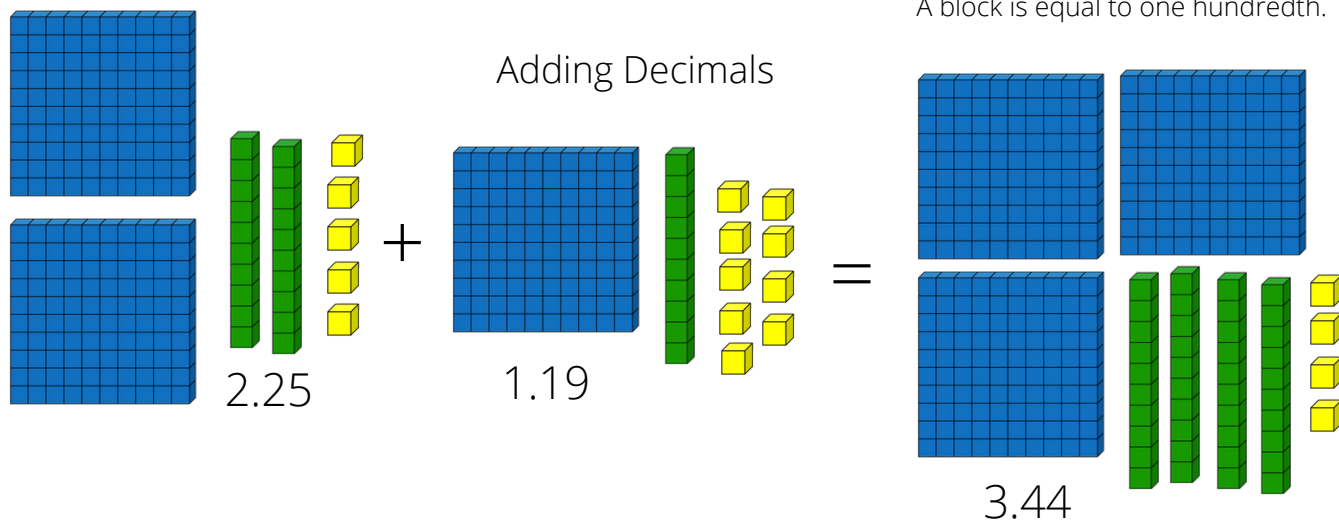


$$4/6 - 1/3 = 2/6 \text{ or } 1/3$$

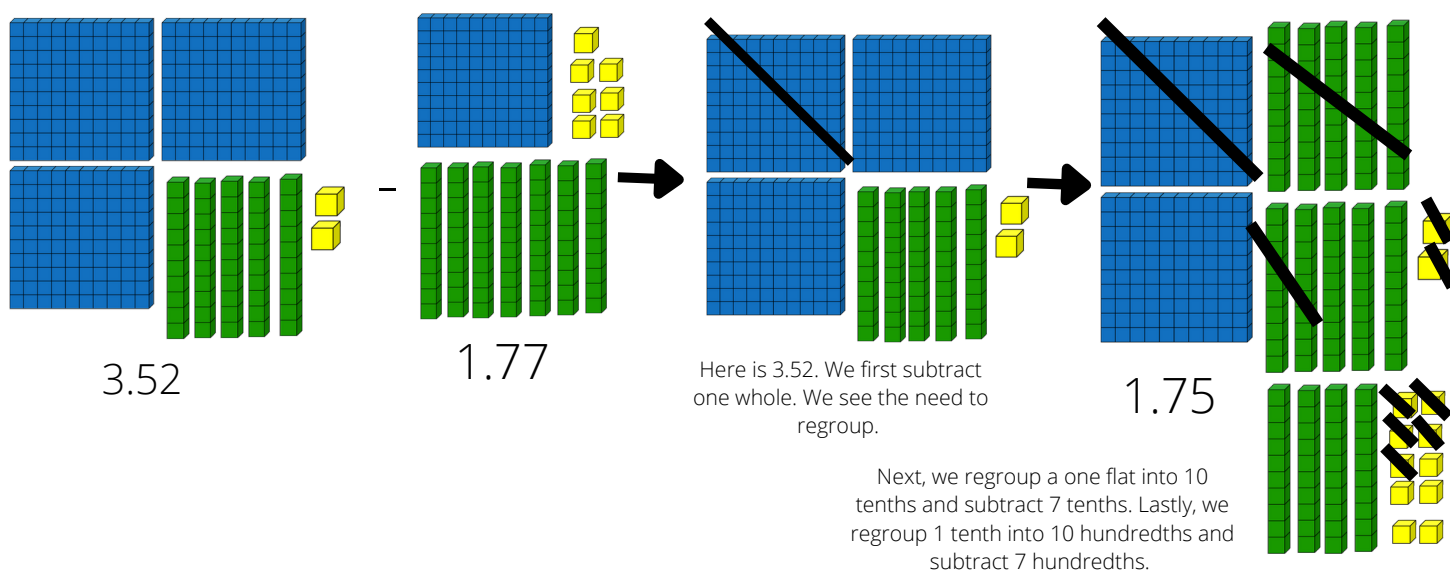


## Adding and Subtracting Strategy: Base Ten Blocks

The value of the base ten blocks are now ones, tenths, and hundredths.  
A flat is equal to one one or whole.  
A rod is equal to one tenth.  
A block is equal to one hundredth.

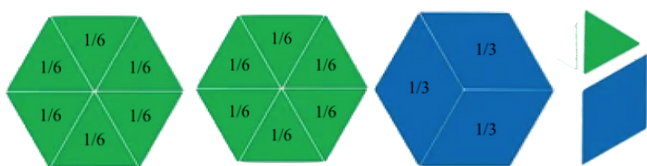


### Subtracting Decimals

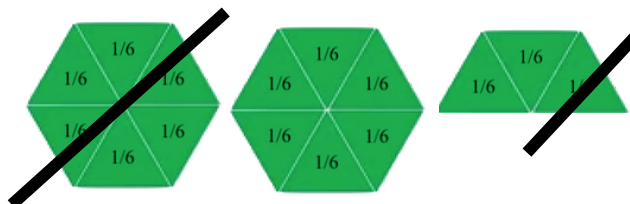


## Adding and Subtracting Strategy: Mixed Numbers

$$2 \frac{1}{6} + 1 \frac{1}{3} = 3 \frac{3}{6} \text{ or } 3 \frac{1}{2}$$



$$2 \frac{1}{2} - 1 \frac{1}{6} = 1 \frac{2}{6} \text{ or } 1 \frac{1}{3}$$





## Dividing Strategy: Partial Quotients

### Division of Whole Numbers

$$1,496 \div 4 = 274$$

4 x	<b>200</b>	=	1,200
4 x	<b>50</b>	=	200
4 x	<b>20</b>	=	80
4 x	<b>4</b>	=	16

<b>200</b>	
<b>50</b>	
+ <b>20</b>	
<b>4</b>	
<hr/>	
<b>274</b>	

4

1,496

- 1,200

---

296

- 200

---

96

- 80

---

16

- 16

---

0

Use known multiplication facts and fact families to build until you reach the quotient.

### Division of Decimals

$$4.68 \div 4 = 1.17$$

4 x	<b>1.00</b>	=	4.00
4 x	<b>0.05</b>	=	0.2
4 x	<b>0.10</b>	=	0.4
4 x	<b>0.02</b>	=	0.08

<b>1.00</b>	
+ <b>0.05</b>	
<b>0.10</b>	
<b>0.02</b>	
<hr/>	
<b>1.17</b>	

4

4.68

- 4.00

---

0.68

- 0.2

---

0.48

- 0.4

---

0.08

- 0.08

---

0

Help students see the relationship between multiplying numbers and decimals.

Don't forget to line up the decimal!

Help students see the relationship between multiplying numbers and decimals.

## Multiplying Strategy: Decimals Standard Algorithm

$$\begin{array}{r} 3.68 \\ \times 1.4 \\ \hline 1472 \\ + 3680 \\ \hline 5152 \end{array}$$

Use knowledge about multiplication to estimate.

It should be close to 5.

$$3.68 \times 1.4 = \mathbf{5.152}$$

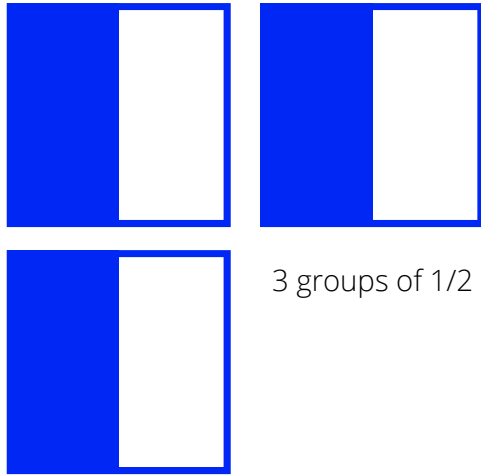
## Multiplying Strategy: Multiplying Decimals

$$6.6 \div 3 = 2.2$$

6.6 split into 3 groups

### Multiplying Strategy: Whole Number x Fractions

$$3 \times \frac{1}{2} = \frac{3}{2} \text{ or } 1 \frac{1}{2}$$

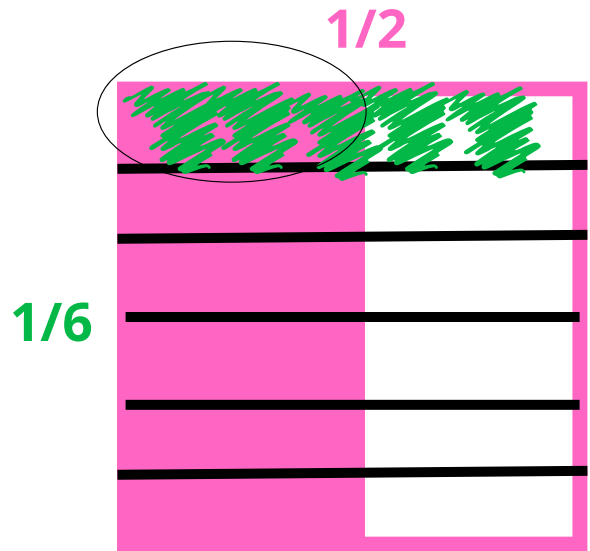


The shaded regions make up the product.

### Multiplying Strategy: Fraction x Fractions

$$\frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$$

$\frac{1}{2}$  groups of  $\frac{1}{6}$

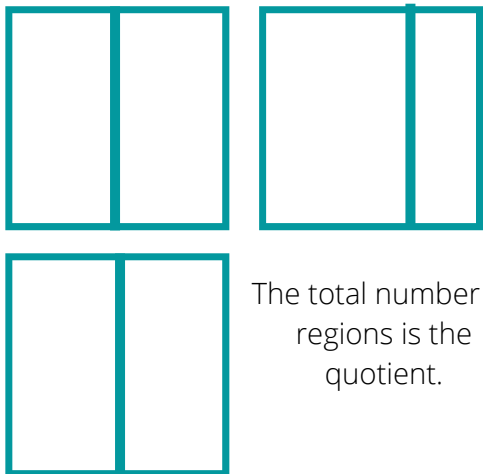


The overlapping region is the numerator and the number of total regions is the denominator.

### Dividing Strategy: Whole Number ÷ Fractions

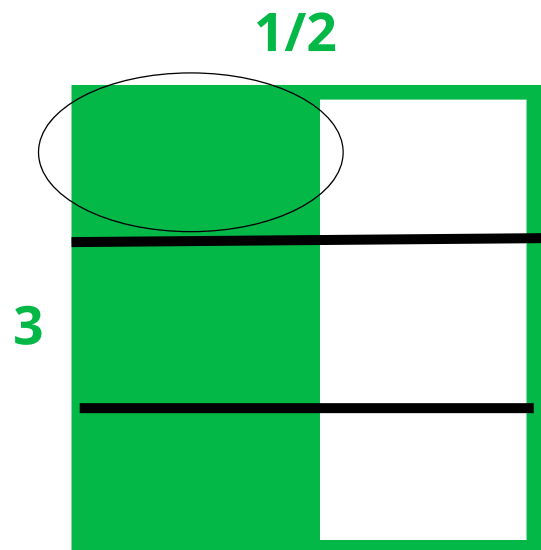
$$3 \div \frac{1}{2} = 6$$

How many groups of  $\frac{1}{2}$  are in 3?



### Dividing Strategy: Fraction ÷ Whole Number

$$\frac{1}{2} \div 3 = \frac{1}{6}$$



There is 1 piece shaded of each group of 3.  
This makes up the numerator.  
The total number of pieces make up the denominator.