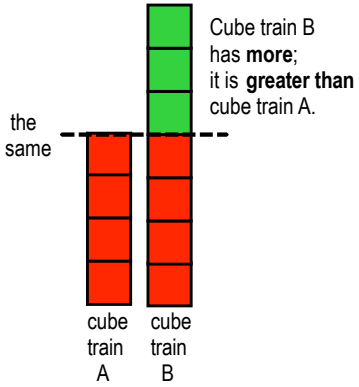
Grade 1 ~ Benchmark 1 ~ Instructional Support

The first Benchmark is dedicated to building number sense using numbers 0 – 40: 0 – 20 in block 1, 0 – 30 in block 2, and 0 – 40 in block 3. Most blocks also feature a computation strategy to be developed by students and made explicit during instruction. These strategies most likely encompass those that the students will create and use; consider eliciting these strategies ***from*** the students rather than beginning with direct instruction and presenting them *to* students. Through the process of solving carefully selected and purposeful problems, most students will likely use the listed strategies; highlight student strategies (among others) whose match the ones listed in each blocks' "Teaching Strategies" column.

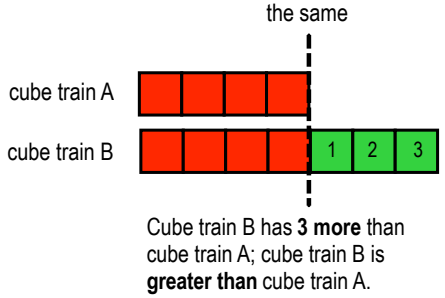
Block 1	Block 2	Block 3
Title : Comparisons • compare numbers in order to better understand the part-whole relationship among numbers and understanding the meaning of greater than, less than when working with numbers. • one more – one less • patterns: identify & create using objects & pictures • money: penny	**Title: Numbers and Patterns** • patterns: making different repeating patterns; in skip counting • sorting & classifying • money: dime	**Title: Addition** • join two sets of numbers that equal simple sums; emphasize the set model. • extend pattern work to include labels

Comparisons: In block 1, students use **qualitative** methods to estimate the difference between two sets of objects. Qualitative estimation is using *words* to estimate: more, less, greater than, and less than. By block 3, students use **quantitative** methods (numbers) to estimate a difference between sets of objects. Students progress from 1) 'I can **see** it's more (or less)', to 2) 'I can **count** to know it's more (or less)', to 3) 'I can use a number line and know that the one further right is greater'.

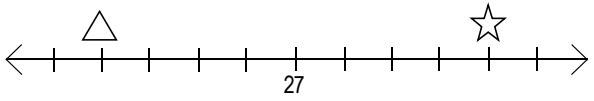
Qualitative Estimating (using words)



Quantitative Estimating (using numbers)



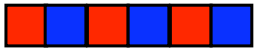
Using a Number Line



My number is greater than 27.

Patterns: In block 2, the focus is on **identifying and creating repeating patterns using objects and pictures.** Later, students will label patterns and use symbolic notation.

Concrete
(cubes or other objects)



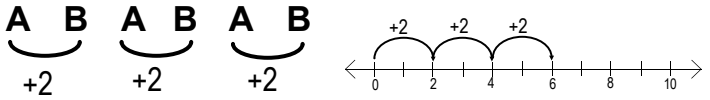
⇒

Pictorial

student drawing

⇒

Symbolic (can be transferred and shown on a number line)



Grade 1 ~ Benchmark 1 ~ Instructional Support (*Continued*)

Addition: Addition means joining or combining sets. The Kindergarten Math Core introduces students to the meaning of addition (and subtraction) for whole numbers less than ten, using manipulatives and pictures to record results. The goal of first grade is to provide a variety of contexts using the three models of addition to wean students off manipulatives and pictures and begin increasingly to do straight arithmetic problems (e.g., 8 + 6 = Δ). It is the variety of models and contexts, not the difficulty of the problem, that builds understanding. Students also engage in a variety of thinking strategies to make computation easier; these thinking strategies include the properties of addition and further work on place value.

Addition Models

Addition can be modeled using a set model and/or a measurement model. Measurement models are linear models that include number lines and bar models. A bar model is simply a thickened number line without marked increments.

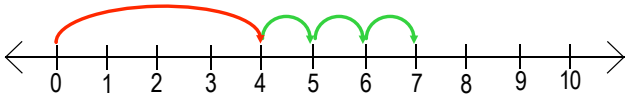
Set Model

Mark had 4 apples. He picked 3 more.
How many apples does Mark have?

4 + 3 = 7

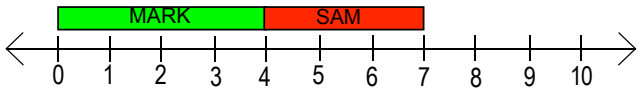
** Caution: When presented only with a set model, students tend to simply count objects starting with 1, 2, … With that approach students are simply counting; they are not thinking about addition.

Measurement Model



Students initially learn to add by 'counting-on'. To find the sum of 4 + 3, the child starts with 4 and counts 3 numbers forward. The number line clearly illustrates counting-on and can be used to clarify confusion. Counting-on is an excellent strategy for adding 1, 2, or 3 to a number. After counting-on is learned, students begin to move beyond counting to manipulating numbers.

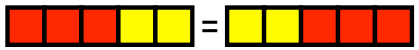
Mark ran 4 miles. Sam ran 3 miles.
How many miles did Mark and Sam run?
4 + 3 = 7 miles



Addition Properties

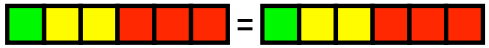
Students begin laying foundations for making generalizations, an algebraic skill, by studying the commutative, associative, and identity properties of addition.

Commutative Property



$3 + 2 = 2 + 3$
$a + b = b + a$

Associative Property



$1+(2+3) = (1+2)+3$
$a+(b+c) = (a+b)+c$

Identity Property of Addition

$5 + 0 = 5$
$n + 0 = n$

Grade 1 ~ Benchmark 2 ~ Instructional Support

Block 4	Block 5	Block 6
Naming, Creating, and Identifying Plane and Solid Figures • name, create and identify plane and solid figures • recognize different components of growing patterns	**Subtraction, Shapes, and Solids** • make relationship between addition and subtraction as inverse operations ('doing' and 'undoing') • compose and decompose shapes and patterns • recognize that 2 or more shapes combined make a larger shape	**Numbers and Data** • introduction to tables, bar graphs, and pictographs

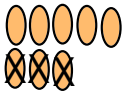
Key Idea: Subtraction

Subtraction is defined as missing addends; addition is the 'doing' and subtraction is the 'undoing'. Though, subtraction is more difficult than addition because while addition is only 'joining', subtraction has three interpretations. Each interpretation can be represented as a set model or a measurement model. The three interpretations are shown in the examples below. ***For whole numbers***, subtraction always begins with the greater number. As with addition, it is the familiarity with all of the interpretations and models that builds understanding, not the difficulty of the problem.

Take-Away Interpretation

Set Model

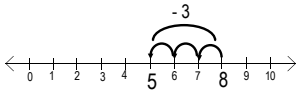
Sarah had 8 eggs. She used 3. How many were left?



8 - 3 = 5

Measurement Model

Kim had 8 feet of ribbon. She used 3 feet to make a bow. How many feet are left?



8 - 3 = 5

Part-Whole Interpretation

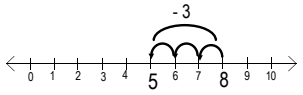
Set Model

The group has 8 students. 3 are boys. How many are girls?

8 - 3 = 5

Measurement Model

Mark drives to a school 8 miles away. Mark has gone 3 miles. How many miles does he have left?



8 - 3 = 5

Comparison Interpretation

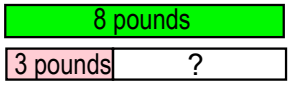
Set Model

Sue has 8 basketballs. Libby has 3 basketballs. How many more basketballs does Sue have?

8 - 3 = 5

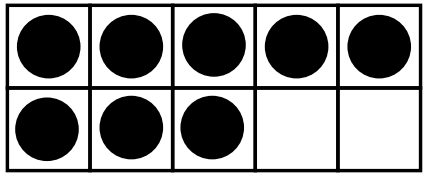
Measurement Model

Matt's hamster weighs 8 pounds. Pete's mouse weighs 3 pounds. How much heavier is Matt's hamster?



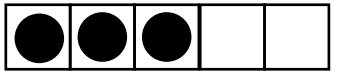
8 - 3 = 5

A **ten-frame** is a 2 x 5 array on which dots are placed to illustrate numbers and their relationships to 10. These relationships are especially useful when thinking about various combinations of numbers. (See example below.) Later, similar relationships can be used in the development of mental computation skills on larger numbers (e.g. 68 + 7). (Van de Walle, 2010, p. 133-134)



Consider how the knowledge of 8 as '5 and 3 more' and as '2 away from 10' can play a role: 5 + 3, 8 + 6, 8 – 2, 8 – 3, 8 – 4, 13 – 8. Students can discuss the role of 5 and 10 in each of these examples.

Five-Frames



For students in kindergarten or early first grade who have not yet explored a ten-frame, it is a good idea to begin with a five-frame. After a week or so, introduce ten-frames.

Grade 1 ~ Benchmark 3 ~ Instructional Support

Block 7	Block 8	Block 9
Numbers and Number Patterns • continue using numbers 0 – 100 with number lines in sequencing, skip counting, patterning, and in solving addition and subtraction problems (number line models are on **Benchmarks 1 and 2 Instructional Support** pages	**Place Value** • recognize and identify number values for ones, tens, and hundreds • use expanded notation as well as standard form	**Measurement and Operation Meanings** • identify the appropriate **tool** for the attribute to be measured • use standard and non-standard means to measure length, weight, capacity, temperature, and time

Whole-Number Place Value Concepts

Physical models for base-ten concepts can play a key role in helping children develop the idea of 'a ten' as both a single entity and as a set of ten units. Remember, though, that the models do not "show" the concept to the students; the students must mentally construct the concept and impose it on the model. (Van de Walle, 2010, p. 191)

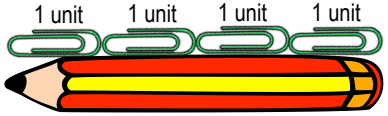
Common Objects That Can Be Grouped
- counters (beans) & cups
- cubes, blocks
- bundles of sticks (craft sticks, coffee stirrers, straws)

Commercial Items Grouped for Base-Ten
- base-ten blocks
- ten-frame cards

Measurement

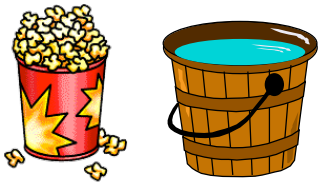
Measurement is a number that tells a comparison between an attribute of an object and the unit of the same attribute. For example, the attribute of length is measured in units of the same attribute, length. You would not use minutes or pounds to measure the length of a bookshelf. To measure length, the comparison can be done by lining up copies of the unit (non-standard or standard) directly against the length being measured. The example below shows the length of the pencil being measured in non-standard units – one paperclip equals one unit.

Length: How long from **beginning to end**?



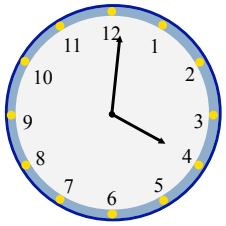
'*Start at the start or you'll only get part*' and '*No gaps or overlaps*'.

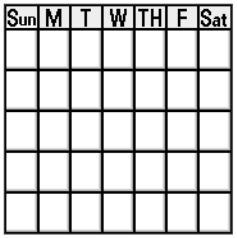
Capacity: How many will **fill** it?



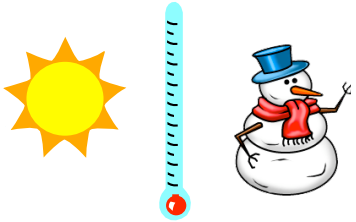
Weight: What is the **pull**, or force, of gravity?

Time: How many minutes (hours, seconds, days, weeks, years, etc…) from **beginning to end**?





Temperature: How **hot or cold**?

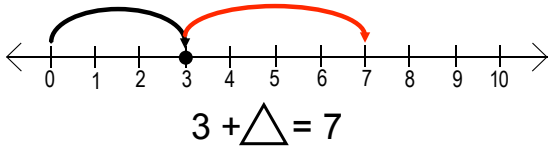


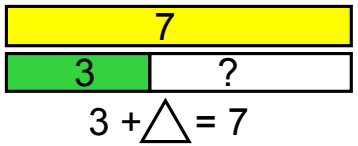
Grade 1 ~ Benchmark 4 ~ Instructional Support

Block 10	Block 11
Addition and Subtraction Relationship • use number sense to perform simple operations with whole numbers, number patterns, and their relationships • part-whole relationships on number lines	**Measurement and Growing Patterns** • identify and use number patterns to describe and represent number relationships • understand simple geometry and measurement concepts • collect, represent, and understand data

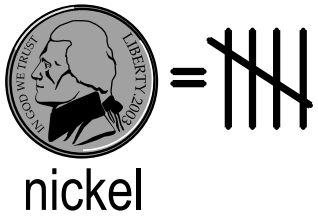
Addition and Subtraction Relationships

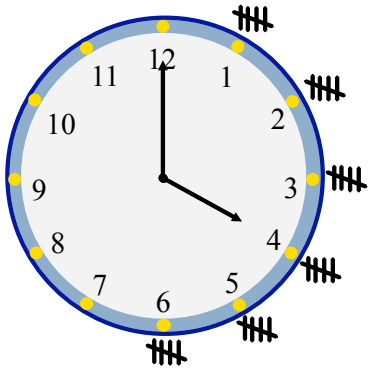
Students progress from *developing* meanings of and relationships between addition and subtraction to *practicing* more abstract and symbolic strategies.





Number patterns, tally marks, money, and time (a few teaching strategies ideas listed in block 11)





Hundreds Chart

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

Growing Patterns: