



Making the Most of Meaningful Math Models

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MAKING THE MOST OF MEANINGFUL MATH MODELS

Fostering thinking skills and conceptual understanding using:

- Powerful visual models
- Tools

.... in the strand of NUMBER!

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Different Types of Quantities

DISCRETE

Collection of countable amounts
(counting, sharing)



CONTINUOUS

Unbroken measurable amounts
(measuring, weighing, pouring)



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Number Models

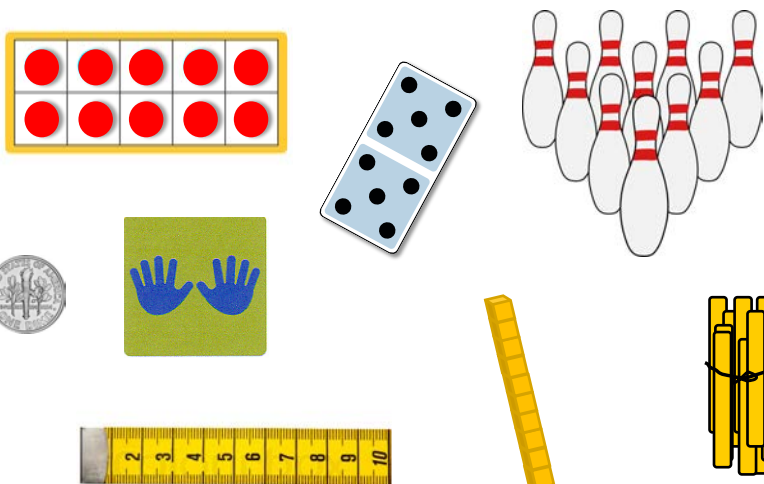
- Set model
- Length model
- Number line model
- Array/Area model



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Representing Ten



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Set Model

Extending the Make-Ten Addition Strategy

If you have a strategy to calculate

$$9 + 5 = \underline{\quad}$$

then use the same thinking to calculate

$$29 + 15 = \underline{\quad}$$

$$398 + 56 = \underline{\quad}$$

$$1.95 \text{ m} + 2.45 \text{ m} = \underline{\quad}$$

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Length Model

Representing Quantity

Number Track

1	2	3	4	5	6	7	8	9	10
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Bar model



10


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Length Model

Representing Quantity

2. Estimate the **difference** between these lengths.
Then write a number sentence to show your thinking.

a.

29 cm

54 cm

The difference is about cm.

b.

96 cm

38 cm

The difference is about cm.





Length Model

Modeling Addition on a Hundreds Board

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

$$36 + 23 = \underline{\quad}$$

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Length Model

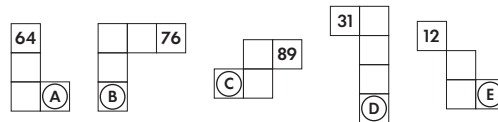
Using a Hundreds Board for Computation

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

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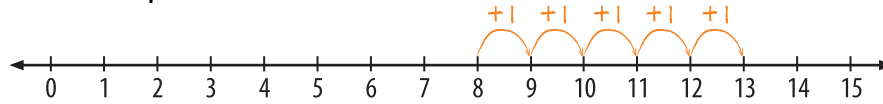
Think
tank

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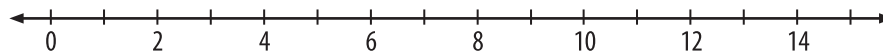
Number Line Model

Modeling Thinking Strategies

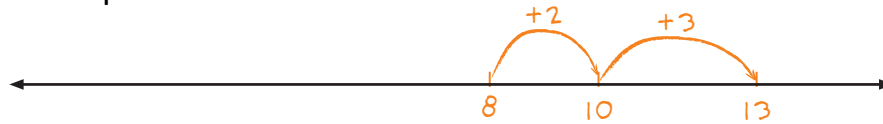
Complete number line



Partial number line



Open number line

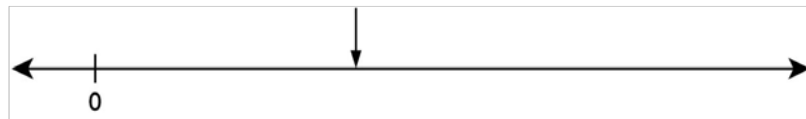


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Number Line Model

Exploring Relative Position of Number



If the arrow is pointing to 50, where do you think these numbers are located?

- 100
- 10
- 110
- 25

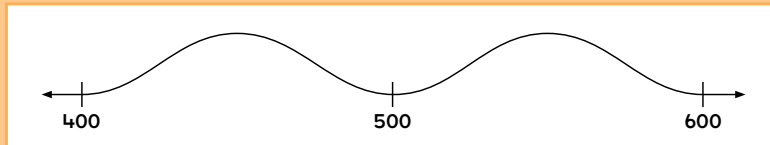
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Number Line Model

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?

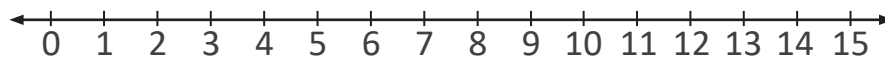
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STEPPING
STONES

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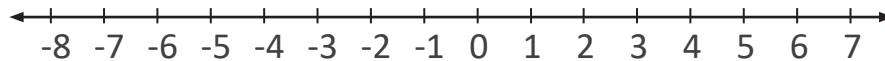
Number Line Model

Represents most Numbers

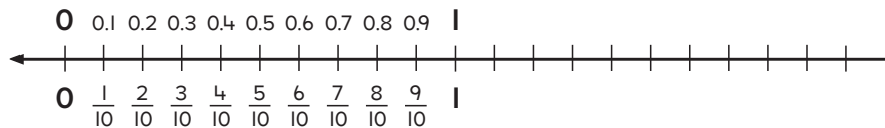
Whole numbers



Integers



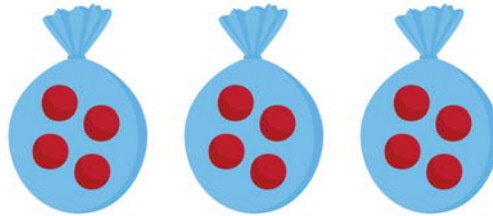
Rational numbers



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.

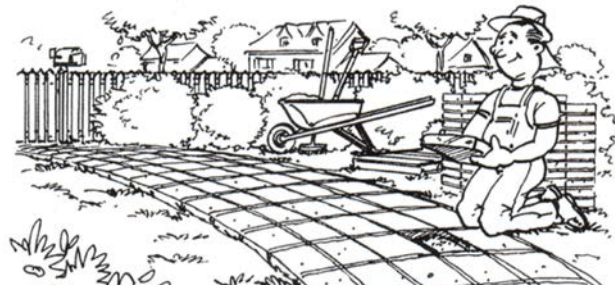
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Array Model

Extending the Fives Facts Strategy

A paver is laying a path. It is 5 bricks wide and 28 bricks long.
How many bricks will be needed?



*I don't know 28×5
but I do know 28×10 .
 $28 \times 10 = 280$ and half of 280 = 140
 $28 \times 5 = 140$*

Array/Area Model

Reinforcing the Doubling/Halving Strategy

30×3	50×3	70×3	90×3
30×4	50×4	70×4	90×4
30×6	50×6	70×6	90×6
30×7	50×7	70×7	90×7
30×8	50×8	70×8	90×8
30×9	50×9	70×9	90×9

Cube A
15, 15, 25, 35, 45, 45

Cube B
6, 8, 12, 14, 16, 18

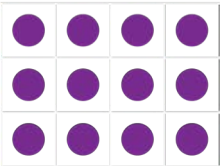


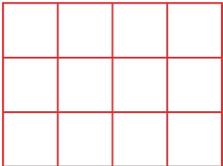
ORIGO STEPPING STONES

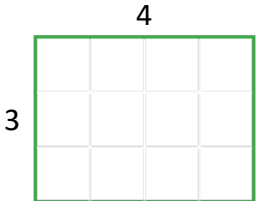
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Array vs. Area Model

Whole Numbers







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Area Model

Multiplying Whole Numbers

$$12 \times 35 = 10 \times 30$$

$$10 \times 5$$

$$2 \times 30$$

$$2 \times 5$$

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Visual Models/Tools

Numeral Expander



Thank You

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