Pike County School District

Standards Mastery Document

1st Grade Mathematics
Revised 2019

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Standards Mastery Document – Revised 2019
1st Grade Mathematics

The Standards Mastery Document is designed for educators by educators as a resource and tool to help educators increase their depth of understanding of the Common Core Standards. This document will enable teachers to plan College & Career Ready curriculum and classroom instruction that promotes inquiry and higher levels of cognitive demand.

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education.

8 Mathematical Practices (MP):

MP 1. Make sense of problems and persevere in solving them.
MP 2. Reason abstractly and quantitatively.
MP 3. Construct viable arguments and critique the reasoning of others.
MP 4. Model with mathematics.
MP 5. Use appropriate tools strategically.
MP 6. Attend to precision.
MP 7. Look for and make use of structure.
MP 8. Look for and express regularity in repeated reasoning.

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Kentucky Academic Standards for Mathematics: Grade 1 Overview

Operations/Algebraic Thinking (OA)	Number and Operations in Base Ten (NBT)	Measurement and Data (MD)	Geometry (G)
• Represent and solve problems involving addition and subtraction. • Understand an apply properties of operations and the relationship between addition and subtraction. • Add and subtract within 20. • Work with addition and subtraction equations.	• Extend the counting sequence. • Understand place value. • Use place value understanding and properties of operations to add and subtract.	• Measure lengths indirectly and by iterating length in units. • Work with time and money. • Understand and apply the statistics process.	• Reason with shapes and their attributes.

In grade 1, instructional time should focus on four critical areas:

1. **In the Operations and Algebraic Thinking domain, students will:**
   - develop strategies for adding and subtracting whole numbers based on their prior work with small numbers;
   - use a variety of models, including discrete objects and length-based models (e.g., cubes connected to form lengths), to model add-to, take-from, put-together, take apart and compare situations to develop meaning for the operations of addition and subtraction, and to develop strategies to solve arithmetic problems with these operations;
   - understand connections between counting and addition and subtraction (e.g., adding two is the same as counting on two);
   - use properties of addition to add whole numbers and to create and use increasingly sophisticated strategies based on these properties (e.g., "making tens") to solve addition and subtraction problems within 20; and
   - build their understanding of the relationship between addition and subtraction by comparing a variety of solution strategies.

2. **In the Number and Operations in Base Ten domain, students will:**
   - develop, discuss and use efficient, accurate and generalizable methods to add within 100 and subtract multiples of 10;
   - compare whole numbers (at least to 100) to develop understanding of and solve problems involving their relative sizes;
   - think of whole numbers between 10 and 100 in terms of tens and ones (especially recognizing the numbers 11 to 19 as composed of a ten and some ones); and
   - understand the order of the counting numbers and their relative magnitudes through activities that build number sense.

3. **In the Measurement and Data domain, students will:**
   - develop an understanding of the meaning and processes of measurement, including underlying concepts such as iterating (the mental activity of building up the length of an object with equal-sized units) and the transitivity principle for indirect measurement.*

4. **In the Geometry domain, students will:**
   - compose and decompose plane or solid figures and build understanding of part-whole relationships as well as the properties of the original and composite shapes;
   - recognize them from different perspectives and orientations;
   - describe their geometric attributes;
   - determine how they are alike and different, to develop the background for measurement and for initial understandings of properties such as congruence and symmetry.

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Table 1
Common Addition and Subtraction Situations[1]

	Result Unknown	**Change Unknown**	**Start Unknown**
Add To	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? 2+3=**?**	Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? 2+**?**=5	Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? **?**+3=5
Take From	Five apples were on the table. I ate two apples. How many apples are on the table now? 5–2=**?**	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? 5-**?**=3	Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? **?**–2=3
	Total Unknown	**Addend Unknown**	**Both Addends Unknown3**
Put Together/ Take Apart[2]	Three red apples and two green apples are on the table. How many apples are on the table? 3+2=**?**	Five apples are on the table. Three are red and the rest are green. How many apples are green? 3 + **?** = 5, 5 – 3 = **?**	Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? 5 = 0 + 5, 5 = 5 + 0 5 = 1 + 4, 5 = 4 + 1 5 = 2 + 3, 5 = 3 + 2
	Difference Unknown	**Bigger Unknown**	**Smaller Unknown**
Compare	**("How many more?" version):** Lucy has two apples. Julie has five apples. How many more apples does Lucy have than Julie?	**(Version with "more"):** Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have?	**(Version with "more"):** Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have?
	("How many fewer?" version): Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie? 2 + **?** = 5, 5 – 2 = **?**	(Version with "fewer"): Lucy has three fewer apples than Julie. Lucy has two apples. How many apples does Julie have? 2 + 3 = **?**, 3 + 2 = **?**	(Version with "fewer"): Lucy has three fewer apples than Julie. Julie has five apples. How many apples does Lucy have? 5 – 3 = **?**, **?** + 3 = 5

Blue shading indicates the four Kindergarten problem subtypes. Students in grades 1 and 2 work with all subtypes and variants (blue and green). Yellow indicates problems that are the difficult four problem subtypes students in grade 1 work with but do not need to master until grade 2.

1 Adapted from Box 2-4 of National Research Council (2009, op. cit., pp. 32, 33).

2 These *take apart* situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean *makes* or *results in* but always does mean *is the same number as*.

3 Either addend can be unknown, so there are three variations of these problem situations. Both Addends Unknown is a productive extension of this basic situation especially for small numbers less than or equal to 10. 4 For the Bigger Unknown or Smaller Unknown situations, one version directs the correct operation (the version using *more* for the bigger unknown and using *less* for the smaller unknown). The other versions are more difficult.

Table 2
Common Multiplication and Division Situations1

	Unknown Product	Group Size Unknown	Number of Groups Unknown
	3×6=**?**	**3 × ? = 18 and 18 ÷ 3 = ?**	**? × 6 = 18 and 18 ÷ 6 = ?**
Equal Groups	There are 3 bags with 6 plums in each bag. How many plums are there in all? Measurement example: you need 3 lengths of string, each 6 inches long. How much string will you need all together?	If 18 plums are shared equally into 3 bags, then how many plums will be in each bag? Measurement example: you have 18 inches of string which you will cut into 3 equal pieces. How long will each piece of string be?	If 18 plums are to be packed 6 to a bag, then how many bags are needed? Measurement example: you have 18 inches of string which you will cut into pieces that are 6 inches long. How many pieces of string will you have?
Arrays[2] Area[3]	There are three rows of apples with 6 apples in each row. How many apples are there? Area example: what is the area of a 3 cm by 6 cm triangle?	If 18 apples are arranged into 3 equal rows, how many apples will be in each row? Area example: a rectangle has area of 18 square centimeters. If one side is 3 cm long, how long is a side next to it?	If 18 apples are arranged into equal rows of 6 apples, how many rows will there be? Area example: a rectangle has area of 18 square centimeters. If one side is 6 cm long, how long is the side next to it?
Compare	A blue hat costs $6. A red hat costs 3 times as much as the blue hat. How much does the red hat cost? Measurement example: a rubber band is 6 cm long. How long will the rubber band be when it is stretched to be 3 times as long?	A red hat costs $18 and that is 3 times as much as a blue hat costs. How much does a blue hat cost? Measurement example: a rubber band is stretched to be 18 cm long and is 3 times as long as it was at first. How long was the rubber band at first?	A red hat costs $18 and a blue hat costs $6. How many times as much does the red hat cost as the blue? Measurement example: a rubber band was 6 cm long at first. Now it is stretched to be 18 cm long. How many times as long is the rubber band now as it was at first?
General	***a×b=?***	***a × ? = p and p ÷ a = ?***	***? × b =p and p ÷ b = ?***

1 The first examples in each cell are examples of discrete things. These are easier for students and should be given before the measurement examples.

2 The language in the array examples shows the easiest form of array problems. A harder form is to use the terms rows and columns: the apples in the grocery window are in 3 rows and 6 columns. How many apples are in there? Both forms are valuable.

3 Area involves arrays of squares that have been pushed together so that there are no gaps or overlaps, so array problems include these especially important measurement situations.

Table 3 Properties of Operations

The variables *a*, *b* and *c* stand for arbitrary numbers in a given number system.
The properties of operations apply to the rational number system, the real number system and the complex number system.

Associative property of addition	$(a + b) + c = a + (b + c)$
Commutative property of addition	$a+b=b+a$
Additive identity property of 0	$a+0=0+a=a$
Existence of additive inverses	For every a there exists –a so that a + (-a) = (-a) + a = 0
Associative property of multiplication	$(a \times b) \times c = a\ x\ (b \times c)$
Commutative property of multiplication	$a \times b = b \times a$
Multiplicative identity property of 1	$a \times 1 = 1 \times a = a$
Existence of multiplicative inverses	For every $a \neq 0$ there exists 1/a so that $a \times 1/a = 1/a \times a = 1$
Distributive property of multiplication over addition	$a \times (b + c) = a \times b + a \times c$

Table 4 Properties of Equality

The variables *a*, *b* and *c* stand for arbitrary numbers in the rational, real or complex number systems.

Reflexive property of equality	$a=a$
Symmetric property of equality	If $a = b$, then $b = a$
Transitive property of equality	If $a = b$ and $b = c$, then a=c
Addition property of equality	If a = b, then a + c = b + c
Subtraction property of equality	If a = b, then a – c = b – c
Multiplication property of equality	If a = b, then a x c = b x c
Division property of equality	If a = b and c ≠0, then a ÷ c = b ÷ c
Substitution property of equality	If a = b, then b may be substituted for a in any expression containing a.

Table 5 Properties of Inequality

The variables *a*, *b* and *c* stand for arbitrary numbers in the rational or real number systems.

Exactly one of the following is true: a < b, a = b, a > b
If a > b and b > c then a > c
If a > b, then b < a
If a > b, then –a < -b
If a > b, then a ± c > b ± c
If a > b and c > 0, then a x c > b x c
If a > b and c < 0, then a x c < b x c
If a > b and c > 0, then a ÷ c > b ÷ c
If a > b and c < 0, then a ÷ c < b ÷ c

Table 6
Fluency Standards across All Grade Levels

Grade	Coding	Fluency Standards
K	**KY.K.OA.5**	Fluently add and subtract within 5.
1	**KY.1.OA.6**	Fluently add and subtract within 10.
2	**KY.2.OA.2 KY.2.NBT.5**	Fluently add and subtract within 20. Fluently add and subtract within 100.
3	**KY.3.OA.7 KY.3.NBT.2**	Fluently multiply and divide within 100. Fluently add and subtract within 1000.
4	**KY.4.NBT.**	Fluently add and subtract multi-digit whole numbers using an algorithm.
5	**KY.5.NBT.5**	Fluently multiply multi-digit whole numbers (not to exceed four-digit by two-digit multiplication) using an algorithm.
6	**KY.6.NS.2 KY.6.NS.3 KY.6.EE.2**	Fluently divide multi-digit numbers using an algorithm. Fluently add, subtract, multiply and divide multi-digit decimals using an algorithm for each operation. Write, read and evaluate expressions in which letters stand for numbers.

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Operations and Algebraic Thinking

Standard: 1.OA.1

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.

Enduring Skills:

MP 1: Make sense of problems and persevere in solving them
MP 2: Use quantitative reasoning

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Know combinations of 10 (make 10 strategy) Explore addition and subtraction with manipulatives to build their conceptual understanding (e.g., snap cubes, subitizing cards, tens frames, hundreds charts, number lines and empty number lines) Take apart and combine numbers in a wide variety of ways	Make sense of quantity and be able to compare numbers Students flexibly model or represent addition and subtraction situations or context problems (involving sums and differences up to 20). **See Table 1**	Solve addition and subtraction word problems using objects, drawings, and equations Apply the knowledge of addition and subtraction to choose the most efficient strategy to solve a problem Explain their reasoning in choosing a strategy to solve a problem Solve word problems with unknown numbers in different positions (e.g., 6 + _ =8, 8= 6 + _).

KY.1.MD.4 Coherence KY.K.OA.2→ KY.1.OA.1→KY.2.OA.1

Note: Drawings need not show detail, but accurately represent the quantities involved in the task.

**The equal sign means "is the same as" but most primary students believe the equal sign tells you that the "answer is coming up" to the right of the equal sign. First graders need to see equations written multiple ways, for example 5 + 7 = 12 and 12 = 5 + 7.*

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Operations and Algebraic Thinking

Standard: 1.OA.2

Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20 by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

Enduring Skills:

MP 1: Make sense of problems and persevere in solving them
MP 4: Model with mathematics
MP 5: Use appropriate tools strategically.

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Add and subtract with sums to 10 Count on (one more, two more, etc.) Decompose a number in order to use a ten Use doubles	Use mental strategies (e.g., count on, make a ten) to add numbers within 20 Be able to state what is happening in the problem Identify what they are looking for in each problem situation Students flexibly model or represent addition situations or context problems (involving adding three quantities and have a sum less than or equal to 20).	Add numbers in any order and be able to identify the most efficient way to solve the problem Add three whole numbers whose sum is less than or equal to 20 Students represent situations using numbers and symbols. For example, students translate "There are ten apples. Some were eaten. Three Remain. How many were eaten?" into an equation such as 10 - _ = 3?

KY.1.MD.4 Coherence KY.1.OA.2. →KY.2.NBT.6

Note: Drawings need not show detail, but accurately represent the quantities involved in the task.

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Operations and Algebraic Thinking

Standard: 1.OA.3

Apply properties of operations as strategies to add and subtract.

Enduring Skills:

MP 2: Reason abstractly and quantitatively
MP 7: Look for and make use of structure

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Know basic concept of addition and subtraction; (put together/take apart.) Flexibly model or represent addition and subtraction situations.	Use representations to solve addition and subtraction problems involving various properties and write equations for the problems that are modeled Demonstrate a conceptual understanding of different properties (commutative and associative)	Given specific situations students describe patterns and make generalizations Explain reasoning to others when solving problems using these properties, such as students generalize this idea (the commutative property) to all addition situations, for example, explaining that switching two piles of counters doesn't change how many are there. Students notice the order and manner in which multiple addends are combined does not affect the sum (the associative property) Students reason 10 – 8 = ? also means 8 + ? = 10; therefore, they solve the problem by asking themselves what is the number added to eight to make 10.

Coherence KY.K.OA.2→KY.1.OA.3→KY.2.NBT.9

*The order of the addends does not change the total (commutative property)
* When I add a number to 0, I get the number I started with (identity element for addition)
* When I subtract 0 from a number, the number does not change (identity element for subtraction)

**Although subtraction is not commutative, it is VERY important not to contribute to a potential misconception by saying that you cannot take a larger number from a smaller number. It is appropriate to say 8 – 5 ≠ 5-8*

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Operations and Algebraic Thinking

Standard: 1.OA.4

Understand subtraction as an unknown-addend problem.

Enduring Skills:

MP 2: Reason abstractly and quantitatively
MP 4: Model with mathematics
MP 7: Look for and make use of structure

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Be able to count on /count back	Use concrete models with manipulatives to find the unknown	Explain how a subtraction equation can be rewritten as an addition equation. Students connect addition and subtraction as operations. (I can solve 10-8 by thinking about what adds to eight to make 10 (_+8=10) (Inverse Operation)

Coherence KY.K.OA.2→KY.1.OA.4→KY.2.NBT.9

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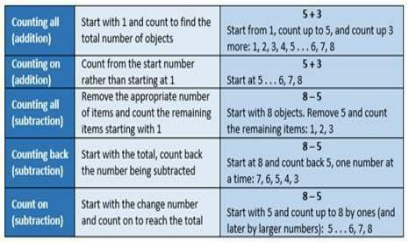
Operations and Algebraic Thinking

Standard: 1.OA.5

Relate counting to addition and subtraction.

Enduring Skills:

MP 5 Use appropriate tools strategically.
MP 8: Look for and express regularity in repeated reasoning

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Basic concept of addition and subtraction. Count on/count back.	Demonstrate the ability to use various strategies when relating addition to subtraction counting all (addition); counting on (addition); counting all (subtraction); counting back (subtraction); counting on (subtraction). 	Choose the most efficient strategy to solve a given problem and explain reasoning.

Counting all (addition)	Start with 1 and count to find the total number of objects	**5 + 3** Start from 1, count up to 5, and count up 3 more: 1, 2, 3, 4, 5 . . . 6, 7, 8
Counting on (addition)	Count from the start number rather than starting at 1	**5 + 3** Start at 5 . . . 6, 7, 8
Counting all (subtraction)	Remove the appropriate number of items and count the remaining items starting with 1	**8 – 5** Start with 8 objects. Remove 5 and count the remaining items: 1, 2, 3
Counting back (subtraction)	Start with the total, count back the number being subtracted	**8 – 5** Start at 8 and count back 5, one number at a time: 7, 6, 5, 4, 3
Count on (subtraction)	Start with the change number and count on to reach the total	**8 – 5** Start with 5 and count up to 8 by ones (and later by larger numbers): 5 . . . 6, 7, 8

KY.K.CC.4→KY.1.OA.5→KY.1.OA.6

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Operations and Algebraic Thinking

Standard: 1.OA.6

Add and subtract within 20

a. Fluently add and subtract within 10.
b. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making 10; decomposing a number leading to a 10; using the relationship between addition and subtraction; creating equivalent but easier or known sums.

Enduring Skills:

MP 2: Reason abstractly and quantitatively
MP 7: Look for and make use of structure.
MP 8: Look for and express regularity in repeated reasoning.

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Count forward and backward Add and subtract within 10 Compose/Decompose numbers within 20.	Students solve addition and subtraction tasks (with sums and differences within 10) efficiently, accurately, flexibly, and appropriately using strategies such as counting on, decomposing, and using relationships. As students count on, they count on from the larger addend (solving 9 + 3 instead of 3 + 9) recognizing this is more efficient this is more efficient and addition is commutative.	Students make 10 (8+6=8+2+4=10+4=14); decompose a number leading to a ten (13-4=13-3-1=10-1=9); know 8+4=12 and know 12-8=4 using the relationship between addition and subtraction; create equivalent, but easier or known sums, adding 6+7 by creating 6+6+1=12+1=13 Students recognize sums such as 8 + 9 are not efficiently solved by counting on and number relationships can be used to determine the sum.

KY.1.NBT.4 Coherence KY.K.OA.2→KY.1.OA.6→KY.2.OA.2→ KY.K.OA.3→ KY.K.OA.4→ KY.K.OA.5

**Note: Being fluent means students choose flexibly among methods and strategies to solve contextual and mathematical problems, they understand and explain their approaches, and they produce accurate answers efficiently.*

Reaching fluency is an ongoing process that will take much of the year.

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Operations and Algebraic Thinking

Standard: 1.OA.7

Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false.

Enduring Skills:

MP 2: Reason abstractly and quantitatively
MP 3: Construct viable arguments and critique the reasoning of others.

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Compare quantities as less than, more than or same as Know how to fluently add and subtract within 10	Students determine which of the following equations are true and which are false: 6=6, 7=8-1, 5+2=2+5, 4+1=5+2	Explain that the equal sign means "same as." After writing their equations, justify their thinking, using concrete materials or words to show that both sides of the equation show the same amount. This reasoning is used to solve missing-value problems such as 8 + 5 = _ + 6. Students reason that because that because six is one more than five, the missing addend must be one less than eight.

Coherence KY.1.OA.7→KY.2.OA.4

**Many students think that the equals sign means that an operation must be performed on the numbers on the left and the result of this operation is written on the right. They think that the equal sign is like an arrow that means becomes and one number cannot be alone on the left. Students often ignore the equal sign in equations that are written in a nontraditional way. For instance, students find the incorrect value for the unknown in the equation 9 =Δ - 5 by thinking 9 – 5 = 4. It is important to provide equations with a single number on the left as in 18 = 10 + 8. Showing pairs of equations such as 11 = 7 + 4 and 7 + 4 = 11 gives students experiences with the meaning of the equal sign as is the same as and equations with one number to the left. Students also need to see equations such as 8 = 8 and 8 = 8 + 0.*

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Operations and Algebraic Thinking

Standard: 1.OA.8

Determine the unknown whole number in an addition or subtraction equation relating three whole numbers.

Enduring Skills:

MP 1: Make sense of problems and persevere in solving them
MP 2: Reason abstractly and quantitatively

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Counting on/counting back Decompose a number leading to a 10 Relate addition and subtraction	After solving various problems using concrete materials, write equations to represent their work symbolically Ability to take apart and combine numbers in a wide variety of ways Students determine the unknown number that makes the equation true in each of the equations 8+? =11, 5=? -3, 6+6=__.	Explain the strategy used to find the unknown value in an equation.

KY.1.OA.7 Coherence KY.1.OA.8

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Number Base Ten

Standard: 1.NBT.1

Count and represent numbers.

a. Count forward to and backward from 120, starting at any number less than 120.
b. In this range, read and write numerals and represent a number of objects with a written numeral.

Enduring Skills:

MP 2: Reason abstractly and quantitatively.
MP 5: Use appropriate tools strategically.
MP 8: Look for and express regularity in repeated reasoning

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Count forward and backward within 100. Read and write a number to 100 Explore visual representations of numerals, matching a visual representation to a set to a numeral	Count forward and backward within 120 starting at any number State number directly before/after a given number within 120	Students recognize repeated sequences emerges as they cross into decade families and use those patterns to start a count from anywhere between 0 and 120. In creating a representation of a number, students select a tool or picture that can be grouped to show tens and ones. For example, students bundle sticks into two bundles of ten and three remaining sticks, connect this to the numeral "23."

Coherence KY.K.CC.2→KY.1.NBT.1→KY.2.NBT.2

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Number Base Ten

Standard: 1.NBT.2.abc

Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones — called a "ten."
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
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).

Enduring Skills:

MP 5: Use appropriate tools strategically.
MP 7: Look for and make use of structure.

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Compose/decompose numbers within 10 Represent 10 as ten ones Ability to count by tens and ones Ability to use base ten manipulatives to represent two-digit numbers & to build and compare ten ones and ten.	Represent numbers 11 to 19 as a ten and some ones Knowledge of the connection between numerals, words, and quantities Knowledge that two-digit numbers are composed of bundles of tens and leftover ones such as 1 ten (a bundle) and 10 ones Students use concrete models and drawings, as well as strategies based on place value, properties of operations, and the relationship between addition and subtraction.	Explain the value of each digit in a two-digit number (place value) Describe groupings using place value terms such as 17 is 1 ten and 7 ones Explore multiples of ten with no ones left over (40 is 4 groups of ten with no ones left over) Describe the decade numbers using words that include numbers of groups of 10 such as 30 is 3 tens When solving any problem, students choose to use a concrete model or a drawing. Their strategy is based on place value, properties of operations or the relationship between addition and subtraction. A written expression shows a strategy using words, pictures, and/or numbers.

Coherence KY.K.NBT.1→KY.1.NBT.2→KY.2.NBT.1

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Number Base Ten

Standard: 1.NBT.3

Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.

Enduring Skills:

MP 2: Reason abstractly and quantitatively.

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Compare numbers to 100 with or without symbols using the terms less, greater, or equal (same) Use base ten manipulatives to represent the numbers and model the comparison of their values	Students use tools such as objects on place value charts, tens frames, hundred charts, and number lines to compare two-digit numbers.	Students describe the comparisons using terms such as greater than, more than, less than, fewer than, equal to, and same as. Students justify their reasoning. Students compare two-digit numbers written as numerals. When comparing two two-digit numbers, students interpret the inherent value of each digit (22 is two tens with two remaining ones) and determine which number is larger. For example, students realize that 32 is greater than 23 because of the value of its digits.

Coherence KY.K.CC.7→KY.1.NBT.3→KY.2.NBT.4

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Number Base Ten

Standard: 1.NBT.4

Add within 100, including adding a two-digit number and a one-digit number. Add a two-digit number and a multiple of 10.
a. Add within 100 using

- using concrete models or drawings
- strategies based on place value
- properties of operations
- the relationship between addition and subtraction

b. Relate the addition 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

Enduring Skills:

MP 2: Reason abstractly and quantitatively.
MP 3: Construct viable arguments and critique the reasoning of others.
MP 7: Look for and make use of structure.

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
How to use concrete materials to compose numerals to 100 Counting on/making tens/doubles Addition and subtraction families Knowledge of place value	Students model addition examples with sums to 100 using concrete materials, pictures and numerals.	Students use mental computation strategies to develop conceptual understanding and number sense around adding one-and two-digit numbers. Make estimates to determine if an answer is reasonable.

KY.2.NBT.7 Coherence KY.1.NBT.4→KY.2.NBT.5

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Number Base Ten

Standard: 1.NBT.5

Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used

Enduring Skills:

MP 2: Reason abstractly and quantitatively.
MP 8: Look for and express regularity in repeated reasoning.

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Finding one more or one less using concrete materials such as a number line or hundred chart Count by tens Knowledge of fact families Ability to model addition using base ten manipulatives	Skip count by tens Students use materials and strategies to add or subtract 10 from any given number in the range 1 to 100.	Mentally find 10 more for any two-digit number (e.g., 32 + 10 = 42) Mentally find 10 less for any two-digit number (e.g., 32 - 10 = 22)

Coherence KY.1.NBT.5→KY.2.NBT.8

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Number Base Ten

Standard: 1.NBT.6

Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences)

a. Subtract using
- concrete models or drawings
- strategies based on place value
- properties of operations
- the relationship between addition and subtraction

b. Relate the subtraction strategy to a written method and explain the reasoning used.

Enduring Skills:

MP 3: Construct viable arguments and critique the reasoning of others.
MP 5: Use appropriate tools strategically.

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Skip counting by tens Number patterns on a hundreds chart	Students use strategies to subtract groups of ten from more tens. 80-30 can be expressed at eight tens with three tens taken away which leaves five tens. Student explore using hundreds chart, base ten blocks, number lines and other tools.	Explain the strategy for subtracting a multiple of 10 from a multiple of 10

Coherence KY.1.NBT.6→KY.2.NBT.8

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Measurement and Data

Standard: 1. MD.1

Order three objects by length; compare the lengths of two objects indirectly by using a third object.

Enduring Skills:

MP 6: Attend to precision

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Recognize when an object is longer or shorter than another object. Compare the length of two objects	Students use nonstandard tools to estimate and measure objects.	Students compare lengths of three different objects describing the objects lengths in relation to one another using precise language, understanding "bigger" and "smaller" are not as specific as "longer" and "shorter" for describing the attributes of length.

Coherence KY.K.MD.1→KY.1.MD.1→KY.2.MD.4

Note: Concept of transitivity

*The understanding that if the length of object A is longer than the length of object B and the length of object B is longer than the length of object C, then the length of object A is longer than the length of object C)

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Measurement and Data

Standard: 1. MD.2

Express the length of an object as a whole number of same-size length units, by laying multiple copies of a shorter object (the length unit) end to end with no gaps or overlaps.

Enduring Skills:

MP 2: Reason abstractly and quantitatively.
MP 5: Use appropriate tools tragically.

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Concept of longer/shorter Directly compare two objects with a measurable attribute in common	Students measure numerous items with different sizes of nonstandard units.	Explain how to use a shorter object to measure the length of a longer object and explain why it is important to avoid gaps and overlaps. Describe why the following statement is true: "The smaller the unit, the more units will be needed to measure the object."

Coherence KY.1.MD.2→KY.2.MD.2

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Measurement and Data

Standard: 1. MD.3

Assign values to time and money.

a. Tell and write time in hours and half-hours using analog and digital clocks.
b. Identify the coins by values (penny, nickel, dime, quarter)

Enduring Skills:

MP 6: Attend to precision.
MP 8: Look for and express regularity in repeated reasoning.

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
How to count consecutively to 60 How to skip count by 5's How to count on a number line Identify penny, nickel, dime, and quarter	Students understand 60 minutes = 1 hour A penny has a value of one cent; a nickel has a value of five cents; a dime has a value of cents; and a quarter has a value of 25 cents.	Students realize the specific logic of an analog clock, recognizing the shorter moving part on an analog clock is called the "hour hand" and its position (relative to the encircling numerals) indicates what hour it is. Students recognize patterns in how the hour and minute hands operate. For example, they notice at 4:30, the minute hand is halfway around the clock (at the six) and the hour hand halfway between the four and the five. Students understand four-thirty is expressed numerically using a digital clock. With money, students use appropriate terms to describe coins and connect the coin names to their values.

KY.2.MD.7 Coherence KY.K.MD.4→KY.1.MD.3→KY.2.MD.8

Note: In grade one, coins should not be used as models or manipulatives for the purposes of teaching place value, counting (by ones or skip counting), or addition and subtraction.

Measurement and Data

Standard: 1. MD.4

Investigate questions involving categorical data.

a. Pose a question that can be answered by gathering data.
b. Determine strategy for gathering data from peers.
c. Organize and represent data in a table/chart with up to three categories.
d. Interpret data to answer questions about the table/chart that connects to the question posed, including total number of data points, how many in each category and how many more or less are in one category than in another.

Enduring Skills:

MP 1: Make sense of problems and persevere in solving them
MP 3: Construct viable arguments and critique the reasoning of others.
MP 4: Model with mathematics
MP 6: Attend to precision

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Use descriptive words to describe how collections have been sorted	Ask a question and determine how to gather data Sort/Organize (data) up to 3 categories	Analyze and interpret the data to answer questions about table/chart. Students create a table or chart to organize data.

KY.2.MD.9 Coherence KY.1.MD.4→KY.2.MD.10

Geometry

Standard: 1.G.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.

Enduring Skills:

MP 7: Look for and make use of structure.

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Identify basic two-dimensional shapes	Build and draw two-dimensional shapes Describe the characteristics of given shapes based on defining/non-defining attributes	Sort shapes into defining/non-defining attributes Describe the difference between defining/non-defining attributes E.g. Students determine what attributes define a shape versus attributes that do not define a shape.

Coherence KY.K.G.4K→KY.1. G.1→KY.2.G.1

Note: Defining attributes include, but are not limited to, number of sides or open/closed shapes. Non-defining attributes include, but are not limited to color, orientation, or overall size.

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Geometry

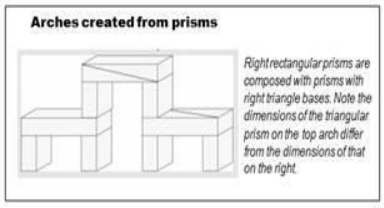
Standard: 1. G.2

Compose shapes

a. Compose two-dimensional shapes to create rectangles, squares, trapezoids, triangles, half- circles, and quarter-circles composite shape and compose new shapes from the composite shape.
b. Use 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 shapes.

Enduring Skills:

MP 1: Make sense of problems and persevere in solving them
MP 4: Model with mathematics

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Identify two-dimensional and three-dimensional shapes	Use concrete manipulatives to: Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) to create a composite shape Compose three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape	Identify and describe the composite shape Students do not need to learn formal names such as "right rectangular prisms" 

Coherence KY.K.G.6→KY.1. G.2

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Geometry

Standard: 1.G.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.

Enduring Skills:

MP 3: Construct viable arguments and critique the reasoning of others
MP 6: Attend to precision

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
How to half (divide) shapes/objects into equal parts or fair shares Knowledge that the whole or unit has been partitioned into equal–sized portions or fair shares Model halves and fourths with concrete materials	Partition (divide) a circle and rectangle into two and four equal parts Describe the equal shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. ***lays the foundation for fractions*	Describe the whole by the number of equal parts (e.g., two halves make a whole) Students see the relationship of taking the same shape and partitioning it into equal pieces. For example, they compare the size of the pieces when it's half of a shape or a fourth of the shape. 

Coherence KY.K.G.6→KY.1. G.3→KY.2. G.3

Note: Students see the relationship of taking the same shape and partitioning it into equal pieces. For example, they compare the size of the pieces when it's half of a shape or a fourth of the shape.