GRADE ONE

MATHEMATICS	OPERATIONS AND ALGEBRAIC THINKING (ADDING & SUBTRACTING WITHIN 20)
COMMON CORE STANDARDS	
1.OA.1, 1.OA.2, 1.OA.3, 1.OA.4, 1.OA.5, 1.OA.6, 1.OA.7, 1.OA.8, 1.MD.4	

KNOW

(Factual)

Addition & subtraction are related operations.

Subtraction can be perceived as an unknown addend problem.

Addition and subtraction problems can be posed with the missing part being in different positions.

The commutative & associative properties of operations can be used to solve problems (but students do not need to know them by name).

Symbols can represent an unknown quantity in an equation.

Know combinations to 10 fluently.

Strategies: Counting on, Making Ten, Decomposing, Using Known Facts

UNDERSTAND

(Conceptual)

There are multiple ways to represent and find sums/ differences within 20 (story problems, pictures, equations, computational strategies, manipulatives).

An equation must be balanced and the equal sign represents quantities on each side of the symbol as the same (equal).

The relationship between addition & subtraction can be used to solve problems.

DO

(Procedural, Application, Extended Thinking)

Represent and solve problems involving addition and subtraction.
4. Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.1**CC.1.OA.1**
5. Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. **CC.1.OA.2**

Understand and apply properties of operations and the relationship between addition and subtraction.
6. Apply properties of operations as strategies to add and subtract.2*Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)* **CC.1.OA.3**
7. Understand subtraction as an unknown-addend problem. *For example, subtract 10 - 8 by finding the number that makes 10 when added to 8.* **CC.1.OA.4**

Add and subtract within 20.
8. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2). **CC.1.OA.5**
9. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 - 4 = 13 - 3 - 1 = 10 - 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 - 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13). **CC.1.OA.6**

Work with addition and subtraction equations. 10. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 - 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.* **CC.1.OA.7** Footnote to 1.NOA.7: These equations are purposeful in showing students how to determine if an equation is "balanced" (quantity on each side of the equation is the same). 11. Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = ☐ - 3, 6 + 6 = ☐. **CC.1.OA.8**

Connections to other Domains &/or Clusters:

Represent and interpret data. 4. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. **CC.1.MD.4**

*Footnote for 1.NOA.3: Students need not use formal terms for these properties. Solve subtraction problems by "adding on". Students use the counting sequence to solve addition facts and write number sentences efficiently. (+0, +1, +2) Knowing that 18 follows 17 is the same as knowing 17 + 1 = 18. Footnote to 1.NOA.8: Just as we teach word problems with unknowns in all positions (1.NOA.1) this standard asks teachers to have students practice equations with unknowns in all positions.

GRADE ONE

MATHEMATICS	NUMBER AND OPERATIONS IN BASE TEN
COMMON CORE STANDARDS	
1.NBT.1, 1.NBT.2, 1.NBT.2a-c, 1.NBT.3, 1.NBT.4, 1.NBT.5	

KNOW	DO
(Factual)	*(Procedural, Application, Extended Thinking)*
The two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: **CC.1.NBT.2** a. 10 can be thought of as a bundle of ten ones — called a "ten." **CC.1.NBT.2a** b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. **CC.1.NBT.2b** c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones). **CC.1.NBT.2c** "10 more" means one more group of tens and "ten less" means one less group of tens. Counting can start with any number (not always with 1). Numbers can be represented in many ways. The placement of the numeral determines its place value meaning (i.e the 5 in 56 means 5 tens or 50. Whereas the 5 in 15 means 5 ones.)	**Extend the counting sequence.** 1. Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral. **CC.1.NBT.1** 3. Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <. **CC.1.NBT.3** **Use place value understanding and properties of operations to add and subtract.** 5. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. **CC.1.NBT.5** Compose and decompose teen numbers into tens and ones. Use models (ten frames, hundreds chart, number line, ten train (cubes), to represent any 2-digit number in tens and ones up to 120. Students practice counting around the decades (e.g. 48, 49, 50, 51, 52). **Use place value understanding and properties of operations to add and subtract.** 6. Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. **CC.1.NBT.4**
UNDERSTAND	
(Conceptual)	
The digits of a 2-digit number represent tens and ones.	

GRADE ONE

MATHEMATICS	NUMBER AND OPERATIONS IN BASE TEN
COMMON CORE STANDARDS	
1.NBT.4, 1.NBT.5, 1.NBT.6	

KNOW	DO
(Factual)	*(Procedural, Application, Extended Thinking)*
Addition & Subtraction are related operations. 10 more or 10 less of any number under 100 mentally. How to add and subtract multiples of 10 to any number (by 20, 30, 70, etc.). Place value strategies can be used to add 2-digit plus 1-digit numbers. Place value strategies for adding & subtracting (counting on, making 10's/100's, breaking apart and putting together, using known facts). Commutative & associative properties of operations can be used to solve problems: (For example students know that if 20+40=60, then 40+20=60 without actually naming the commutative property) Models for adding & subtracting (number line, base ten materials). Methods for recording addition & subtraction strategies using number lines & equations. Symbols can represent an unknown quantity in an equation.	**Use place value understanding and properties of operations to add and subtract.** 4. Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. **CC.1.NBT.4** 5. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. **CC.1.NBT.5** 6. Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. **CC.1.NBT.6** Students will transfer strategies used for adding to 20 to adding to 100. **Represent and interpret data.** 4. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. **CC.1.MD.4**
UNDERSTAND	
(Conceptual)	
When adding two-digit numbers, one adds tens and tens, and then the ones and ones.	

GRADE ONE

MATHEMATICS COMMON CORE STANDARDS 1.MD.1, 1.MD.2, 1.MD.3	MEASUREMENT (LENGTH & TIME)
KNOW	DO
(Factual)	*(Procedural, Application, Extended Thinking)*
Any object can be used as a length unit. The length of two objects can be compared by using the same unit of measure. Analog and digital clocks are used to measure time. Know how to tell time to the hour and half hour (see geometry 1.G.3 as a model for the idea that a half hour is half of a circle.)	**Measure lengths indirectly and by iterating length units.** 7. Order three objects by length; compare the lengths of two objects indirectly by using a third object. **CC.1.MD.1** 8. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.* **CC.1.MD.2** **Tell and write time.** 9. Tell and write time in hours and half-hours using analog and digital clocks. **CC.1.MD.3**
UNDERSTAND	
(Conceptual)	
Lengths of objects can be measured and compared using non-standard units.	

<table>
<tr><th colspan="2">GRADE ONE</th></tr>
<tr><td>MATHEMATICS
COMMON CORE STANDARDS
1.MD.4</td><td>DATA (REPRESENT & INTERPRET)</td></tr>
<tr><td>KNOW</td><td>DO</td></tr>
<tr><td>(Factual)</td><td>(Procedural, Application, Extended Thinking)</td></tr>
<tr><td>Organizing data can help with interpreting and answering questions posed.

Data can be represented in multiple ways (e.g., line plots, bar graphs/towers of cubes, Venn diagrams, tables)

How we interpret data changes depending on the context of the question being asked.</td><td rowspan="4">Represent and interpret data.
10. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.
CC.1.MD.4

Use line plots, bar graphs (towers of cubes), Venn diagrams, and tables to organize and represent data.

Interpret data results by counting or using arithmetic strategies.

This KUD connects to addition and subtraction standards in Operations & Algebraic Thinking and Number & Operations in Base Ten.</td></tr>
<tr><td>UNDERSTAND
(Conceptual)</td></tr>
<tr><td>Organizing, representing, & interpreting data allows for careful analysis and answering questions posed. Data can be interpreted numerically or categorically.

(Think about these understandings…)</td></tr>
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<tr><th colspan="2">GRADE ONE</th></tr>
<tr><td>MATHEMATICS
COMMON CORE STANDARDS
1.G.1, 1.G.2, 1.G.3</td><td>GEOMETRY REASON WITH SHAPES & THEIR ATTRIBUTES</td></tr>
<tr><td>KNOW</td><td>DO</td></tr>
<tr><td>(Factual)</td><td>(Procedural, Application, Extended Thinking)</td></tr>
<tr><td>Shapes can be sorted according to their defining geometric attributes such as the number of sides or closed/open figure (not by non-defining attributes such as color, size, orientation, etc.) For example: A triangle is a triangle no matter what color, size or orientation.

Shapes can be composed and decomposed into other shapes.

Equal partitions of shapes can be described as halves, fourths, as well as half of, fourth of.

Distinguishing features of 2D and 3D shapes.</td><td rowspan="3">Reason with shapes and their attributes.
1. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes. CC.1.G.1

2. Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.3CC.1.G.2

Use pattern blocks, geoboards, tangrams, etc, to compose composite shapes.

3. Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares. CC.1.G.3

Student's first work with fractional ideas comes from a study of symmetry. Folding circles and rectangles (and squares) into 2 or 4 equals shares defines halves and fourths</td></tr>
<tr><td>UNDERSTAND
(Conceptual)</td></tr>
<tr><td>Shapes have defining attributes that can be compared to other shapes.

Decomposing a shape into more equal shares creates smaller pieces.</td></tr>
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