Using Powerful Models in the Classroom

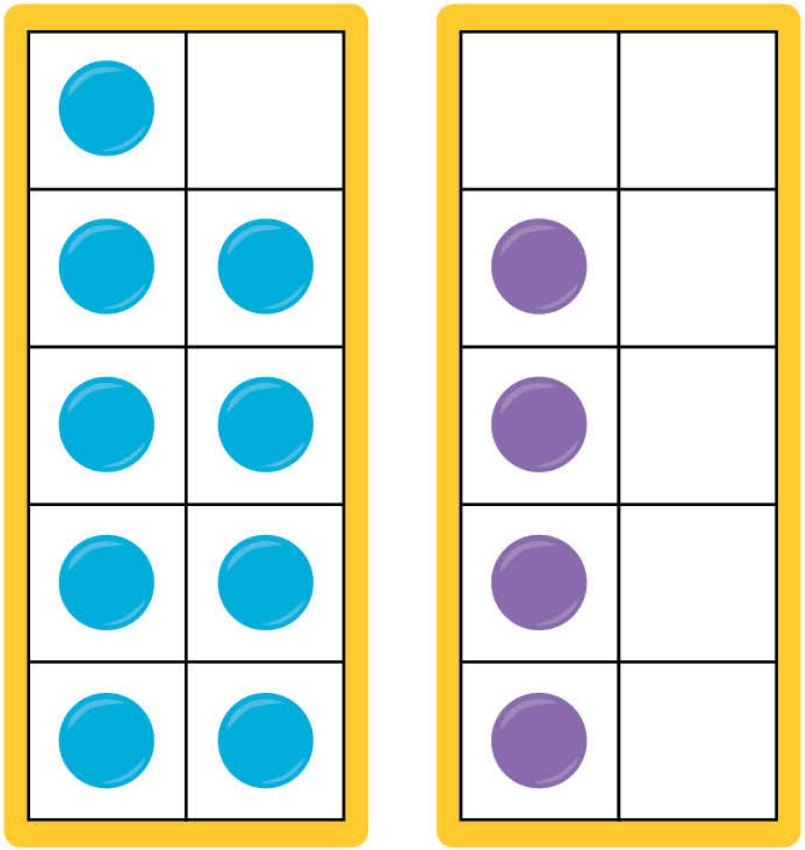
ORIGO EDUCATION

Number Models

- Set model
- Length model
- Number line model
- Array/Area model

Set Model

Introducing the Make-Ten Addition Strategy



$9 + 4$

THE BOX OF FACTS

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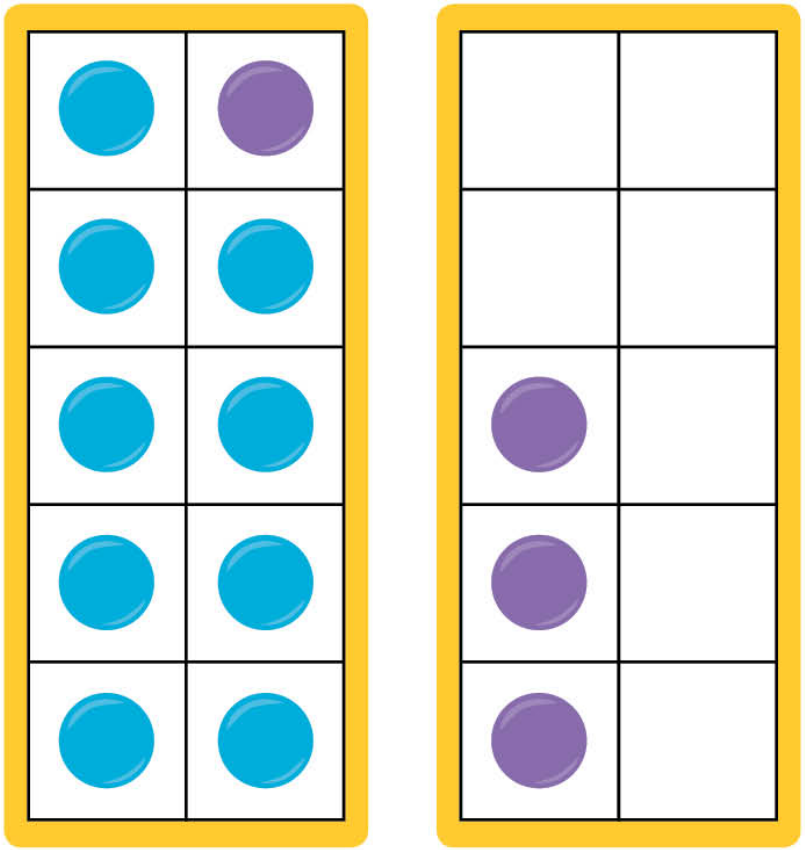
Set Model

Introducing the Make-Ten Addition Strategy



10 + 3

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Set Model

Extending the Make-Ten Addition Strategy

If you have a strategy to calculate

9 + 5 = ___

then use the same thinking to calculate

29 + 15 = ___

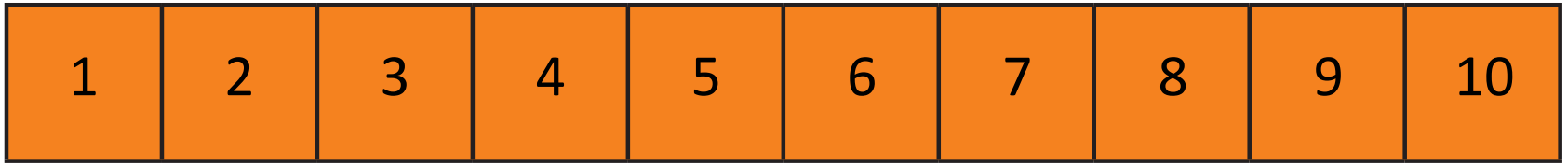
398 + 56 = ___

1.95 m + 2.45 m = ___

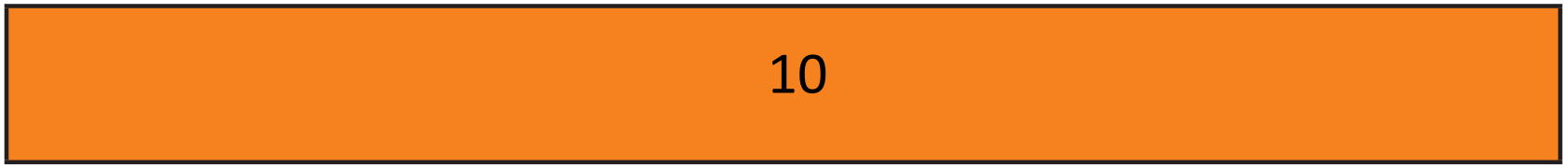
Length Model

Representing Quantity

Number Track



Bar model



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Length Model

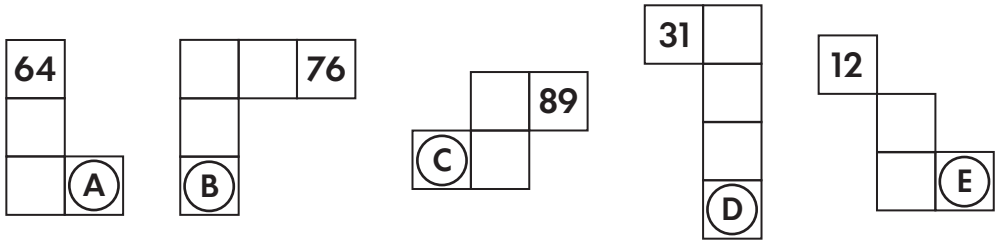
Using a Hundreds Board for Computation

10

Here is a **chunk** of a hundred chart.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

Here are some **pieces** of the same chart.



Write the numbers that belong at A, B, C, D, and E.

Computation and Number Sense

Think Tank™

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Length vs. Number Line Model

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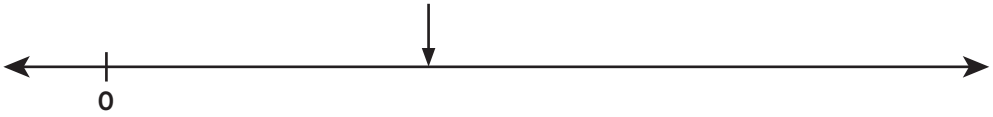
Number Line Model

Exploring Relative Position of Number

1

Trace this number line onto another sheet of paper.



If the arrow is pointing to **50**, mark where you think these numbers are **located**.

a. 65

b. 100

c. 10

d. 45

e. 110

Computation and Number Sense

Think Tank™

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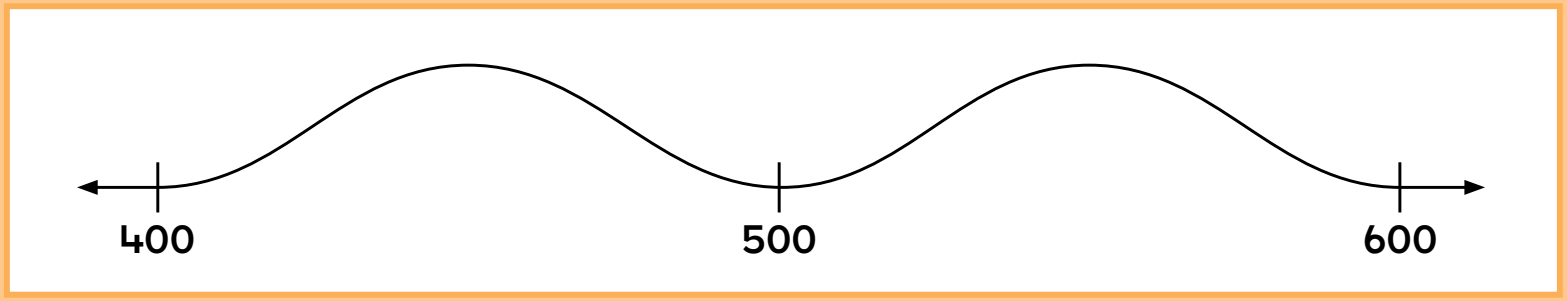
Number Line Model

Rounding Numbers

Imagine you placed a ball on this special number line.

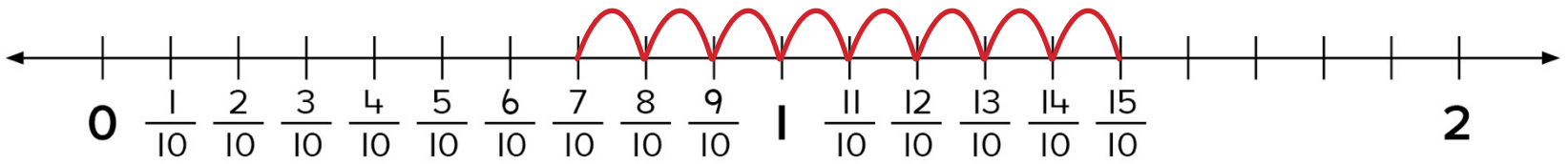


How could the ball help you decide which hundred is closest to 540?

Number Line Model

Adding Fractions with Same Denominator

$$\frac{7}{10} + \frac{8}{10} = \frac{15}{20}$$



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Number Line Model

Calculating Difference

"I always get this wrong!"

$$\begin{array}{r} {\scriptstyle 5\ \ 9\ \ 9} \\ {\scriptstyle 10\ 10\ 10} \\ 600 \\ -\ 432 \\ \hline 277 \end{array}$$

"Can I do it my way?"

$$\begin{array}{r} 600 - 1 \\ 432 - 1 \\ \hline \end{array} \qquad \begin{array}{r} 599 \\ -\ 431 \\ \hline 168 \end{array}$$

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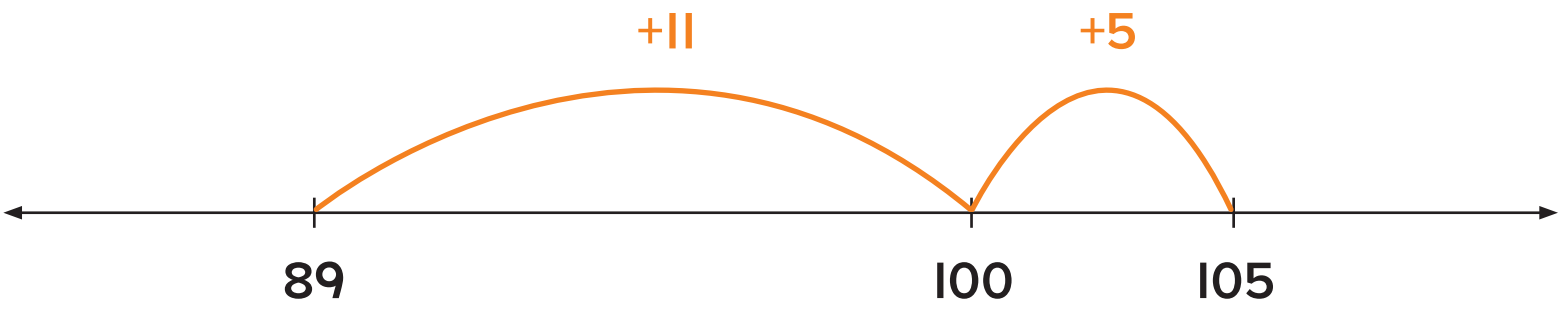
Number Line Model

Connecting Relative Position and Computation



$$\begin{array}{r} 105 \\ -\ 89 \\ \hline \end{array}$$

Up or Down

Focus: Adjusting numbers to subtract (understanding difference as a distance) – effective mental strategy for bridging across a ten
Materials:
Number cubes configured as follows
Cube A: 92, 82, 72, 62, 52, 42
Cube B: 17, 17, 27, 27. 37, 37
Fifteen color counters for each player (different color for each player)
Game board

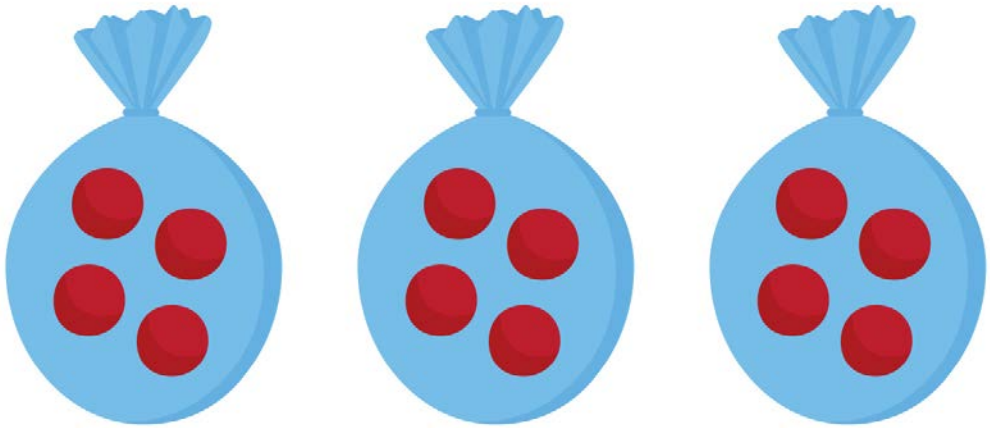
The first player to arrange 3 counters together in a vertical, horizontal, or diagonal line wins.
How to Play
The first player rolls both cubes.
The player says the subtraction expression represented by the cubes, then figures out and says an equivalent subtraction sentence.
The player states the difference before claiming a corresponding space on the board by covering it with a counter. If both choices are unavailable the player misses a turn.
The next player has a turn.
Play continues until one player has a line of three adjacent counters.

Example
Reece rolls 42 and 17. He says, “Forty-two subtract 17 has the same value as 40 – 15 or 45 – 20. The answer is 25. Reece claims the corresponding expression on the game board.

Set Model of Multiplication

Modeling the Commutative Property

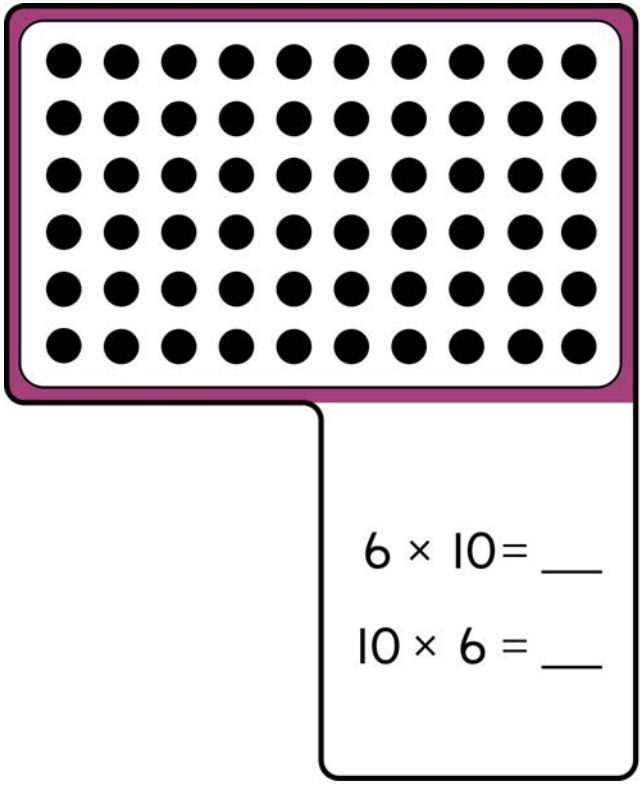
Is **3 bags of 4** the same as **4 bags of 3**?



The total **number** of objects in the bags is the same, but the **pictures** are not the same.

Array Model

Introducing the Fives Facts Strategy



THE BOX OF FACTS

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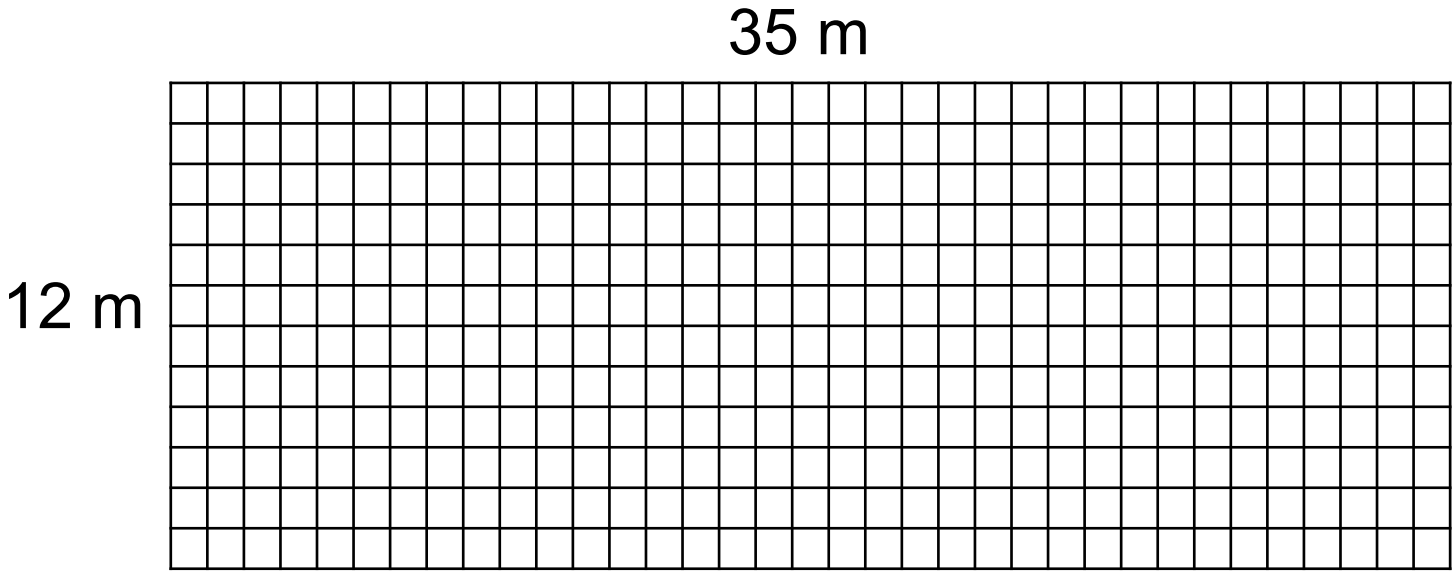
Array Model

Multiplying Whole Numbers



What are some ways you could figure out the area of this rectangle?

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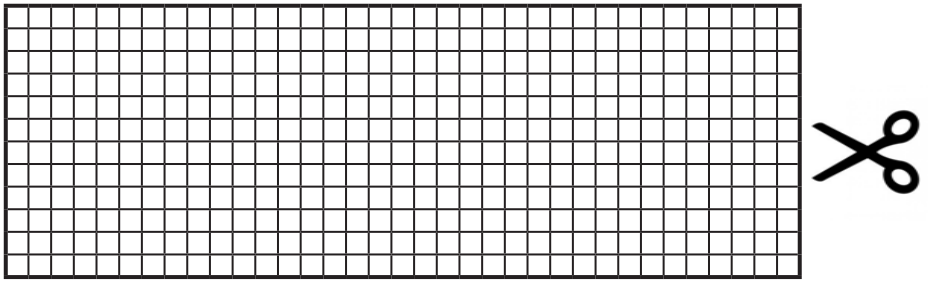
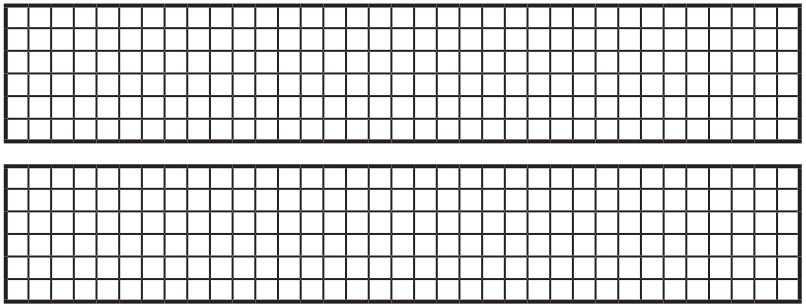
Array Model

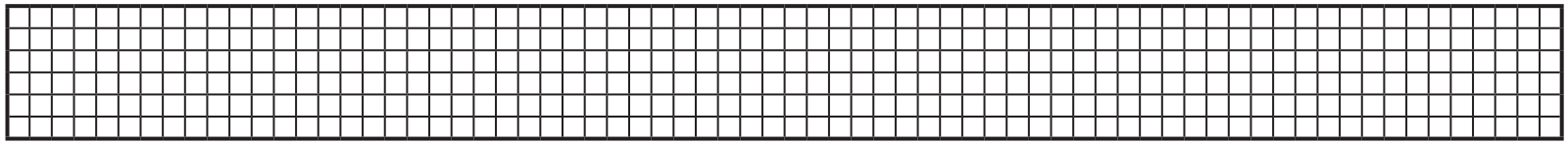
Multiplying Whole Numbers

12 by 35



is the same area as





6 by 70

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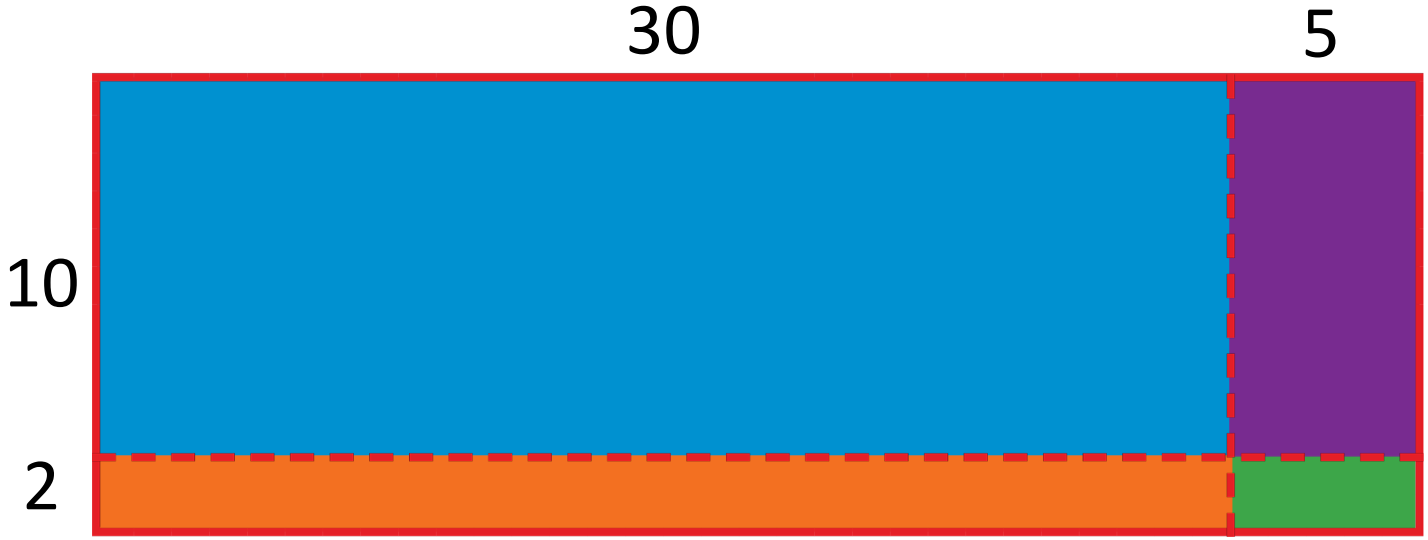
Nice and Easy & Nice and Easy Too

Focus: Using the doubling-and-halving strategy to multiply
Materials:
2 cubes, one with the numerals 15, 15, 25, 35, 45, and 45; one with the numerals 6, 8, 12, 1, 16, and 18
Fifteen color counters for each player; each player gets a different color.
The winner is the first player to build a winning sequence of three adjacent counters in a horizontal, vertical, or diagonal line.
How to Play
Roll the cubes.
Say aloud the multiplication sentence represented by the number cubes, then double one factor and half the other to figure out an equivalent multiplication sentence. Calculate and say aloud the product.
Place a counter onto your equivalent multiplication sentence on the game board.
NOTE: For Nice and Easy Too, students say the equivalent multiplication sentence and cover the product.
If your sentence is not available, you miss a turn.
Play continues in turns until one player builds a winning sequence.
Example
Lincoln rolls 35 and 16, and says: 35 multiplied by 16 is the same as 70 multiplied by 8. The answer is 560. He claims 70 x 8 on the game board.
For ideas on how to bring out the mathematics in this game, see Fundamentals Red (pp. 20-23).

Area Model

Multiplying Whole Numbers



12 x 35 =

10 x 30	2 x 5
10 x 5	10 x 5
2 x 30	2 x 30
2 x 5	10 x 30

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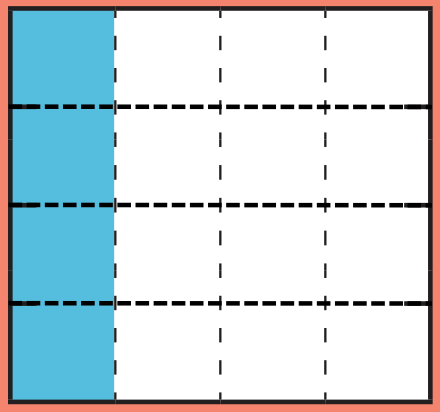
Area Model

Finding Equivalent Fractions

In the shape, color a part to show the first fraction.
Draw more lines to show the second fraction.
Then write the missing numbers.

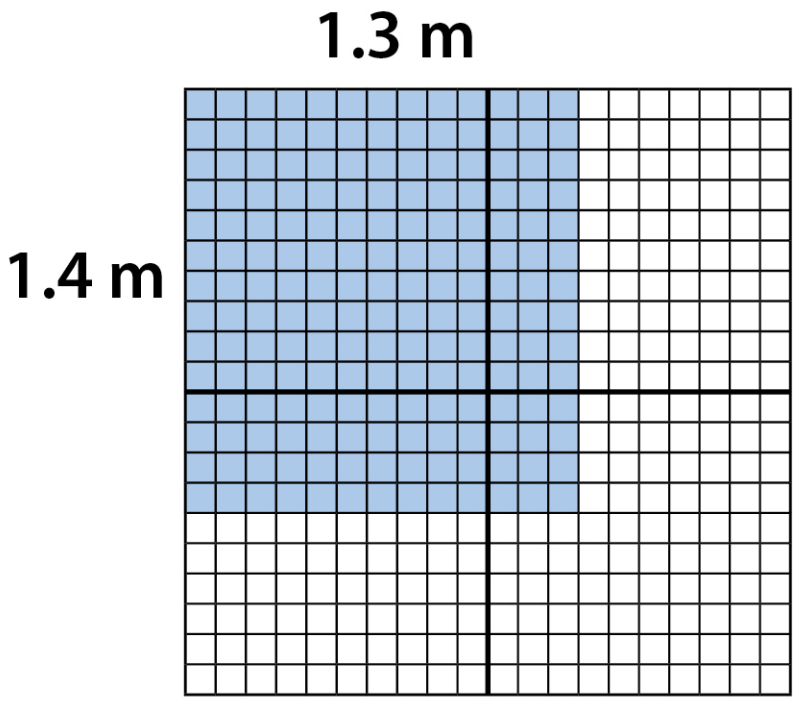


$\frac{1}{4} \times \frac{4}{4} = \frac{4}{16}$ is the same as $\frac{1}{4} \times \frac{4}{4} = \frac{4}{16}$

Array/Area Model

Multiplying Decimal Fractions

$1.4 \times 1.3 = \_\_\_$



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