



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)



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CONTINUOUS

Unbroken measurable amounts
(measuring, weighing, pouring)



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Number Models

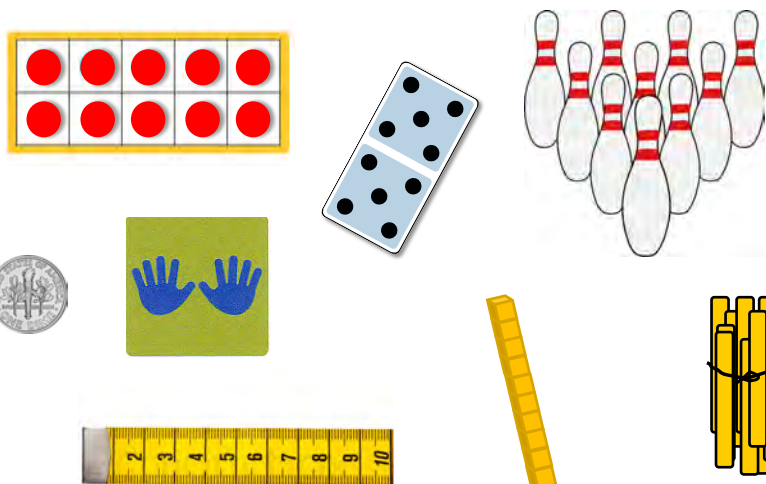
- Set model
- Length model
- Number line model
- Array/Area model



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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



Bar model



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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.

 **STEPPING
STONES**

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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

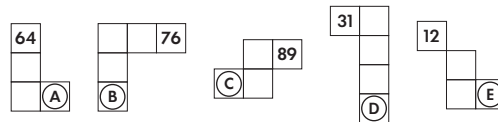
Using a Hundreds Board for Computation

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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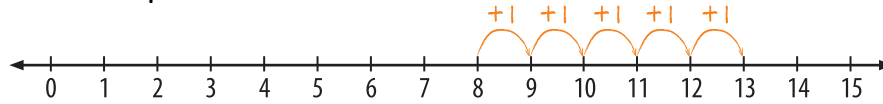
Think
tank

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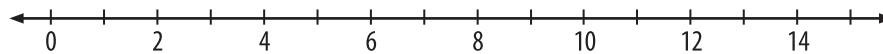
Number Line Model

Modeling Thinking Strategies

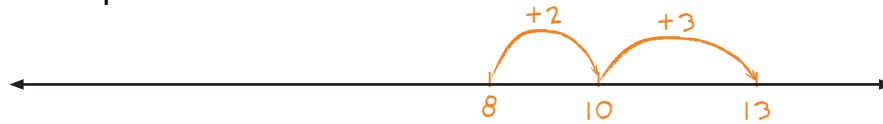
Complete number line



Partial number line



Open number line

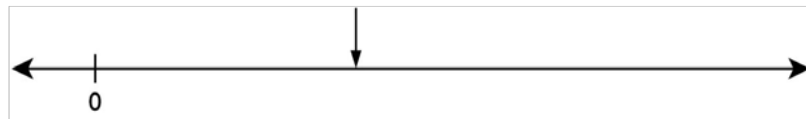


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Number Line Model

Exploring Relative Position of Number



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

- 100
- 10
- 110
- 25

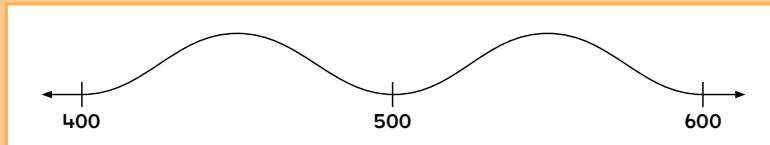
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Number Line Model

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?

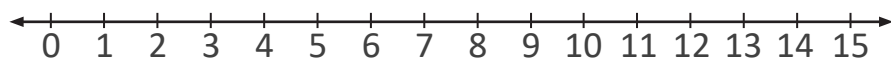
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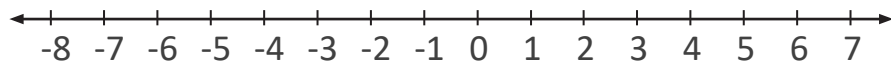
Number Line Model

Represents most Numbers

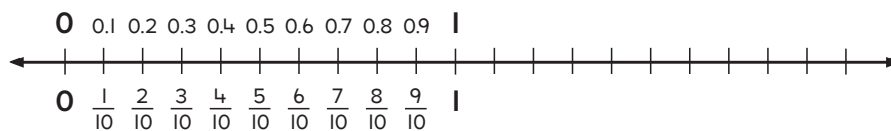
Whole numbers



Integers



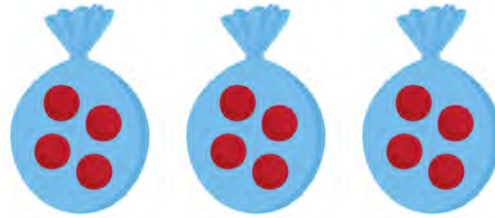
Rational numbers



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.

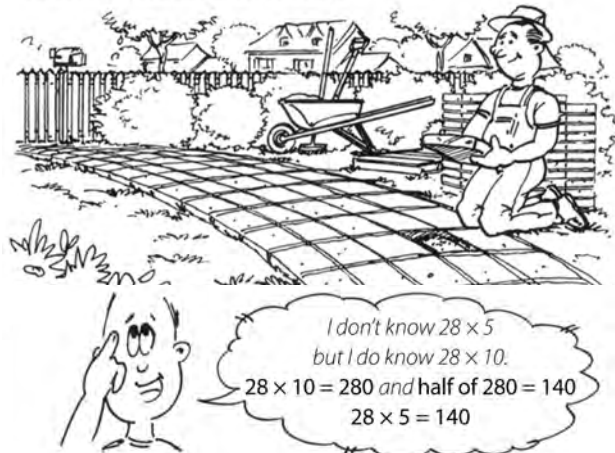
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Array Model

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?



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

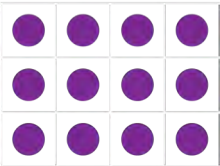


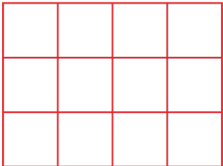
ORIGO STEPPING STONES

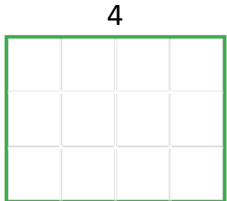
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Array vs. Area Model

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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REINFORCE: Double and Halve

Nice and Easy

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

Nice and Easy Too!

90	150	210	270
120	200	280	360
180	300	420	540
210	350	490	630
240	400	560	720
270	450	630	810