Additive Reasoning

Grade Two HLC

Use place value understanding to add and subtract numbers accurately, flexibly, efficiently, and strategically within 1,000
(in context and in equations) **(NO standard algorithm)**

September → **Grade Two Learning Progressions** → June

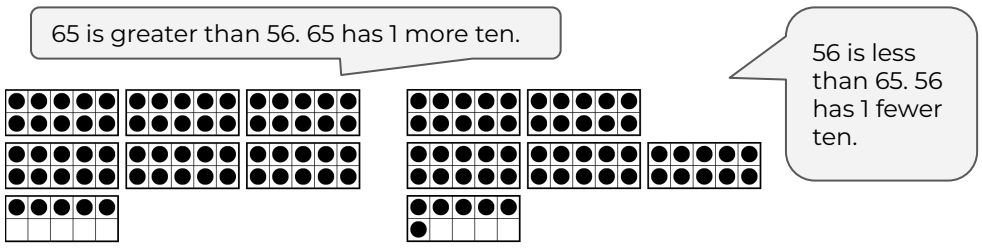
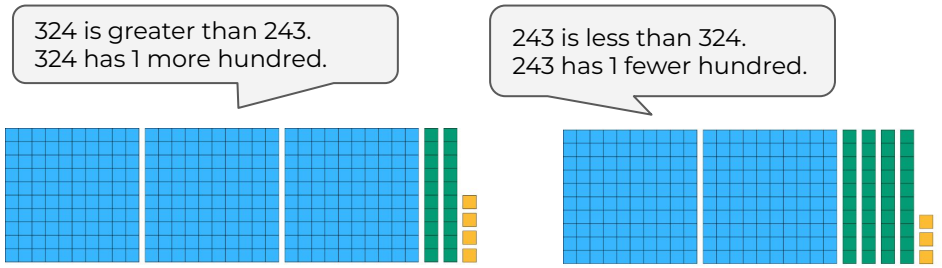
Students must use models to build understanding of the HLC and interact with a variety of contexts.

Rote Oral Count Sequence *(rote counting from 1; rote counting from any start number)*

Teachers need to purposefully choose a variety of number ranges including opportunities to practice teen numbers, crossing decades, and centuries. This information is often best collected in student interviews checking on clusters of 5 numbers at various starting points.

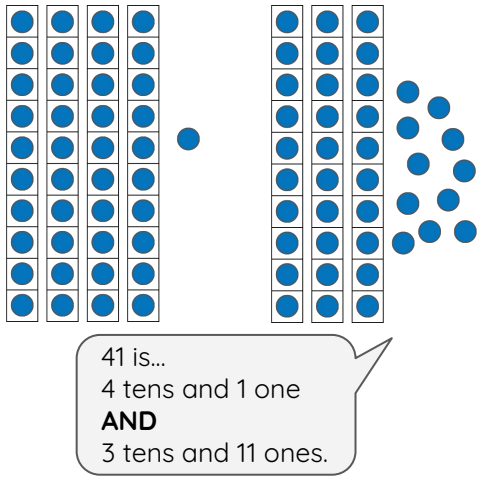
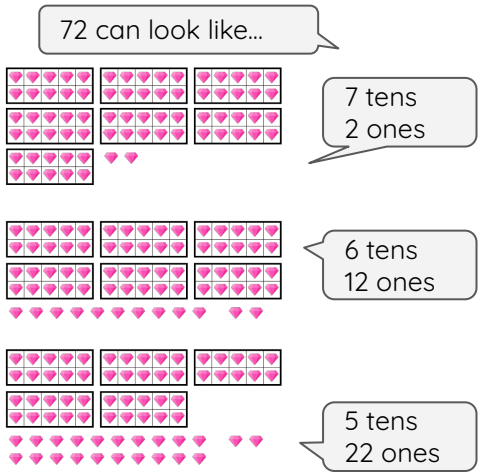
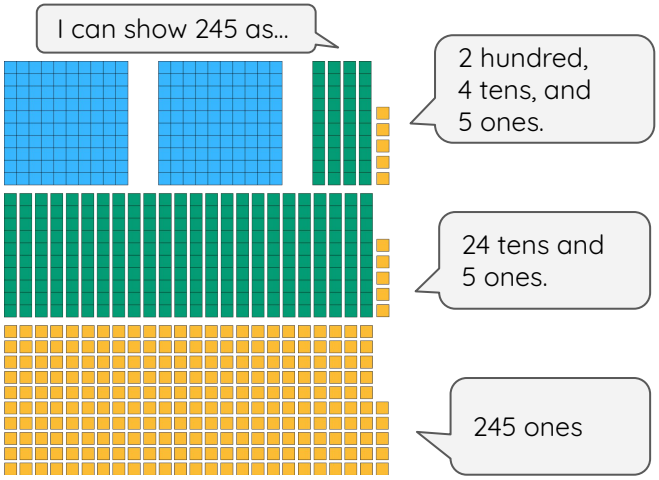
Counts Forward (FWD) and Backward (BWD) within the range **1-120** starting at any number	Counts FWD and BWD within the range **1-220** starting at any number	Counts FWD and BWD within the range **1-500** starting at any number	Counts FWD and BWD within the range **1-1000** starting at any number
Skip counts FWD and BWD by 10s **starting at any number** within the range **1-120**	Skip counts FWD and BWD by 10s **on decade** within the range **1-1000**	Skip counts FWD and BWD by 10s starting at any number within the range **1-500**	Skip counts FWD and BWD by 10s starting at any number within the range **1-1000**
Skip counts FWD and BWD by 100s starting on century within the range **1-1000**		Skip counts FWD and BWD by 100s starting at any number within the range **1-1000**	

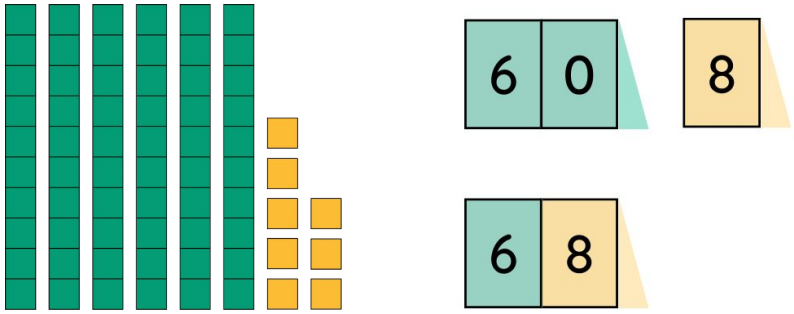
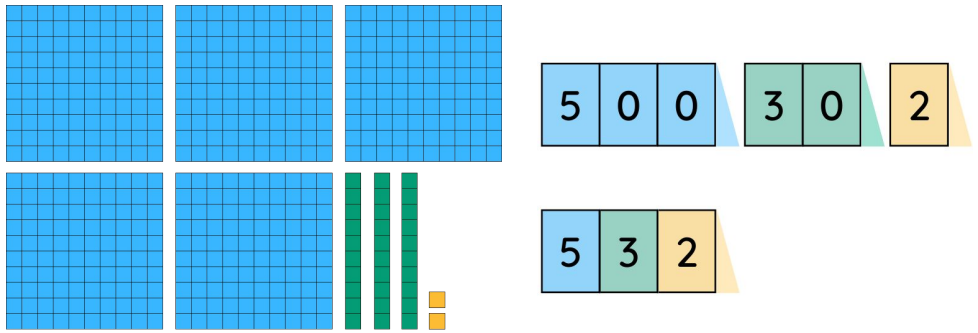
Ordering & Magnitude

Uses place value understanding to compare 2-digit numbers.	Uses place value understanding to compare 3-digit numbers.
	

Operations: Addition and Subtraction Students must use models to build understanding along this trajectory and interact with a variety of contexts for addition and subtraction. Models should support students developing understanding of the magnitude of digits in their place values.

Composition, Decomposition Students must use models to build understanding and flexibility when composing and decomposing quantities. Students must use models to build understanding of unitizing: 10 ones = 1 ten; 10 tens = 1 hundred, etc. as well as *equivalent* representations of a specific quantity (i.e 126 is simultaneously 126 ones; 12 tens and 6 ones; 1 hundred, 2 tens, and 6 ones; 1 hundred and 26 ones; 11 tens and 16 ones; 9 tens and 36 ones; etc.)

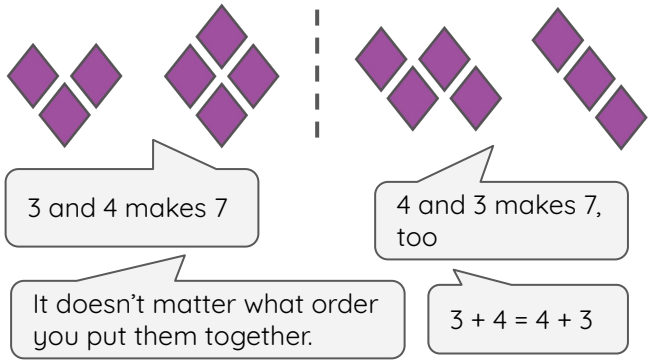
All numbers within the range 1-50	All numbers within the range 1-100	All numbers within the range 1-1000
		

Builds and tells the value of the digits in any 2-digit number. Decompose any 2-digit number into its place value parts.	Builds and tells the value of the digits in any 3-digit number. Decompose any 3-digit number into its place value parts.
	

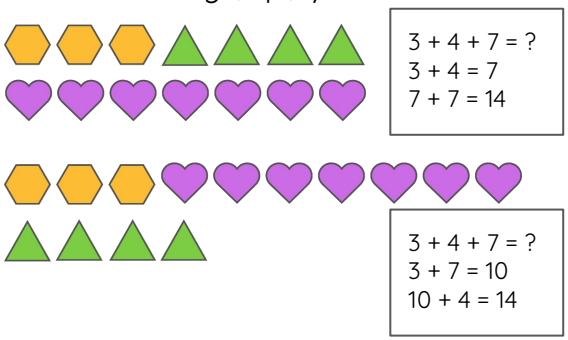
Properties of Addition

These properties are investigated throughout the year with different numbers and problem situations. The sequence of how the properties appear below does not suggest the order in which to explore them. Many times the properties can be explored simultaneously with student work.

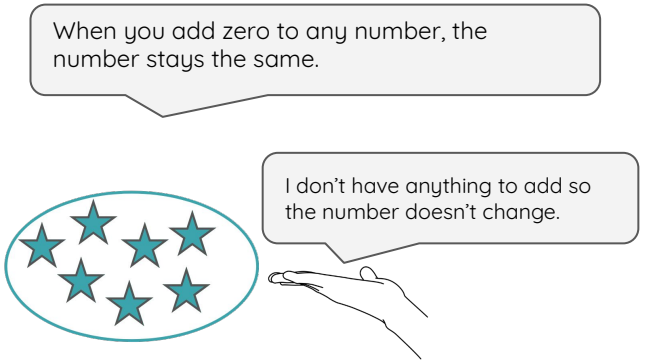
Commutative Property



Associative Property



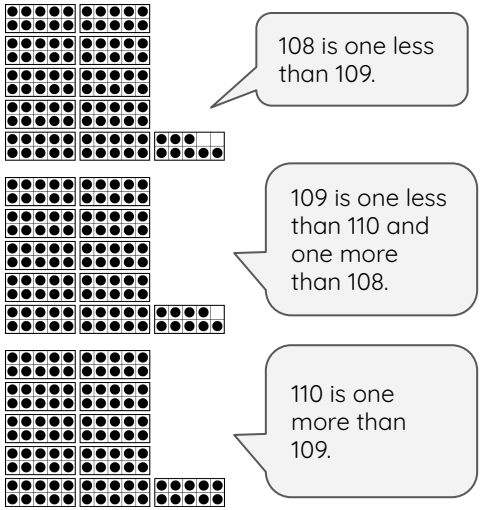
Identity Property



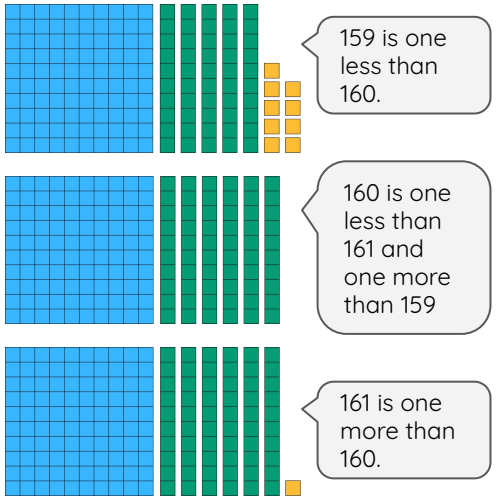
Place Value - Building Understanding

Students must use models to build understanding along this trajectory and interact with a variety of contexts for addition and subtraction. Models should support students developing understanding of the magnitude of digits in their place values.

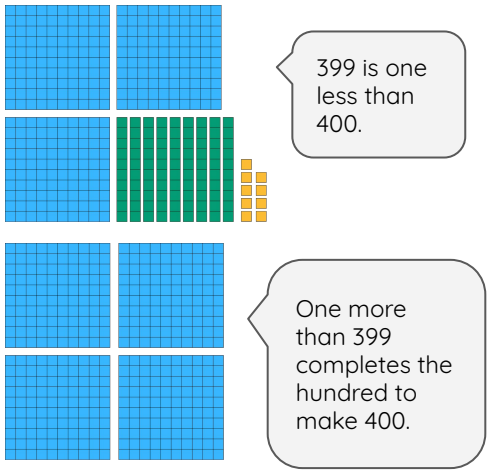
Models the number 1 more/1 less within 120



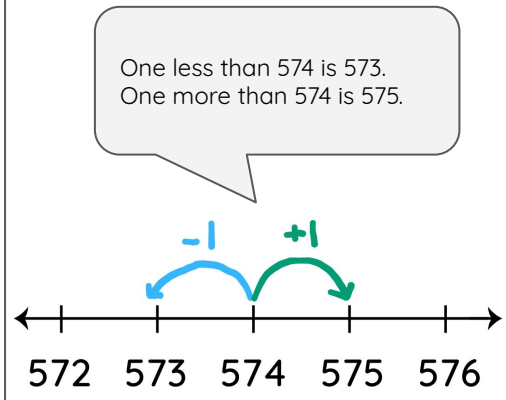
Models the number 1 more/1 less within 220



Models the number 1 more/1 less within 500



Models the number 1 more/1 less within 1000



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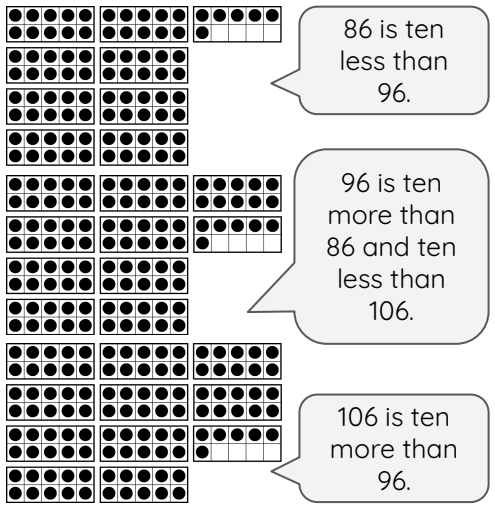
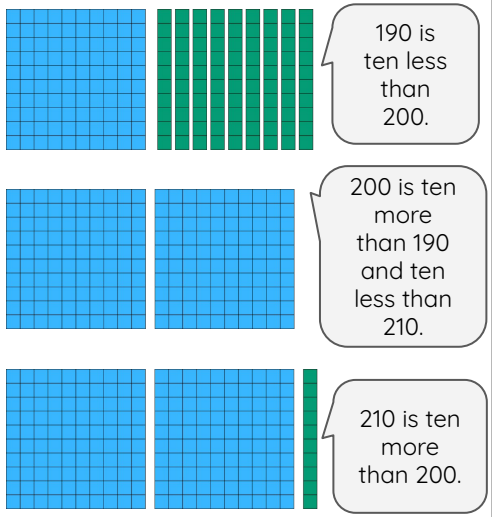
Place Value - Building Understanding *(cont.)*

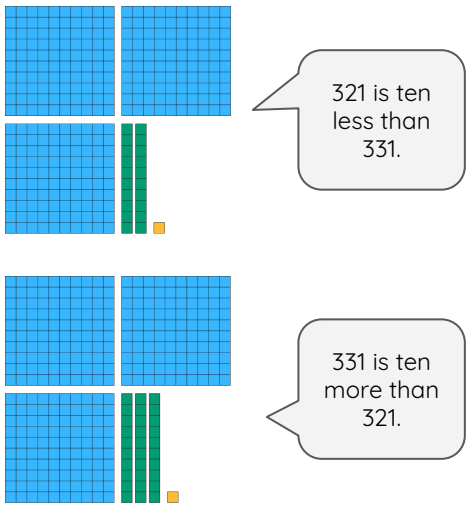
Models the number 10 more/10 less from any number within 120



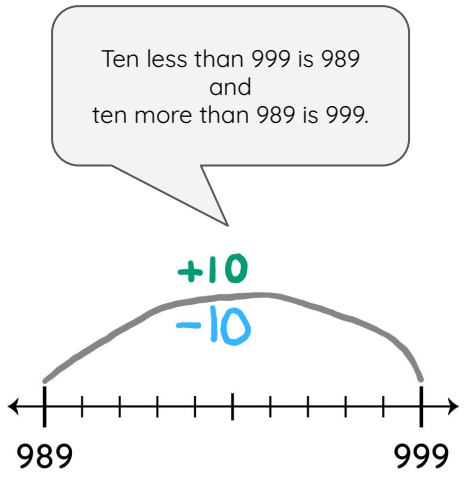
Models the number 10 more/10 less from any number within 220



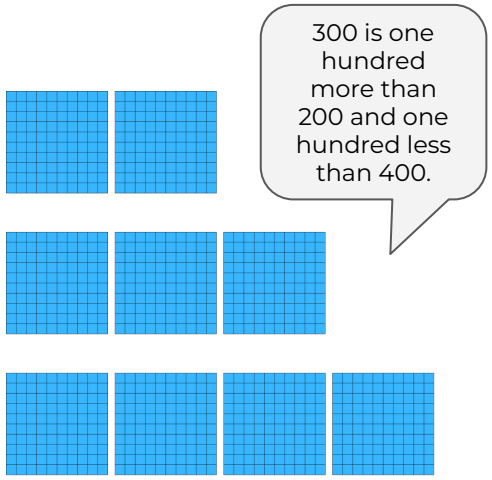
Models the number 10 more/10 less from any number within 500



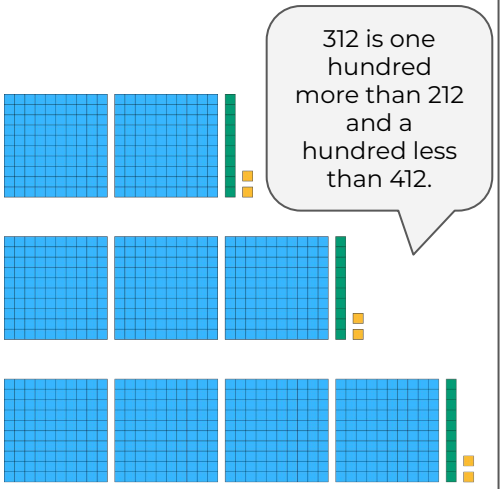
Models the number 10 more/10 less from any number within 1000



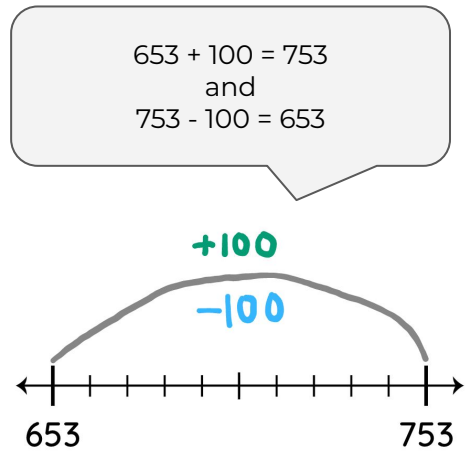
Models the number 100 more/100 less from any century within 1000



Models the number 100 more/100 less from any number within 500

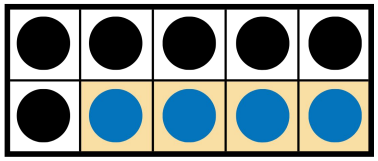
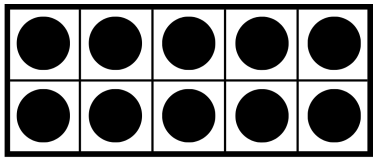
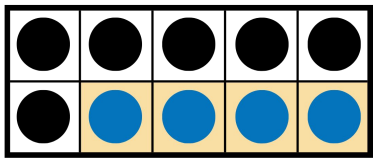
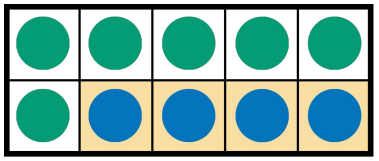
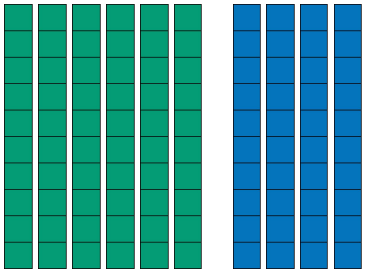
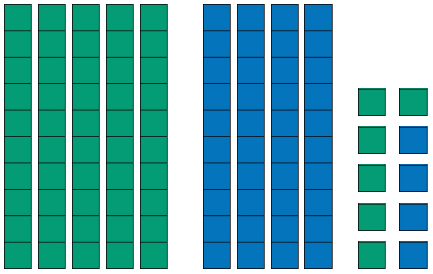
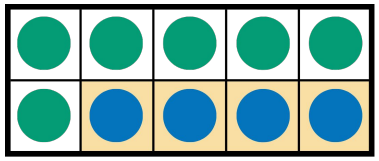
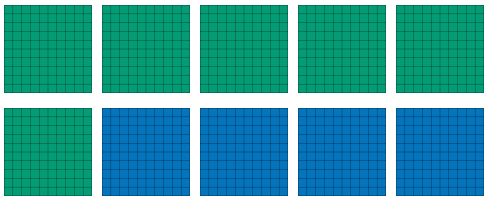
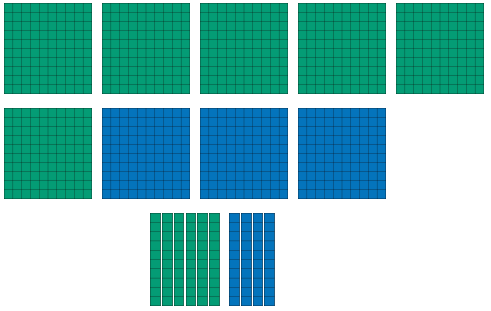


Models the number 100 more and 100 less from any number within 1000



Developing and Extending Fact Fluency

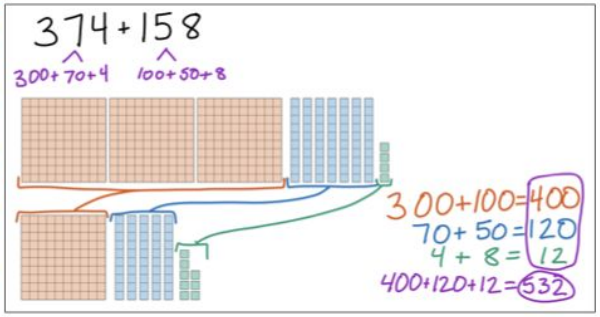
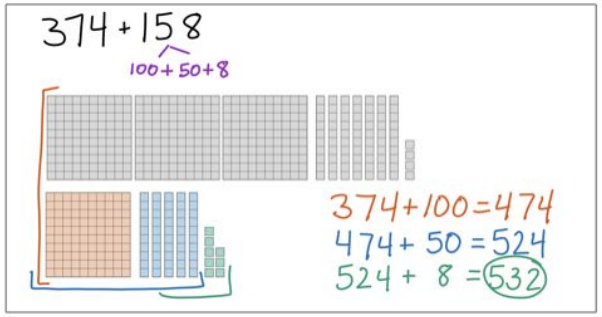
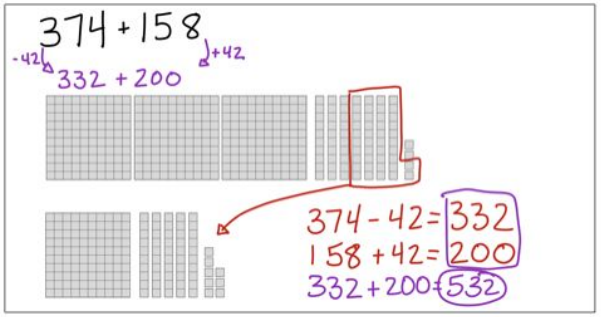
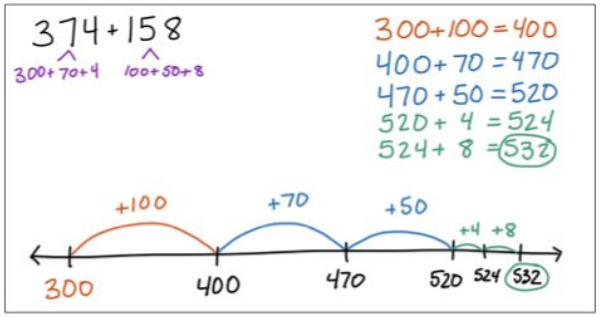
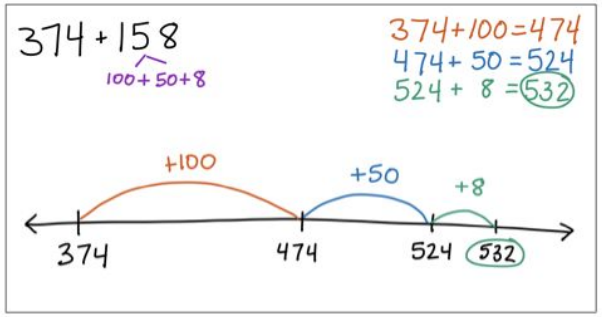
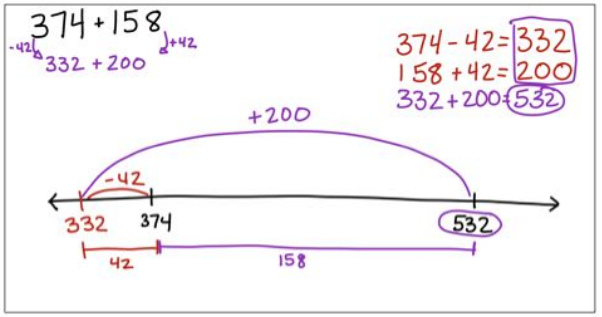
Students use relational thinking to develop fact fluency within 10 and then extend those fact patterns to greater numbers.

Uses understanding of combinations to 10 to find combinations to 20.	Uses understanding of combinations to 10 to find multiple of 10s partners to 100.	Uses understanding of combinations to 10 to find multiple of 100s partners to 1000.	Uses understanding of combinations to 1s, 10s, 100s to add any numbers within 1000.
 6 + 4 = 10 so 16 + 4 = 20  	 6 + 4 = 10 so 60 + 40 = 100  **56 + ___ = 100** 50 + 40 = 90 6 + 4 = 10 90 + 10 = 100 **56 + 44 = 100** 	 6 + 4 = 10 so 600 + 400 = 1000  **560 + ___ = 1000** 500 + 400 = 900 60 + 40 = 100 900 + 100 = 1000 **560 + 440 = 1000** 	**See model/strategy charts on the following pages for examples of adding and subtracting within 1000.**

Use Place Value to compose, decompose and recompose

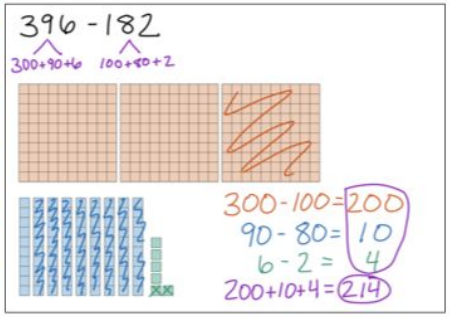
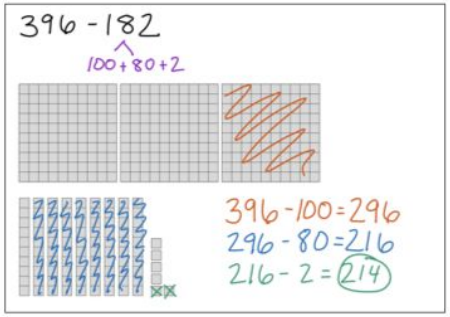
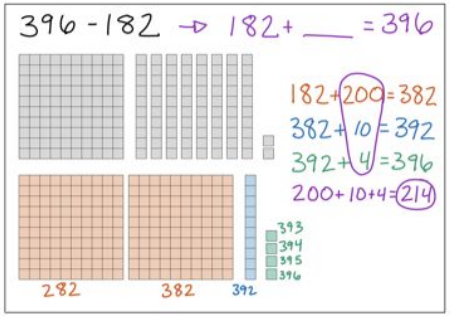
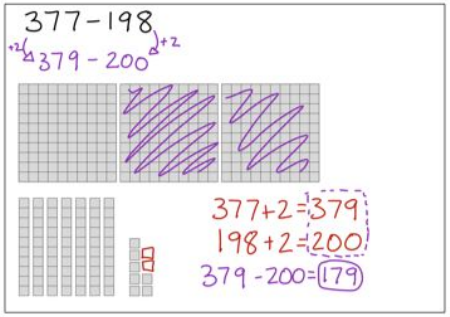
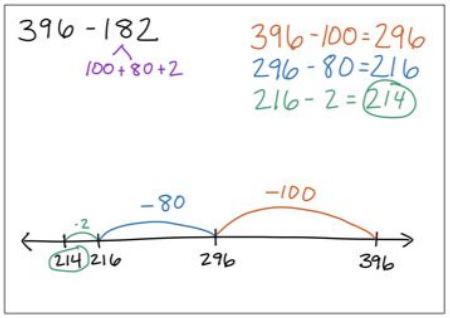
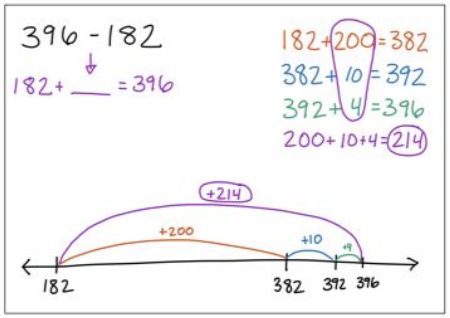
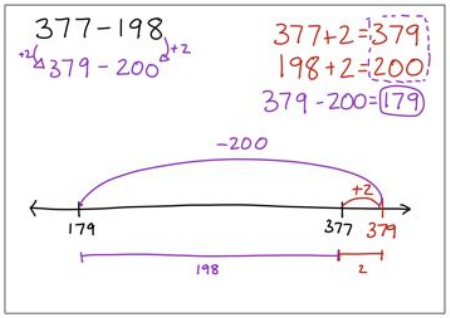
Decompose both numbers to add and subtract, decompose one number to add and subtract, recompose like units, missing addend, compensation
There is an explicit connection between counting and addition (i.e. counting 10 more is the same as adding 10, counting back 10 is the same as subtracting 10).

Models & Strategies for Addition

Models	Place Value: Decompose both numbers	Place Value: Decompose one number	Compensation
Ten Frames	Ten Frames are not an efficient model for 3-digit computation. See Grade 1 Progression for examples with 2-digit numbers.		
Place Value Materials			
Number Lines			

**We recommend starting with articulated number lines in Grade 2, and then connecting them to open number lines while moving from 2-digit to 3-digit computation.*

Models & Strategies for Subtraction

Models	Strategies: Place Value: Decompose both numbers	Place Value: Decompose one number	Missing Addend	Compensation
Ten Frames	Ten Frames are not an efficient model for 3-digit computation. See Grade 1 Progression for examples with 2-digit numbers.			
Place Value Materials				
Number Lines	Number Lines are not an appropriate model for this strategy.			

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