COMMON CORE State Standards

DECONSTRUCTED for CLASSROOM IMPACT

FIRST GRADE

MATHEMATICS

The COMMON CORE Institute

855.809.7018 | www.commoncoreinstitute.com

Introduction

The Common Core Institute is pleased to offer this grade-level tool for educators who are teaching with the Common Core State Standards.

The Common Core Standards Deconstructed for Classroom Impact is designed for educators by educators as a two-pronged resource and tool 1) to help educators increase their depth of understanding of the Common Core Standards and 2) to enable teachers to plan College & Career Ready curriculum and classroom instruction that promotes inquiry and higher levels of cognitive demand.

What we have done is not all new. This work is a purposeful and thoughtful compilation of preexisting materials in the public domain, state department of education websites, and original work by the Center for College & Career Readiness. Among the works that have been compiled and/or referenced are the following: Common Core State Standards for Mathematics and the Appendix from the Common Core State Standards Initiative; Learning Progressions from The University of Arizona's Institute for Mathematics and Education, chaired by Dr. William McCallum; the Arizona Academic Content Standards; the North Carolina Instructional Support Tools; and numerous math practitioners currently in the classroom.

We hope you will find the concentrated and consolidated resource of value in your own planning. We also hope you will use this resource to facilitate discussion with your colleagues and, perhaps, as a lever to help assess targeted professional learning opportunities.

Understanding the Organization

The Overview acts as a quick-reference table of contents as it shows you each of the domains and related clusters covered in this specific grade-level booklet. This can help serve as a reminder of what clusters are part of which domains and can reinforce the specific domains for each grade level.

Key Changes identifies what has been moved to and what has been moved from this particular grade level, as appropriate. This section also includes **Critical Areas of Focus**, which is designed to help you begin to approach how to examine your curriculum, resources, and instructional practices. A review of the **Critical Areas of Focus** might enable you to target specific areas of professional learning to refresh, as needed.

Math Fluency Standards	
K	Add/subtract within 5
1	Add/subtract within 10
2	Add/subtract within 20 Add/subtract within 100 (pencil & paper)
3	Multiply/divide within 100 Add/subtract within 1000
4	Add/subtract within 1,000,000
5	Multi-digit multiplication
6	Multi-digit division Multi-digit decimal operations
7	Solve $px + q = r$, $p(x + q) = r$
8	Solve simple 2 x 2 systems by inspection

For each domain is the domain itself and the associated clusters. Within each domain are sections for each of the associated clusters. The cluster-specific content can take you to a deeper level of understanding. Perhaps, most importantly, we include here the **Learning Progressions.** The **Learning Progressions** provide context for the current domain and its related standards. For any grade except Kindergarten, you will see the domain-specific standards for the current grade in the center column. To the left are the domain-specific standards for the preceding grade and to the right are the domain-specific standards for the following grade. Combined with the **Critical Areas of Focus,** these Learning Progressions can assist you in focusing your planning.

For each cluster, we have included four key sections: Description, Big Idea, Academic Vocabulary, and Deconstructed Standard.

The cluster **Description** offers clarifying information, but also points to the **Big Idea** that can help you focus on that which is most important for this cluster within this domain. The **Academic Vocabulary** is derived from the cluster description and serves to remind you of potential challenges or barriers for your students.

Each standard specific to that cluster has been deconstructed. Thereis a **Deconstructed Standard** for each standard specific to that cluster and each **Deconstructed Standard** has its own subsections, which can provide you with additional guidance and insight as you plan. Note the deconstruction drills down to the sub-standards when appropriate. These subsections are:

- Standard Statement
- Standard Description
- Essential Question(s)
- Mathematical Practice(s)
- DOK Range Target for Learning and Assessment
- Learning Expectations
- Explanations and Examples

As noted, first are the **Standard Statement** and **Standard Description**, which are followed by the **Essential Question(s)** and the associated **Mathematical Practices**. The **Essential Question(s)** amplify the **Big Idea**, with the intent of taking you to a deeper level of understanding; they may also provide additional context for the **Academic Vocabulary**.

The **DOK Range Target for Learning and Assessment** remind you of the targeted level of cognitive demand. The **Learning Expectations** correlate to the DOK and express the student learning targets for student proficiency for KNOW, THINK, and DO, as appropriate. In some instances, there may be no learning targets for student proficiency for one or more of KNOW, THINK or DO. The learning targets are expressions of the deconstruction of the Standard as well as the alignment of the DOK with appropriate consideration of the Essential Questions.

The last subsection of the **Deconstructed Standard** includes **Explanations and Examples**. This subsection might be quite lengthy as it can include additional context for the standard itself as well as examples of what student work and student learning could look like. **Explanations and Examples** may offers ideas for instructional practice and lesson plans.

Standards for Mathematical Practice in 1st Grade

Each of the explanations below articulates some of the knowledge and skills expected of students to demonstrate grade-level mathematical proficiency.

PRACTICE	EXPLANATION
Make sense and persevere in problem solving.	Students continue to develop the ability to focus attention, take reasonable risks, remain flexible, try alternatives, and persevere (Copley, 2010). As the teacher uses provides opportunities for students to share thinking, students become conscious of what they know and how they solve problems. They make sense of the problem, find an entry point to begin the task, and are willing to try different approaches. They are able to ask "Does this make sense?". They may continue to rely on manipulatives and graphic representations as they develop conceptual understanding and math fluency.
Reason abstractly and quantitatively.	Students recognize that a number represents a specific quantity. They use numbers and symbols to represent a problem, explain their thinking and strategies, and justify a response..
Construct viable arguments and critique the reasoning of others.	Students continue to develop their ability to clearly express, explain, organize, and consolidate their math thinking using both verbal and written representations. Their understanding of grade appropriate vocabulary helps them to construct viable arguments about mathematics.
Model with mathematics.	Students model real-life mathematical situations with a number sentence or an equation, and check to make sure their equation accurately matches the problem context. They also use tools, such as tables, to create models for analysis.
Use appropriate tools strategically.	Students have access to a variety of concrete (e.g., ten frames, number balances, number lines) and technological tools (e.g., virtual manipulatives, calculators, interactive websites) and use them to investigate mathematical concepts. They select tools that help them solve and/or illustrate solutions; they recognize that multiple tools can be used for the same problem depending on the strategy used.
Attend to precision.	Students attend to precision in their communication, calculations, and measurements. They are able to describe their actions and strategies clearly, using grade-level appropriate vocabulary accurately. Their explanations and reasoning becomes more precise, and they begin to pay attention to details as they work.
Look for and make use of structure.	Students look carefully for patterns and structures in the number system and other areas of mathematics. When exploring geometric properties, students recognize that certain attributes are critical (number of sides, angles), while other properties are not (size, color, orientation).
Look for and express regularity in repeated reasoning.	Students begin to look for regularity in problem structures when solving mathematical tasks. Further, students use repeated reasoning while solving a task with multiple correct answers.

OVERVIEW

Operations and Algebraic Thinking (OA)

- Represent and solve problems involving addition and subtraction.
- Understand and apply properties of operations and the relationship between addition and subtraction.
- Add and subtract within 20.
- Work with addition and subtraction equations.

Number and Operations in Base Ten (NBT)

- Extend the counting sequence.
- Understand place value.
- Use place value understanding and properties of operations to add and subtract.

Measurement and Data (MD)

- Measure lengths indirectly and by iterating length units.
- Tell and write time.
- Represent and interpret data.

Geometry (G)

- Reason with shapes and their attributes.

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.

KEY CHANGES	
NEW TO FIRST GRADE	▪ Use of a symbol for the unknown number in an equation (1.OA.1) ▪ Properties of Operations – Commutative and Associative (1.OA.3) ▪ Counting sequence to 120; writing numerals to 120 (1.NBT.1) ▪ Unitizing a ten (10 can be thought of as a bundle of ten ones, called a "ten") (1.NBT.2.a) ▪ Comparison Symbols (<, >) (1.NBT.3) ▪ Defining and non-defining attributes of shapes (1.G.1) ▪ Half-circles, quarter-circles, cubes (1.G.2) ▪ Partitioning circles and squares; Relationships among halves, fourths, and quarters (1.G.3)
MOVED FROM FIRST GRADE	▪ Estimation (1.01f) ▪ Groupings of 2's, 5's, and 10's to count collections (1.02) ▪ Fair Shares (1.04) ▪ Specified types of data displays (4.01) ▪ Certain, impossible, more likely or less likely to occur (4.02) ▪ Venn Diagrams (5.02) ▪ Extending patterns (5.03)

KEY CHANGES

CRITICAL AREAS OF FOCUS

1. Developing understanding of addition, subtraction, and strategies for addition and subtraction within 20.

- Students develop strategies for adding and subtracting whole numbers based on their prior work with small numbers. They 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. Students understand connections between counting and addition and subtraction (e.g., adding two is the same as counting on two). They 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. By comparing a variety of solution strategies, children build their understanding of the relationship between addition and subtraction.

2. Developing understanding of whole number relationships and place value, including grouping in tens and ones.

- Students develop, discuss, and use efficient, accurate, and generalizable methods to add within 100 and subtract multiples of 10.
- 10. They compare whole numbers (at least to 100) to develop understanding of and solve problems involving their relative sizes. They 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). Through activities that build number sense, they understand the order of the counting numbers and their relative magnitudes.

3. Developing understanding of linear measurement and measuring lengths as iterating length units.

- Students 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. Reasoning about attributes of, and composing and decomposing geometric shapes.

- Students compose and decompose plane or solid figures (e.g., put two triangles together to make a quadrilateral) and build understanding of part-whole relationships as well as the properties of the original and composite shapes. As they combine shapes, they recognize them from different perspectives and orientations, describe their geometric attributes, and determine how they are alike and different, to develop the background for measurement and for initial understandings of properties such as congruence and symmetry.

DOMAIN:

OPERATIONS AND ALGEBRAIC THINKING (OA)

FIRST GRADE

MATHEMATICS

FIRST GRADE

LEXILE GRADE LEVEL BAND: 190L TO 530L

DOMAIN	Operations and Algebraic Thinking (OA)
CLUSTERS	1. Represent and solve problems involving addition and subtraction. 2. Understand and apply properties of operations and the relationship between addition and subtraction. 3. Add and subtract within 20. 4. Work with addition and subtraction equations.

OPERATIONS AND ALGEBRAIC THINKING (OA)

KINDERGARTEN	FIRST GRADE	SECOND GRADE
ADDITION AND SUBTRACTION		
Section 1: Addition and Subtraction Within 10	***Section 1: Addition and Subtraction Within 10***	***Section 1: Addition and Subtraction Within 10***
K.OA.1 Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.		
K.OA.3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).		
K.OA.4 For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.		
K.OA.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.		
K.OA.5 Fluently add and subtract within 5.		
Section 2: Addition and Subtraction Within 100	***Section 2: Addition and Subtraction Within 100***	***Section 2: Addition and Subtraction Within 100***
	1.OA.4 Understand subtraction as an unknown-addend problem.	
	1.OA.5 Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).	
	1.NBT.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.	
	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, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.	

Highlighted standards are the priority standards

OPERATIONS AND ALGEBRAIC THINKING (OA)		
KINDERGARTEN	**FIRST GRADE**	**SECOND GRADE**
ADDITION AND SUBTRACTION		
Section 2: Addition and Subtraction Within 100	***Section 2: Addition and Subtraction Within 100***	***Section 2: Addition and Subtraction Within 100***
	1.OA.2 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.	
	1.OA.6 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).	
	1.OA.3 Apply properties of operations as strategies to add and subtract.	
Section 3: Addition and Subtraction Within 1000	***Section 3: Addition and Subtraction Within 1000***	***Section 3: Addition and Subtraction Within 1000***
		2.NBT.7 Add and subtract within 1000, 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. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
		2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
		2.OA.2 Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.
		2.OA.4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.
		2.NBT.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
		2.NBT.9 Explain why addition and subtraction strategies work, using place value and the properties of operations.
		2.NBT.6 Add up to four two-digit numbers using strategies based on place value and properties of operations.

OPERATIONS AND ALGEBRAIC THINKING (OA)		
KINDERGARTEN	**FIRST GRADE**	**SECOND GRADE**
EARLY EQUATIONS AND EXPRESSIONS		
Section 2: Exploring Equations	***Section 2: Exploring Equations***	***Section 2: Exploring Equations***
	1.OA.7 Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false.	
	1.OA.8 Determine the unknown whole number in an addition or subtraction equation relating three whole numbers.	
Section 1: Equipartitioning Wholes	***Section 1: Equipartitioning Wholes***	***Section 1: Equipartitioning Wholes***
	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.	2.G.3 Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.
EARLY EQUATIONS AND EXPRESSIONS		
Section 1: Understanding and Relating Multiplication and Division Operations	***Section 1: Understanding and Relating Multiplication and Division Operations***	***Section 1: Understanding and Relating Multiplication and Division Operations***
		2.OA.3 Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.

Source: turnonccmath.net, NC State University College of Education

CLUSTER: **1. Represent and solve problems involving addition and subtraction. (OA)**

Students develop strategies for adding and subtracting whole numbers based on their prior work with small numbers. They 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.

An important component of solving problems involving addition and subtraction is the ability to recognize that any given group of objects (up to 10) can be separated into sub groups in multiple ways and remain equivalent in amount to the original group (Ex: A set of 6 cubes can be separated into a set of 2 cubes and a set of 4 cubes and remain 6 total cubes).

BIG IDEA: Objects, drawings, and equations can be used to represent and solve addition and subtraction problems within 20.

ACADEMIC VOCABULARY: number words 0-120

STANDARD AND DECONSTRUCTION

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, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.**

DESCRIPTION

First grade students extend their experiences in Kindergarten by working with numbers to 20 to solve a new type of problem situation: Compare (See Table 1 at end of document for examples of all problem types). In a Compare situation, two amounts are compared to find "How many more" or "How many less".

PROBLEM TYPE: COMPARE

Difference Unknown: "How many more?" version Lucy has 7 apples. Julie has 9 apples. How many more apples does Julie have than Lucy?	***Bigger Unknown:*** "More" version suggests operation. Julie has 2 more apples than Lucy. Lucy has 7 apples. How many apples does Julie have?	***Smaller Unknown:*** Version with "more" Mastery expected in Second Grade
Difference Unknown: "How many more?" version Lucy has 7 apples. Julie has 9 apples. How many more apples does Julie have than Lucy? 7 + ☐ = 9 9 - 7 = ☐	***Bigger Unknown:*** Version with "fewer" Mastery expected in Second Grade	***Smaller Unknown:*** "Fewer" version suggests operation. Lucy has 2 fewer apples than Julie. Julie has 9 apples. How many apples does Lucy have?

Compare problems are more complex than those introduced in Kindergarten. In order to solve compare problem types, First Graders must think about a quantity that is not physically present and must conceptualize that amount.

In addition, the language of "how many more" often becomes lost or not heard with the language of 'who has more'. With rich experiences that encourage students to match problems with objects and drawings can help students master these challenges.

STANDARD AND DECONSTRUCTION

DESCRIPTION

NOTE: Although First Grade students should have experiences solving and discussing all 12 problem types located in Table 1, they are not expected to master all types by the end of First Grade due to the high language and conceptual demands of some of the problem types. Please see Table 1 at the end of this document for problem types that First Grade Students are expected to master by the end of First Grade. (Note: This Table is different than the Table 1 in the original glossary found on the CCSS website.)

First Graders also extend the sophistication of the methods they used in Kindergarten (counting) to add and subtract within this larger range. Now, First Grade students use the methods of counting on, making ten, and doubles +/- 1 or +/- 2 to solve problems.

Example: Nine bunnies were sitting on the grass. Some more bunnies hopped there. Now, there are 13 bunnies on the grass. How many hopped over there?	
Counting On Method	Student: Niiinnneee.... holding a finger for each next number counted 10, 11, 12, 13. Holding up her four fingers, 4! 4 bunnies hopped over there.
Example: 8 red apples and 6 green apples are on the tree. How many apples are on the tree?	
Making Tens Method	Student: I broke up 6 into 2 and 4. Then, I took the 2 and added it to the 8. That's 10. Then I added the 4 to the 10. That's 14. So there are 14 apples on the tree.
Example: 13 apples are on the table. 6 of them are red and the rest are green. How many apples are green?	
Doubles +/- 1 or 2	Student: I know that 6 and 6 is 12. So, 6 and 7 is 13. There are 7 green apples.

In order for students to read and use equations to represent their thinking, they need extensive experiences with addition and subtraction situations in order to connect the experiences with symbols (+, -, =) and equations (5 = 3 + 2). In Kindergarten, students demonstrated the understanding of how objects can be joined (addition) and separated (subtraction) by representing addition and subtraction situations using objects, pictures and words. In

In First Grade, students extend this understanding of addition and subtraction situations to use the addition symbol (+) to represent joining situations, the subtraction symbol (-) to represent separating situations, and the equal sign (=) to represent a relationship regarding quantity between one side of the equation and the other.

ESSENTIAL QUESTION(S)

How can I represent this addition or subtraction problem?

What strategy will help me best to solve this problem?

Why would another strategy not help me best solve this problem?

MATHEMATICAL PRACTICE(S)

1.MP.1. Make sense of problems and persevere in solving them.

1.MP.2. Reason abstractly and quantitatively.

1.MP.3. Construct viable arguments and critique the reasoning of others.

1.MP.4. Model with mathematics.

1.MP.5. Use appropriate tools strategically.

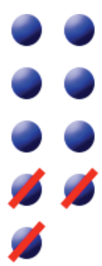
1.MP.8. Look for and express regularity in repeated reasoning.

DOK Range Target for Instruction & Assessment	☒ 1 ☒ 2 ☐ 3 ☐ 4		
Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Use a symbol for an unknown number in an addition or subtraction problem within 20.	Interpret situations to solve word problems with unknowns in all positions within 20 using addition and subtraction. Determine appropriate representations for solving word problems involving different situations using addition and subtraction within 20. Solve word problems within 20 using addition and subtraction.	

EXPLANATIONS AND EXAMPLES

- Contextual problems that are closely connected to students' lives should be used to develop fluency with addition and subtraction. Table 1 describes the four different addition and subtraction situations and their relationship to the position of the unknown. Students use objects or drawings to represent the different situations.

- Take From example: Abel has 9 balls. He gave 3 to Susan. How many balls does Abel have now?



- Compare example: Abel has 9 balls. Susan has 3 balls. How many more balls does Abel have than Susan? A student will use 9 objects to represent Abel's 9 balls and 3 objects to represent Susan's 3 balls. Then they will compare the 2 sets of objects.

- Note that even though the modeling of the two problems above is different, the equation, 9 - 3 = ?, can represent both situations yet the compare example can also be represented by 3 + ? = 9 (How many more do I need to make 9?)

- It is important to attend to the difficulty level of the problem situations in relation to the position of the unknown.

- Result Unknown, Total Unknown, and Both Addends Unknown problems are the least complex for students.

- The next level of difficulty includes Change Unknown, Addend Unknown, and Difference Unknown.

- The most difficult are Start Unknown and versions of Bigger and Smaller Unknown (compare problems).

- Students may use document cameras to display their combining or separating strategies. This gives them the opportunity to communicate and justify their thinking.

STANDARD AND DECONSTRUCTION

1.OA.2

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.

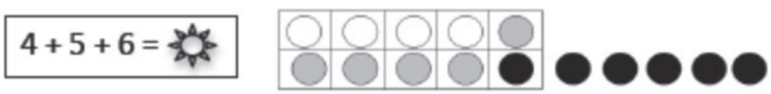
DESCRIPTION

First Grade students solve multi-step word problems by adding (joining) three numbers whose sum is less than or equal to 20, using a variety of mathematical representations.

Example: Mrs. Smith has 4 oatmeal raisin cookies, 5 chocolate chip cookies, and 6 gingerbread cookies. How many cookies does Mrs. Smith have?

Student A:

I put 4 counters on the Ten Frame for the oatmeal raisin cookies. Then, I put 5 different color counters on the ten frame for the chocolate chip cookies. Then, I put another 6 color counters out for the gingerbread cookies. Only one of the gingerbread cookies fit, so I had 5 leftover. Ten and five more makes 15 cookies. Mrs. Smith has 15 cookies.



Student B:

I used a number line. First I jumped to 4, and then I jumped 5 more. That's 9. I broke up 6 into 1 and 5 so I could jump 1 to make 10. Then, I jumped 5 more and got 15. Mrs. Smith has 15 cookies.

Student C:

I wrote: 4 + 5 + 6 = ☐. I know that 4 and 6 equals 10, so the oatmeal raisin and gingerbread equals 10 cookies. Then I added the 5 chocolate chip cookies. 10 and 5 is 15. So, Mrs. Smith has 15 cookies.

ESSENTIAL QUESTION(S)

How can I represent this addition or subtraction problem?

What strategy will help me best to solve this problem?

Why would another strategy not help me best solve this problem?

MATHEMATICAL PRACTICE(S)

1.MP.1. Make sense of problems and persevere in solving them.

1.MP.2. Reason abstractly and quantitatively.

1.MP.3. Construct viable arguments and critique the reasoning of others.

1.MP.4. Model with mathematics.

1.MP.5. Use appropriate tools strategically.

1.MP.8. Look for and express regularity in repeated reasoning.

DOK Range Target for Instruction & Assessment	☒ 1 ☐ 2 ☐ 3 ☐ 4		
Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Know how to add three whole numbers whose sum is less than or equal to 20.	Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20.	

EXPLANATIONS AND EXAMPLES

To further students' understanding of the concept of addition, students create word problems with three addends. They can also increase their estimation skills by creating problems in which the sum is less than 5, 10 or 20. They use properties of operations and different strategies to find the sum of three whole numbers such as:

- Counting on and counting on again (e.g., to add 3 + 2 + 4 a student writes 3 + 2 + 4 = ? and thinks, "3, 4, 5, that's 2 more, 6, 7, 8, 9 that's 4 more so 3 + 2 + 4 = 9."
- Making tens (e.g., 4 + 8 + 6 = 4 + 6 + 8 = 10 + 8 = 18).
- Using "plus 10, minus 1" to add 9 (e.g., to add 3 + 9 + 6 A student thinks, "9 is close to 10 so I am going to add 10 plus 3 plus 6 which gives me 19. Since I added 1 too many, I need to take 1 away so the answer is 18.)
- Decomposing numbers between 10 and 20 into 1 ten plus some ones to facilitate adding the ones.

FIRST GRADE

LEXILE GRADE LEVEL BAND: 190L TO 530L

CLUSTER	**2. Understand and apply properties of operations and the relationship between addition and subtraction. (OA)**
	Students understand connections between counting and addition and subtraction (e.g., adding two is the same as counting on two). They 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. By comparing a variety of solution strategies, children build their understanding of the relationship between addition and subtraction.
BIG IDEA	Addition and subtraction can be done multiple ways through properties of operations and the relationship between the operations.
ACADEMIC VOCABULARY	order, first, second

STANDARD AND DECONSTRUCTION

1.OA.3	**Apply properties of operations as strategies to add and subtract. 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.) (Students need not use formal terms for these properties.)**
DESCRIPTION	Elementary students often believe that there are hundreds of isolated addition and subtraction facts to be mastered. However, when students understand the commutative and associative properties, they are able to use relationships between and among numbers to solve problems. First Grade students apply properties of operations as strategies to add and subtract. Students do not use the formal terms "commutative" and "associative". Rather, they use the understandings of the commutative and associative property to solve problems.

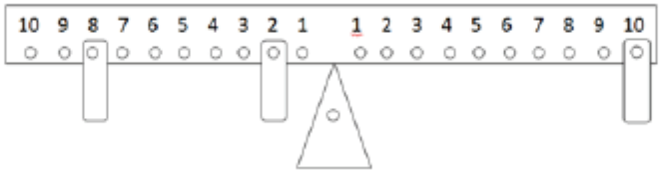
Commutative Property of Addition	Associative Property of Addition
The order of the addends does not change the sum. For example, if: 8 + 2 = 10 is known, then 2 + 8 = 10 is also known.	The grouping of the 3 or more addends does not affect the sum. For example, when adding 2 + 6 + 4, the sum from adding the first two numbers first (2 + 6) and then the third number (4) is the same as if the second and third numbers are added first (6 + 4) and then the first number (2). The student may note that 6 + 4 equals 10 and add those two numbers first before adding 2. Regardless of the order, the sum remains 12.

Students use mathematical tools and representations (e.g., cubes, counters, number balance, number line, 100 chart) to model these ideas.

COMMUTATIVE PROPERTY EXAMPLES	
CUBES	A student uses 2 colors of cubes to make as many different combinations of 8 as possible. When recording the combinations, the student records that 3 green cubes and 5 blue cubes equals 8 cubes in all. In addition, the student notices that 5 green cubes and 3 blue cubes also equals 8 cubes.

NUMBER BALANCE

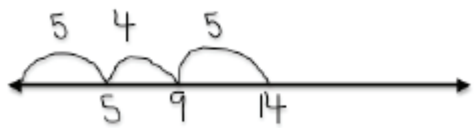
A student uses a number balance to investigate the commutative property. "If 8 and 2 equals 10, then I think that if I put a weight on 2 first this time and then on 8, it'll also be 10."



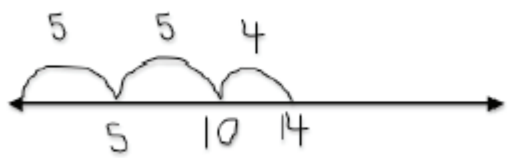
ASSOCIATIVE PROPERTY EXAMPLES

NUMBER LINE: ☐ = 5 + 4 + 5

Student A: First I jumped to 5. Then, I jumped 4 more, so I landed on 9. Then I jumped 5 more and landed on 14.



Student B: I got 14, too, but I did it a different way. First I jumped to 5. Then, I jumped 5 again. That's 10. Then, I jumped 4 more. See, 14!



Mental Math: There are 9 red jelly beans, 7 green jelly beans, and 3 black jelly beans. How many jelly beans are there in all? Student: "I know that 7 + 3 is 10. And 10 and 9 is 19. There are 19 jelly beans."

ESSENTIAL QUESTION(S)

What is another way to show this addition problem?

How can solving a problem a different way make it easier to do?

MATHEMATICAL PRACTICE(S)

1.MP.2. Reason abstractly and quantitatively.

1.MP.7. Look for and make use of structure.

1.MP.8. Look for and express regularity in repeated reasoning.

DOK Range Target for Instruction & Assessment

☒ 1 ☒ 2 ☐ 3 ☐ 4

Learning Expectations	Know: Concepts/Skills	Think	Do
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Define properties of operation strategies.	Apply properties of operation as strategies to solve addition and subtraction problems.	

EXPLANATIONS AND EXAMPLES	Students should understand the important ideas of the following properties: • Identity property of addition (e.g., 6 = 6 + 0) • Identity property of subtraction (e.g., 9 – 0 = 9) • Commutative property of addition (e.g., 4 + 5 = 5 + 4) • Associative property of addition (e.g., 3 + 9 + 1 = 3 + 10 = 13) Students need several experiences investigating whether the commutative property works with subtraction. The intent is not for students to experiment with negative numbers but only to recognize that taking 5 from 8 is not the same as taking 8 from 5. Students should recognize that they will be working with numbers later on that will allow them to subtract larger numbers from smaller numbers. However, in first grade we do not work with negative numbers.

STANDARD AND DECONSTRUCTION

1.OA.4 **Understand subtraction as an unknown-addend problem. For example, subtract 10 - 8 by finding the number that makes 10 when added to 8.**

DESCRIPTION

First Graders often find subtraction facts more difficult to learn than addition facts. By understanding the relationship between addition and subtraction, First Graders are able to use various strategies described below to solve subtraction problems.

For Sums to 10

*Think-Addition:

Think-Addition uses known addition facts to solve for the unknown part or quantity within a problem. When students use this strategy, they think, "What goes with this part to make the total?" The Think-Addition strategy is particularly helpful for subtraction facts with sums of 10 or less and can be used for sixty-four of the 100 subtraction facts. Therefore, in order for Think-Addition to be an effective strategy, students must have mastered addition facts first.

For example, when working with the problem 9 - 5 = □, First Graders think "Five and what makes nine?", rather than relying on a counting approach in which the student counts 9, counts off 5, and then counts what's left. When subtraction is presented in a way that encourages students to think using addition, they use known addition facts to solve a problem.

Example: 10 – 2 = □

Student: "2 and what make 10? I know that 8 and 2 make 10. So, 10 – 2 = 8."

For Sums Greater than 10

The 36 facts that have sums greater than 10 are often considered the most difficult for students to master. Many students will solve these particular facts with Think-Addition (described above), while other students may use other strategies described below, depending on the fact. Regardless of the strategy used, all strategies focus on the relationship between addition and subtraction and often use 10 as a benchmark number.

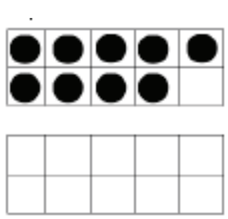
*Build Up Through 10:

This strategy is particularly helpful when one of the numbers to be subtracted is 8 or 9. Using 10 as a bridge, either 1 or 2 are added to make 10, and then the remaining amount is added for the final sum.

Example: 15 – 9 =□

Student A: "I'll start with 9. I need one more to make 10. Then, I need 5 more to make 15. That's 1 and 5-, so it's 6. 15 – 9 = 6."

Student B: "I put 9 counters on the 10 frame. Just looking at it I can tell that I need 1 more to get to 10. Then I need 5 more to get to 15. So, I need 6 counters."



DESCRIPTION

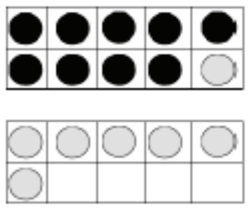
*Back Down Through 10

This strategy uses take-away and 10 as a bridge. Students take away an amount to make 10, and then take away the rest. It is helpful for facts where the ones digit of the two-digit number is close to the number being subtracted.

Example: 16 – 7 = ☐

Student A: "I'll start with 16 and take off 6. That makes 10. I'll take one more off and that makes 9. 16 – 7 = 9."

Student B: "I used 16 counters to fill one ten frame completely and most of the other one. Then, I can take these 6 off from the 2nd ten frame. Then, I'll take one more from the first ten frame. That leaves 9 on the ten frame."



ESSENTIAL QUESTION(S)

What is another way to show this subtraction problem?

How can addition help me to solve this subtraction problem?

MATHEMATICAL PRACTICE(S)

1.MP.2. Reason abstractly and quantitatively.

1.MP.7. Look for and make use of structure.

1.MP.8. Look for and express regularity in repeated reasoning.

DOK Range Target for Instruction & Assessment

☒ 1 ☒ 2 ☐ 3 ☐ 4

Learning Expectations	Know: Concepts/Skills	Think	Do
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Identify the unknown in a subtraction problem.	Solve subtraction problems to find the missing addend. Explain the relationship of addition and subtraction.	

EXPLANATIONS AND EXAMPLES

When determining the answer to a subtraction problem, 12 - 5, students think, "If I have 5, how many more do I need to make 12?" Encouraging students to record this symbolically, 5 + ? = 12, will develop their understanding of the relationship between addition and subtraction. Some strategies they may use are counting objects, creating drawings, counting up, using number lines or 10 frames to determine an answer.

Refer to Table 1 to consider the level of difficulty of this standard.

STANDARD AND DECONSTRUCTION

1.OA.5	**Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).**
DESCRIPTION	When solving addition and subtraction problems to 20, First Graders often use counting strategies, such as counting all, counting on, and counting back, before fully developing the essential strategy of using 10 as a benchmark number. Once students have developed counting strategies to solve addition and subtraction problems, it is very important to move students toward strategies that focus on composing and decomposing numbers using ten as a benchmark number, as discussed in 1.OA.6, particularly since counting becomes a hindrance when working with larger numbers. By the end of First Grade, students are expected to use the strategy of 10 to solve problems. Counting All: Students count all objects to determine the total amount. Counting On & Counting Back: Students hold a "start number" in their head and count on/back from that number. Example: 15 + 2 = ☐ **Counting All:** The student counts out fifteen counters. The student adds two more counters. The student then counts all of the counters starting at 1 (1, 2, 3, 4, 5, 6, 7, 8, 9) to find out the total amount. **Counting On:** Holding 15 in her head, the student holds up one finger and says 16, then holds up another finger and says 17. The student knows that 15 + 2 is 17, since she counted on 2 using her fingers. Example: 12 - 3 = ☐ **Counting All:** The student counts out twelve counters. The student then removes 3 of them. To determine the final amount, the student counts each one (1, 2, 3, 4, 5, 6, 7, 8, 9) to find out the final amount. **Counting Back:** Keeping 12 in his head, the student counts backwards, "11" as he holds up one finger, says "10" as he holds up a second finger, says "9" as he holds up a third finger. Seeing that he has counted back 3 since he is holding up 3 fingers, the student states that 12 - 3 = 9.
ESSENTIAL QUESTION(S)	Why does counting help me add and subtract?
MATHEMATICAL PRACTICE(S)	1.MP.7. Look for and make use of structure. 1.MP.8. Look for and express regularity in repeated reasoning.
DOK Range Target for Instruction & Assessment	☒ 1 ☐ 2 ☐ 3 ☐ 4

Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Know how to count on and count back.	Explain how counting on and counting back relate to addition and subtraction.	

EXPLANATIONS AND EXAMPLES	Students' multiple experiences with counting may hinder their understanding of counting on and counting back as connected to addition and subtraction. To help them make these connections when students count on 3 from 4, they should write this as 4 + 3 = 7. When students count back (3) from 7, they should connect this to 7 – 3 = 4. Students often have difficulty knowing where to begin their count when counting backward.

STANDARD AND DECONSTRUCTION

1.OA.6	**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).**

DESCRIPTION

In First Grade, students learn about and use various strategies to solve addition and subtraction problems. When students repeatedly use strategies that make sense to them, they internalize facts and develop fluency for addition and subtraction within 10. When students are able to demonstrate fluency within 10, they are accurate, efficient, and flexible. First Graders then apply similar strategies for solving problems within 20, building the foundation for fluency to 20 in Second Grade.

Developing Fluency for Addition & Subtraction within 10.

Example: Two frogs were sitting on a log. 6 more frogs hopped there. How many frogs are sitting on the log now?

<u>Counting- On</u>	<u>Internalized Fact</u>
I started with 6 frogs and then counted up, Sixxxx.... 7, 8. So there are 8 frogs on the log. 6 + 2 = 8	There are 8 frogs on the log. I know this because 6 plus 2 equals 8. 6 + 2 = 8

Add and Subtract within 20

Example: Sam has 8 red marbles and 7 green marbles. How many marbles does Sam have in all?

<u>Making 10 and Decomposing a Number</u>	<u>Creating an Easier Problem with Known Sums</u>
I know that 8 plus 2 is 10, so I broke up (decomposed) the 7 up into a 2 and a 5. First I added 8 and 2 to get 10, and then added the 5 to get 15. 7 = 2 + 5 8 + 2 = 10 10 + 5 = 15	I broke up (decomposed) 8 into 7 and 1. I know that 7 and 7 is 14. I added 1 more to get 15. 8 = 7 + 1 7 + 7 = 14 14 + 1 = 15

Example: There were 14 birds in the tree. 6 flew away. How many birds are in the tree now?

<u>Back Down Through Ten</u>	<u>Relationship between Addition & Subtraction</u>
I know that 14 minus 4 is 10. So, I broke the 6 up into a 4 and a 2. 14 minus 4 is 10. Then I took away 2 more to get 8. 6 = 4 + 2 14 – 4 = 10 10 – 2 = 8	I thought, '6 and what makes 14?'. I know that 6 plus 6 is 12 and two more is 14. That's 8 altogether. So, that means that 14 minus 6 is 8. 6 + 8 = 14 14 – 6 = 8

ESSENTIAL QUESTION(S)

How can math facts help me solve problems?

Which strategy will help me solve the problem the best?

MATHEMATICAL PRACTICE(S)

1.MP.2. Reason abstractly and quantitatively.

1.MP.7. Look for and make use of structure.

1.MP.8. Look for and express regularity in repeated reasoning.

DOK Range Target for Instruction & Assessment	☒ 1 ☒ 2 ☐ 3 ☐ 4		
Learning Expectations:	**Know: Concepts/Skills**	**Think**	**Do**
Students should be able to:	Add fluently within 20. Subtract fluently within 20.	Apply strategies to add and subtract within 20.	
EXPLANATIONS AND EXAMPLES	This standard is strongly connected to all the standards in this domain. It focuses on students being able to fluently add and subtract numbers to 10 and having experiences adding and subtracting within 20. By studying patterns and relationships in addition facts and relating addition and subtraction, students build a foundation for fluency with addition and subtraction facts. Adding and subtracting fluently refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly, accurately, and efficiently. The use of objects, diagrams, or interactive whiteboards and various strategies will help students develop fluency.		

CLUSTER	**4. Work with addition and subtraction equations. (OA)**
BIG IDEA	Addition and subtractions can be represented with an equation.
ACADEMIC VOCABULARY	equations, equal, the same amount/quantity as, true, false

STANDARD AND DECONSTRUCTION

1.OA.7	**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.**		
DESCRIPTION	In order to determine whether an equation is true or false, First Grade students must first understand the meaning of the equal sign. This is developed as students in Kindergarten and First Grade solve numerous joining and separating situations with mathematical tools, rather than symbols. Once the concepts of joining, separating, and "the same amount/quantity as" are developed concretely, First Graders are ready to connect these experiences to the corresponding symbols (+, -, =). Thus, students learn that the equal sign does not mean "the answer comes next", but that the symbol signifies an equivalent relationship that the left side 'has the same value as' the right side of the equation. When students understand that an equation needs to "balance", with equal quantities on both sides of the equal sign, they understand various representations of equations, such as: • an operation on the left side of the equal sign and the answer on the right side (5 + 8 = 13) • an operation on the right side of the equal sign and the answer on the left side (13 = 5 + 8) • numbers on both sides of the equal sign (6 = 6) • operations on both sides of the equal sign (5 + 2 = 4 + 3). Once students understand the meaning of the equal sign, they are able to determine if an equation is true (9 = 9) or false (9 = 8).		
ESSENTIAL QUESTION(S)	How can numbers be equal?		
MATHEMATICAL PRACTICE(S)	1.MP.2. Reason abstractly and quantitatively. 1.MP.3. Construct viable arguments and critique the reasoning of others. 1.MP.6. Attend to precision. 1.MP.7. Look for and make use of structure.		
DOK Range Target for Instruction & Assessment	☒ 1 ☐ 2 ☐ 3 ☐ 4		
Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Explain the meaning of an equal sign (the quantity on each side of the equality symbol is the same).	Compare the values on each side of an equal sign. Determine if an equation is true or false.	

EXPLANATIONS AND EXAMPLES

Interchanging the language of "equal to" and "the same as" as well as "not equal to" and "not the same as" will help students grasp the meaning of the equal sign. Students should understand that "equality" means "the same quantity as". In order for students to avoid the common pitfall that the equal sign means "to do something" or that the equal sign means "the answer is," they need to be able to:

- Express their understanding of the meaning of the equal sign.
- Accept sentences other than a + b = c as true (a = a, c = a + b, a = a + 0, a + b = b + a).
- Know that the equal sign represents a relationship between two equal quantities.
- Compare expressions without calculating.
- These key skills are hierarchical in nature and need to be developed over time.

Experiences determining if equations are true or false help student develop these skills. Initially, students develop an understanding of the meaning of equality using models. However, the goal is for students to reason at a more abstract level. At all times students should justify their answers, make conjectures (e.g., if you add a number and then subtract that same number, you always get zero), and make estimations.

Once students have a solid foundation of the key skills listed above, they can begin to rewrite true/false statements using the symbols, < and >.

Examples of true and false statements:

- 7 = 8 – 1
- 8 = 8
- 1 + 1 + 3 =7
- 4 + 3 = 3 + 4
- 6 – 1 = 1 – 6
- 12 + 2 – 2 = 12
- 9 + 3 = 10
- 5 + 3 = 10 – 2
- 3 + 4 + 5 = 3 + 5 + 4
- 3 + 4 + 5 = 7 + 5
- 13 = 10 + 4
- 10 + 9 + 1 = 19

Students can use a clicker (electronic response system) or interactive whiteboard to display their responses to the equations. This gives them the opportunity to communicate and justify their thinking.

STANDARD AND DECONSTRUCTION

1.OA.8	**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 = ?.**
DESCRIPTION	First Graders use their understanding of and strategies related to addition and subtraction as described in 1.OA.4 and 1.OA.6 to solve equations with an unknown. Rather than symbols, the unknown symbols are boxes or pictures. Example: Five cookies were on the table. I ate some cookies. Then there were 3 cookies. How many cookies did I eat? Student A: What goes with 3 to make 5? 3 and 2 is 5. So, 2 cookies were eaten. Student B: Fiiivee, four, three (holding up 1 finger for each count). 2 cookies were eaten (showing 2 fingers). Student C: We ended with 3 cookies. Threeeee, four, five (holding up 1 finger for each count). 2 cookies were eaten (showing 2 fingers). Example: Determine the unknown number that makes the equation true. 5 - ☐ = 2 Student: 5 minus something is the same amount as 2. Hmmm. 2 and what makes 5? 3! So, 5 minus 3 equals 2. Now it's true!
ESSENTIAL QUESTION(S)	How are two numbers related? How can fact families help me solve problems?
MATHEMATICAL PRACTICE(S)	1.MP.2. Reason abstractly and quantitatively. 1.MP.6. Attend to precision. 1.MP.7. Look for and make use of structure.
DOK Range Target for Instruction & Assessment	☒ 1 ☒ 2 ☐ 3 ☐ 4

Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Recognize part-part-whole relationships of addition and subtraction equations	Determine the unknown whole number in an addition or subtraction equation with three whole numbers	

EXPLANATIONS AND EXAMPLES

Students need to understand the meaning of the equal sign and know that the quantity on one side of the equal sign must be the same quantity on the other side of the equal sign. They should be exposed to problems with the unknown in different positions. Having students create word problems for given equations will help them make sense of the equation and develop strategic thinking.

Examples of possible student "think-throughs":

- 8 + ? = 11: "8 and some number is the same as 11. 8 and 2 is 10 and 1 more makes 11. So the answer is 3."
- 5 = ☐ – 3: "This equation means I had some cookies and I ate 3 of them. Now I have 5. How many cookies did I have to start with? Since I have 5 left and I ate 3, I know I started with 8 because I count on from 5. . . 6, 7, 8."

Students may use a document camera or interactive whiteboard to display their combining or separating strategies for solving the equations. This gives them the opportunity to communicate and justify their thinking.

DOMAIN:

NUMBER & OPERATIONS IN BASE TEN (NBT)

FIRST GRADE

MATHEMATICS

DOMAIN	**NBT Number and Operations in Base Ten. (NBT)**
CLUSTERS	**1. Extend the counting sequence.** **2. Understand place value.** **3. Use place value understanding and properties of operations to add and subtract.**

COUNTING AND CARDINALITY (CC)		
KINDERGARTEN	**FIRST GRADE**	**SECOND GRADE**
COUNTING		
Section 1: Principles of Counting	***Section 1: Principles of Counting***	***Section 1: Principles of Counting***
K.CC.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies (include groups with up to ten objects).		
K.CC.4.a When counting objects, say the number-names in the standard order, pairing each object with one and only one number-name and each number-name with one and only one object.		
K.CC.4.b Understand that the last number-name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.		
K.CC.4.c Understand that each successive number-name refers to a quantity that is one larger.		
K.CC.7 Compare two numbers between 1 and 10 presented as written numerals.		
K.CC.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies (include groups with up to ten objects).		
Section 2: Counting Numbers from 11 to 20	***Section 2: Counting Numbers from 11 to 20***	***Section 2: Counting Numbers from 11 to 20***
K.CC.2 Count forward beginning from a given number within the known sequence (instead of having to begin at 1).		
K.CC.5 Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1 - 20, count out that many objects.		
K.CC.3 Write numbers from 0 to 20. Represent a number of objects with a written numeral 0 – 20 (with 0 representing a count of no objects).		

COUNTING AND CARDINALITY (CC)		
KINDERGARTEN	**FIRST GRADE**	**SECOND GRADE**
COUNTING		
Section 3: Counting to 100 and Beyond	***Section 3: Counting to 100 and Beyond***	***Section 3: Counting to 100 and Beyond***
K.CC.1 Count to 100 by ones and by tens.	1.NBT.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.	2.NBT.2 Count within 1000; skip-count by 5s, 10s, and 100s.
		2.NBT.3 Read and write numbers to 1000 using base-ten numerals, number-names, and expanded form.

Source: turnonccmath.net, NC State University College of Education

NUMBER OPERATIONS IN BASE TEN (NBT)		
KINDERGARTEN	**FIRST GRADE**	**SECOND GRADE**
PLACE VALUE AND DECIMALS		
Section 1: Two-digit Whole Numbers	***Section 1: Two-digit Whole Numbers***	***Section 1: Two-digit Whole Numbers***
K.NBT.1 Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.	1.NBT.2.a 10 can be thought of as a bundle of ten ones, called a "ten."	
	1.NBT.2.b The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.	
	1.NBT.2.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).	
	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 <.	
	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.	
	1.OA.3 Apply properties of operations as strategies to add and subtract.	
	K.NBT.1 Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.	
Section 2: Three-digit Whole Numbers	***Section 2: Three-digit Whole Numbers***	***Section 2: Three-digit Whole Numbers***
		2.NBT.1.a 100 can be thought of as a bundle of ten tens, called a "hundred."
		2.NBT.1.b The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).
		2.NBT.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.
		2.NBT.8 Mentally add 10 or 100 to a given number 100 - 900, and mentally subtract 10 or 100 from a given number 100 - 900.
		2.NBT.6 Add up to four two-digit numbers using strategies based on place value and properties of operations.

NUMBER OPERATIONS IN BASE TEN (NBT)		
KINDERGARTEN	**FIRST GRADE**	**SECOND GRADE**
	TIME AND MONEY	
Section 1: Time	***Section 1: Time***	***Section 1: Time***
	1.MD.3 Tell and write time in hours and half-hours using analog and digital clocks.	2.MD.7 Read and write time (digital and analog) to nearest 5 minutes.
Section 1: Time	***Section 1: Time***	***Section 1: Time***
		2.MD.8 Solve word problems involving money (dollars, quarters, dimes, nickels, and pennies) including symbols.
	ADDITION AND SUBTRACTION	
Section 1: Addition and Subtraction Within 10	***Section 1: Addition and Subtraction Within 10***	***Section 1: Addition and Subtraction Within 10***
K.OA.1 Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.		
K.OA.3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).		
K.OA.4 For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.		
K.OA.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.		
K.OA.5 Fluently add and subtract within 5.		
Section 2: Addition and Subtraction Within 100	***Section 2: Addition and Subtraction Within 100***	***Section 2: Addition and Subtraction Within 100***
	1.OA.4 Understand subtraction as an unknown-addend problem.	
	1.OA.5 Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).	
	1.NBT.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.	

NUMBER OPERATIONS IN BASE TEN (NBT)		
KINDERGARTEN	**FIRST GRADE**	**SECOND GRADE**
ADDITION AND SUBTRACTION		
Section 2: Addition and Subtraction Within 100	***Section 2: Addition and Subtraction Within 100***	***Section 2: Addition and Subtraction Within 100***
	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, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.	
	1.OA.2 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.	
	1.OA.6 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).	
	1.OA.3 Apply properties of operations as strategies to add and subtract.	
Section 3: Addition and Subtraction Within 1000	***Section 3: Addition and Subtraction Within 1000***	***Section 3: Addition and Subtraction Within 1000***
		2.NBT.7 Add and subtract within 1000, 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. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
		2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
		2.OA.2 Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.

NUMBER OPERATIONS IN BASE TEN (NBT)		
KINDERGARTEN	**FIRST GRADE**	**SECOND GRADE**
ADDITION AND SUBTRACTION		
Section 3: Addition and Subtraction Within 1000	***Section 3: Addition and Subtraction Within 1000***	***Section 3: Addition and Subtraction Within 1000***
		2.OA.4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.
		2.NBT.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
		2.NBT.9 Explain why addition and subtraction strategies work, using place value and the properties of operations.
		2.NBT.6 Add up to four two-digit numbers using strategies based on place value and properties of operations.

CLUSTER	**1. Extend the counting sequence. (NBT)**
	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.
BIG IDEA	The counting sequence can be extended in the counting, reading, and writing of numbers.
ACADEMIC VOCABULARY	number words 0-120

STANDARD AND DECONSTRUCTION

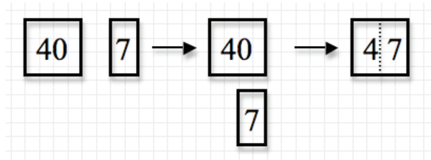
1.NBT.1	**Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.**
DESCRIPTION	First Grade students rote count forward to 120 by counting on from any number less than 120. First graders develop accurate counting strategies that build on the understanding of how the numbers in the counting sequence are related—each number is one more (or one less) than the number before (or after). In addition, first grade students read and write numerals to represent a given amount. As first graders learn to understand that the position of each digit in a number impacts the quantity of the number, they become more aware of the order of the digits when they write numbers. For example, a student may write "17" and mean "71". Through teacher demonstration, opportunities to "find mistakes", and questioning by the teacher ("I am reading this and it says seventeen. Did you mean seventeen or seventy-one? How can you change the number so that it reads seventy-one?"), students become precise as they write numbers to 120.
ESSENTIAL QUESTION(S)	What does a numeral represent? How can I write how many objects are in a set? What number can I start counting from?
MATHEMATICAL PRACTICE(S)	1.MP.2. Reason abstractly and quantitatively. 1.MP.7. Look for and make use of structure. 1.MP.8. Look for and express regularity in repeated reasoning.
DOK Range Target for Instruction & Assessment	☒ 1 ☐ 2 ☐ 3 ☐ 4

Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Recall numbers and numerals up to 120.	Represent a number of objects up to 120 with a written numeral.	Count to 120, starting at any number less than 120 Read and write numerals up to 120.

EXPLANATIONS AND EXAMPLES

Students use objects, words, and/or symbols to express their understanding of numbers. They extend their counting beyond 100 to count up to 120 by counting by 1s. Some students may begin to count in groups of 10 (while other students may use groups of 2s or 5s to count). Counting in groups of 10 as well as grouping objects into 10 groups of 10 will develop students understanding of place value concepts.

Students extend reading and writing numerals beyond 20 to 120. After counting objects, students write the numeral or use numeral cards to represent the number. Given a numeral, students read the numeral, identify the quantity that each digit represents using numeral cards, and count out the given number of objects..



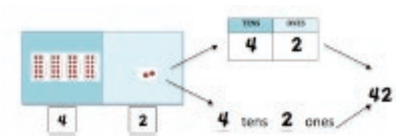
CLUSTER	**2. Understand place value. (NBT)**
	Students develop, discuss, and use efficient, accurate, and generalizable methods to add within 100 and subtract multiples of 10. They compare whole numbers (at least to 100) to develop understanding of and solve problems involving their relative sizes. They 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). Through activities that build number sense, they understand the order of the counting numbers and their relative magnitudes.
BIG IDEA	Two digit numbers represent amounts of tens and ones and can be compared to one another.
ACADEMIC VOCABULARY	tens, ones, bundle, left-overs, singles, groups, greater/less than, equal to

STANDARD AND DECONSTRUCTION

1.NBT.2 **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."**

DESCRIPTION

First Grade students are introduced to the idea that a bundle of ten ones is called "a ten". This is known as unitizing. When First Grade students unitize a group of ten ones as a whole unit ("a ten"), they are able to count groups as though they were individual objects. For example, 4 trains of ten cubes each have a value of 10 and would be counted as 40 rather than as 4. This is a monumental shift in thinking, and can often be challenging for young children to consider a group of something as "one" when all previous experiences have been counting single objects. This is the foundation of the place value system and requires time and rich experiences with concrete manipulatives to develop.



hat 42 cubes is the same amount as 4 tens and 2 left-overs. It is also not obvious that 42 could also be composed of 2 groups of 10 and 22 leftovers. Therefore, first graders require ample time grouping proportional objects (e.g.,

cubes, beans, beads, ten-frames) to make groups of ten, rather than using pre-grouped materials (e.g., base ten blocks, pre-made bean sticks) that have to be "traded" or are non-proportional (e.g., money).

Example: 42 cubes can be grouped many different ways and still remain a total of 42 cubes.

"We want children to construct the idea that all of these are the same and that the sameness is clearly evident by virtue of the groupings of ten. Groupings by tens is not just a rule that is followed but that any grouping by tens, including all or some of the singles, can help tell how many." (Van de Walle & Lovin, p. 124)

DESCRIPTION

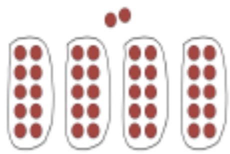
A student's ability to conserve number is an important aspect of this standard. It is not obvious to young children t

As children build this understanding of grouping, they move through several stages:

Counting By Ones; Counting by Groups & Singles; and Counting by Tens and Ones.

Counting By Ones: At first, even though First Graders will have grouped objects into tens and left-overs, they rely on counting all of the individual cubes by ones to determine the final amount. It is seen as the only way to determine how many.

Example:

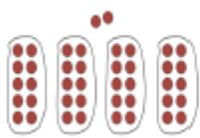


Teacher: How many counters do you have?
Student: 1, 2, 3, 4, …. 41, 42. I have 42 counters.

Counting By Groups and Singles: While students are able to group objects into collections of ten and now tell how many groups of tens and left-overs there are, they still rely on counting by ones to determine the final amount.

They are unable to use the groups and left-overs to determine how many.

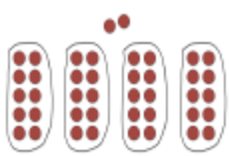
Example:



Teacher: How many counters do you have?
Student: I have 4 groups of ten and 2 left-overs.
Teacher: Does that help you know how many? How many do you have?
Student: Let me see. 1, 2, 3, 4, 5, …. 41, 42. I have 42 counters.

Counting by Tens & Ones: Students are able to group objects into ten and ones, tell how many groups and leftovers there are, and now use that information to tell how many. Ex: "I have 3 groups of ten and 4 left-overs. That means that there are 34 cubes in all." Occasionally, as this stage is becoming fully developed, first graders rely on counting by ones to "really" know that there are 34, even though they may have just counted the total by groups and left-overs.

Example:



Teacher: How many counters do you have?
Student: I have 4 groups of ten and 2 left-overs.
Teacher: Does that help you know how many? How many do you have?
Student: Yes. That means that I have 42 counters.
Teacher: Are you sure?
Student: Um. Let me count just to make sure… 1, 2, 3, … 41, 42. Yes. I was right. There are 42 counters.

DESCRIPTION

Base Ten Materials: Groupable and Pre-Grouped

Ample experiences with a variety of groupable materials that are proportional (e.g., cubes, links, beans, beads) and ten frames allow students opportunities to create tens and break apart tens, rather than "trade" one for another.

Since students first learning about place value concepts primarily rely on counting, the physical opportunity to build tens helps them to "see" that a "ten stick" has "ten items" within it. Pre-grouped materials (e.g., base ten blocks, bean sticks) are not introduced or used until a student has a firm understanding of composing and decomposing tens. (Van de Walle & Lovin, 2006).

First Grade students extend their work from Kindergarten when they composed and decomposed numbers from 11 to 19 into ten ones and some further ones. In Kindergarten, everything was thought of as individual units: "ones".

In First Grade, students are asked to unitize those ten individual ones as a whole unit: "one ten". Students in first grade explore the idea that the teen numbers (11 to 19) can be expressed as one ten and some leftover ones. Ample experiences with a variety of groupable materials that are proportional (e.g., cubes, links, beans, beads) and ten frames help students develop this concept.

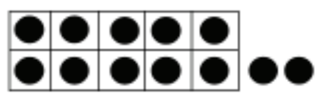
Example: Here is a pile of 12 cubes. Do you have enough to make a ten? Would you have any leftover? If so, how many leftovers would you have?

Student A

I filled a ten frame to make one ten and had two counters left over.

I had enough to make a ten with some leftover.

The number 12 has 1 ten and 2 ones.



Student B

I counted out 12 cubes. I had enough to make 10. I now have 1 ten and 2 cubes left over. So the number 12 has 1 ten and 2 ones.

In addition, when learning about forming groups of 10, First Grade students learn that a numeral can stand for many different amounts, depending on its position or place in a number. This is an important realization as young children begin to work through reversals of digits, particularly in the teen numbers.

Example: Comparing 19 to 91

19

91

Teacher: Are these numbers the same or different?
Students: Different!
Teacher: Why do you think so?
Students: Even though they both have a one and a nine, the top one is nineteen. The bottom one is ninety-one.
Teacher: Is that true some of the time, or all of the time? How do you know? Teacher continues discussion.

First Grade students apply their understanding of groups of ten as stated in 1.NBT.2b to decade numbers (e.g. 10, 20, 30, 40). As they work with groupable objects, first grade students understand that 10, 20, 30…80, 90 are comprised of a certain amount of groups of tens with none left-over.

ESSENTIAL QUESTION(S)	How can I group objects to help tell how many? Why does grouping objects by ten help me tell how many? What does each digit mean in a two-digit number?
MATHEMATICAL PRACTICE(S)	1.MP.2. Reason abstractly and quantitatively. 1.MP.7. Look for and make use of structure. 1.MP.8. Look for and express regularity in repeated reasoning.

SUBSTANDARD DECONSTRUCTED	**1.NBT.2a 10 can be thought of as a bundle of ten ones — called a "ten."**		
DOK Range Target for Instruction & Assessment	☒ 1 ☐ 2 ☐ 3 ☐ 4		
Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Explain what each digit of a two-digit number represents. Define a bundle of 10 ones as a "ten".		

SUBSTANDARD DECONSTRUCTED	**1.NBT.2b The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.**		
DOK Range Target for Instruction & Assessment	☒ 1 ☐ 2 ☐ 3 ☐ 4		
Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:		Represent numbers 11 to 19 as composed of a ten and correct number of ones.	

SUBSTANDARD DECONSTRUCTED	**1.NBT.2c 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).**		
DOK Range Target for Instruction & Assessment	☒ 1 ☐ 2 ☐ 3 ☐ 4		
Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:		Represent the numbers 20, 30, 40, 50, 60, 70, 80, and 90 as composed of the correct number of tens.	

EXPLANATIONS AND EXAMPLES

Understanding the concept of 10 is fundamental to children's mathematical development. Students need multiple opportunities counting 10 objects and "bundling" them into one group of ten. They count between 10 and 20 objects and make a bundle of 10 with or without some left over (this will help students who find it difficult to write teen numbers). Finally, students count any number of objects up to 99, making bundles of 10s with or without leftovers.

As students are representing the various amounts, it is important that an emphasis is placed on the language associated with the quantity. For example, 53 should be expressed in multiple ways such as 53 ones or 5 groups of ten with 3 ones leftover. When students read numbers, they read them in standard form as well as using place value concepts. For example, 53 should be read as "fifty-three" as well as five tens, 3 ones. Reading 10, 20, 30, 40, 50 as "one ten, 2 tens, 3 tens, etc." helps students see the patterns in the number system.

Students may use the document camera or interactive whiteboard to demonstrate their "bundling" of objects. This gives them the opportunity to communicate their thinking.

STANDARD AND DECONSTRUCTION

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 <.**

DESCRIPTION

First Grade students use their understanding of groups and order of digits to compare two numbers by examining the amount of tens and ones in each number. After numerous experiences verbally comparing two sets of objects using comparison vocabulary (e.g., 42 is more than 31. 23 is less than 52, 61 is the same amount as 61.), first grade students connect the vocabulary to the symbols: greater than (>), less than (<), equal to (=).

Student A
42 has 4 tens and 2 ones. 45 has 4 tens and 5 ones. They have the same number of tens, but 45 has more ones than 42. So, 42 is less than 45.
42 < 45

Student B
42 is less than 45. I know this because when I count up I say 42 before I say 45.
42 < 45
This says 42 is less than 45.

ESSENTIAL QUESTION(S)

How can the digits in a two digit number help me tell which number is greater than, less than, or equal to?

MATHEMATICAL PRACTICE(S)

1.MP.2. Reason abstractly and quantitatively.

1.MP.6. Attend to precision.

1.MP.7. Look for and make use of structure.

1.MP.8. Look for and express regularity in repeated reasoning.

DOK Range Target for Instruction & Assessment

☒ 1 ☐ 2 ☐ 3 ☐ 4

Learning Expectations	Know: Concepts/Skills	Think	Do
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Identity the value of each digit represented in a two-digit number. Know what each symbol represents >, <, and =.	Compare two two-digit numbers based on meanings of the tens and ones digits. Use >, =, and < symbols to record the results of comparisons.	

EXPLANATIONS AND EXAMPLES

Students use models that represent two sets of numbers. To compare, students first attend to the number of tens, then, if necessary, to the number of ones. Students may also use pictures, number lines, and spoken or written words to compare two numbers. Comparative language includes but is not limited to more than, less than, greater than, most, greatest, least, same as, equal to, and not equal to.

FIRST GRADE

LEXILE GRADE LEVEL BAND: 190L TO 530L

CLUSTER	**3. Use place value understanding and properties of operations to add and subtract. (NBT)**
BIG IDEA	Strategies based on place value and properties of operations can be used to add and subtract using concrete models or drawings.
ACADEMIC VOCABULARY	tens, ones, bundle, left-overs, singles, groups, greater/less than, equal to

STANDARD AND DECONSTRUCTION

1.NBT.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.

DESCRIPTION

First Grade students use concrete materials, models, drawings and place value strategies to add within 100. They do so by being flexible with numbers as they use the base-ten system to solve problems. The standard algorithm of carrying or borrowing is neither an expectation nor a focus in First Grade. Students use strategies for addition and subtraction in Grades K-3. By the end of Third Grade students use a range of algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction to fluently add and subtract within 1000. Students are expected to fluently add and subtract multi-digit whole numbers using the standard algorithm by the end of Grade 4.

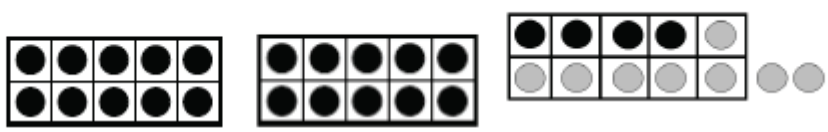
Example: 24 red apples and 8 green apples are on the table. How many apples are on the table?

Student A:

I used ten frames. I put 24 chips on 3 ten frames. Then, I counted out 8 more chips. 6 of them filled up the third ten frame. That meant I had 2 left over. 3 tens and 2 left over. That's 32. So, there are 32 apples on the table.

$24 + 6 = 30$

$30 + 2 = 32$

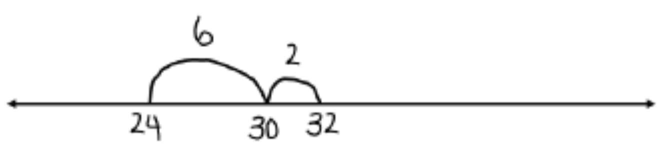


Student B:

I used an open number line. I started at 24. I knew that I needed 6 more jumps to get to 30. So, I broke apart 8 into 6 and 2. I took 6 jumps to land on 30 and then 2 more. I landed on 32. So, there are 32 apples on the table.

$24 + 6 = 30$

$30 + 2 = 32$



DESCRIPTION

Student C:

I turned 8 into 10 by adding 2 because it's easier to add. So, 24 and ten more is 34. But, since I added 2 extra, I had to take them off again. 34 minus 2 is 32. There are 32 apples on the table.

$8 + 2 = 10$

$24 + 10 = 34$

$34 – 2 = 32$

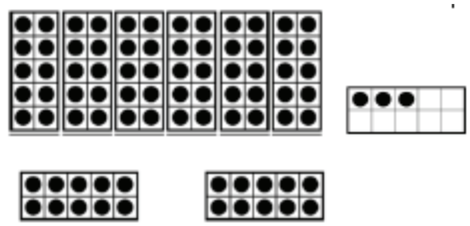
Example: 63 apples are in the basket. Mary put 20 more apples in the basket. How many apples are in the basket?

Student A:

I used ten frames. I picked out 6 filled ten frames. That's 60. I got the ten frame with 3 on it. That's 63. Then, I picked one more filled ten frame for part of the 20 that Mary put in. That made 73. Then, I got one more filled ten frame to make the rest of the 20 apples from Mary. That's 83. So, there are 83 apples in the basket.

$63 + 10 = 73$

$73 + 10 = 83$

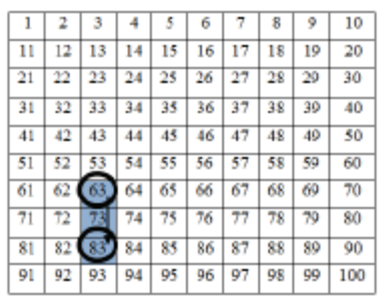


Student B:

I used a hundreds chart. I started at 63 and jumped down one row to 73. That means I moved 10 spaces. Then, I jumped down one more row (that's another 10 spaces) and landed on 83. So, there are 83 apples in the basket.

$63 + 10 = 73$

$73 + 10 = 83$



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Student C:

I knew that 10 more than 63 is 73. And 10 more than 73 is 83. So, there are 83 apples in the basket.

$63 + 10 = 73$

$73 + 10 = 83$

ESSENTIAL QUESTION(S)	What strategy will best help me show this addition or subtraction problem? How can grouping objects help me add and subtract?		
MATHEMATICAL PRACTICE(S)	1.MP.2. Reason abstractly and quantitatively. 1.MP.3. Construct viable arguments and critique the reasoning of others. 1.MP.4. Model with mathematics. 1.MP.7. Look for and make use of structure. 1.MP.8. Look for and express regularity in repeated reasoning.		
DOK Range Target for Instruction & Assessment	☒ 1 ☒ 2 ☐ 3 ☐ 4		
Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Identify the value of each digit of a number within 100. Decompose any number within one hundred into tens and ones.	Choose an appropriate strategy for solving an addition problem within 100. Relate the chosen strategy (using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction) to a written method (equation) and explain the reasoning used. Use composition and decomposition of tens when necessary to add within 100.	

EXPLANATIONS AND EXAMPLES

Students extend their number fact and place value strategies to add within 100. They represent a problem situation using any combination of words, numbers, pictures, physical objects, or symbols. It is important for students to understand if they are adding a number that has 10s to a number with 10s, they will have more tens than they started with; the same applies to the ones. Also, students should be able to apply their place value skills to decompose numbers. For example, 17 + 12 can be thought of 1 ten and 7 ones plus 1 ten and 2 ones. Numeral cards may help students decompose the numbers into 10s and 1s.

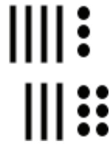
Students should be exposed to problems both in and out of context and presented in horizontal and vertical forms. As students are solving problems, it is important that they use language associated with proper place value (see example). They should always explain and justify their mathematical thinking both verbally and in a written format. Estimating the solution prior to finding the answer focuses students on the meaning of the operation and helps them attend to the actual quantities. This standard focuses on developing addition - the intent is not to introduce traditional algorithms or rules.

EXPLANATIONS AND EXAMPLES

Examples:

• 43 + 36

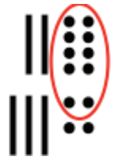
Student counts the 10s (10, 20, 30…70 or 1, 2, 3…7 tens) and then the 1s.



• 28

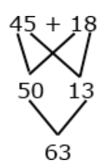
+34

Student thinks: 2 tens plus 3 tens is 5 tens or 50. S/he counts the ones and notices there is another 10 plus 2 more. 50 and 10 is 60 plus 2 more or 62.



• 45 + 18

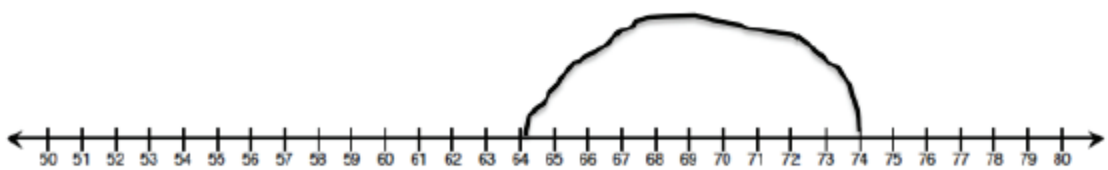
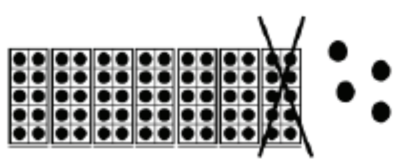
Student thinks: Four 10s and one 10 are 5 tens or 50. Then 5 and 8 is 5 + 5 + 3 (or 8 + 2 + 3) or 13. 50 and 13 is 6 tens plus 3 more or 63.



• 29+14

Student thinks: "29 is almost 30. I added one to 29 to get to 30. 30 and 14 is 44. Since I added one to 29, I have to subtract one so the answer is 43."

STANDARD AND DECONSTRUCTION

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.**
DESCRIPTION	First Graders build on their counting by tens work in Kindergarten by mentally adding ten more and ten less than any number less than 100. First graders are not expected to compute differences of two-digit numbers other than multiples of ten. Ample experiences with ten frames and the number line provide students with opportunities to think about groups of ten, moving them beyond simply rote counting by tens on and off the decade. Such representations lead to solving such problems mentally. Example: There are 74 birds in the park. 10 birds fly away. How many birds are in the park now? Student A I thought about a number line. I started at 74. Then, because 10 birds flew away, I took a leap of 10. I landed on 64. So, there are 64 birds left in the park.  Student B I pictured 7 ten frames and 4 left over in my head. Since 10 birds flew away, I took one of the ten frames away. That left 6 ten frames and 4 left over. So, there are 64 birds left in the park.  Student C I know that 10 less than 74 is 64. So there are 64 birds in the park.
ESSENTIAL QUESTION(S)	Why can I find 10 more or 10 less than a number quickly? How can finding 10 more or 10 less quickly help me solve problems?
MATHEMATICAL PRACTICE(S)	1.MP.2. Reason abstractly and quantitatively. 1.MP.3. Construct viable arguments and critique the reasoning of others. 1.MP.7. Look for and make use of structure. 1.MP.8. Look for and express regularity in repeated reasoning.

DOK Range Target for Instruction & Assessment	☒ 1 ☒ 2 ☐ 3 ☐ 4		
Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Identify the value of each digit in a number within 100.	Explain how to mentally find 10 more or 10 less than a given two-digit number. Apply knowledge of place value to mentally add or subtract 10 to/from a given two-digit number.	

EXPLANATIONS AND EXAMPLES

This standard requires students to understand and apply the concept of 10 which leads to future place value concepts. It is critical for students to do this without counting. Prior use of models such as base ten blocks, number lines, and 100s charts helps facilitate this understanding. It also helps students see the pattern involved when adding or subtracting 10.

Examples:

- 10 more than 43 is 53 because 53 is one more 10 than 43.
- 10 less than 43 is 33 because 33 is one 10 less than 43.

Students may use interactive versions of models (base ten blocks,100s charts, number lines, etc.) to develop prior understanding.

STANDARD AND DECONSTRUCTION

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), 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.

DESCRIPTION

First Grade students use concrete models, drawings, and place value strategies to subtract multiples of 10 from decade numbers (e.g., 30, 40, 50). They often use similar strategies as discussed in 1.OA.4.

Example: There are 60 students in the gym. 30 students leave. How many students are still in the gym?

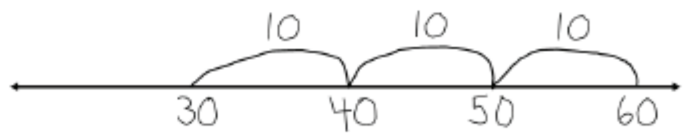
Student A

I used a number line. I started at 60 and moved back 3 jumps of 10 and landed on 30. There are 30 students left.

60 – 10 = 50

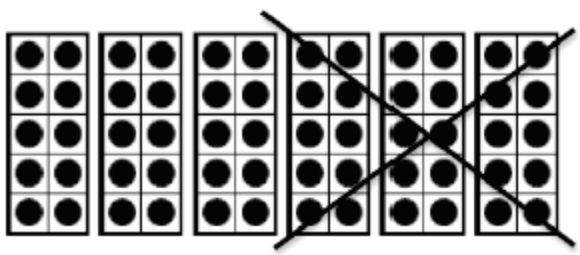
50 – 10 = 40

40 – 10 = 30



Student B

I used ten frames. I had 6 ten frames- that's 60. I removed three ten frames because 30 students left the gym. There are 30 students left in the gym.



60 – 30 = 30

Student C

I thought, "30 and what makes 60?". I know 3 and 3 is 6. So, I thought that 30 and 30 makes 60. There are 30 students still in the gym.

30 + 30 = 60

ESSENTIAL QUESTION(S)

How can I easily show a subtraction problem that has only tens?

Why can I solve this subtraction problem using this strategy?

MATHEMATICAL PRACTICE(S)

1.MP.2. Reason abstractly and quantitatively.

1.MP.3. Construct viable arguments and critique the reasoning of others.

1.MP.4. Model with mathematics.

1.MP.5. Use appropriate tools strategically.

1.MP.7. Look for and make use of structure.

1.MP.8. Look for and express regularity in repeated reasoning.

DOK Range Target for Instruction & Assessment	☒ 1 ☒ 2 ☐ 3 ☐ 4		
Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Identify the value of each digit of a number within 100.	Subtract multiples of 10 in the range of 10-90 from multiples of 10 in the range of 10-90 (positive or zero differences). Choose appropriate strategy (concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction) for solving subtraction problems with multiples of 10. Relate the chosen strategy to a written method (equation) and explain the reasoning used.	

EXPLANATIONS AND EXAMPLES

This standard is foundational for future work in subtraction with more complex numbers. Students should have multiple experiences representing numbers that are multiples of 10 (e.g. 90) with models or drawings. Then they subtract multiples of 10 (e.g. 20) using these representations or strategies based on place value. These opportunities develop fluency of addition and subtraction facts and reinforce counting up and back by 10s.

Examples:

- 70 - 30: Seven 10s take away three 10s is four 10s.
- 80 - 50: 80, 70 (one 10), 60 (two 10s), 50 (three 10s), 40 (four 10s), 30 (five 10s).
- 60 - 40: I know that 4 + 2 is 6 so four 10s + two 10s is six 10s so 60 - 40 is 20.

Students may use interactive versions of models (base ten blocks,100s charts, number lines, etc.) to demonstrate and justify their thinking.

DOMAIN:

MEASUREMENT & DATA (MD)

FIRST GRADE

MATHEMATICS

DOMAINS	Measurement and Data (MD)
CLUSTERS	1. Measure lengths indirectly and by iterating length units. 2. Tell and write time. 3. Represent and interpret data.

MEASUREMENT AND DATA (MD)		
KINDERGARTEN	**FIRST GRADE**	**SECOND GRADE**
TIME AND MONEY		
Section 1: Time	***Section 1: Time***	***Section 1: Time***
	1.MD.3 Tell and write time in hours and half-hours using analog and digital clocks.	2.MD.7 Read and write time (digital and analog) to nearest 5 minutes.
Section 2: Money	***Section 2: Money***	***Section 2: Money***
		2.MD.8 Solve word problems involving money (dollars, quarters, dimes, nickels, and pennies) including symbols.
LENGTH' AREA AND VOLUME		
Section 1: Attributes, Measuring Length by Direct Comparison	***Section 1: Attributes, Measuring Length by Direct Comparison***	***Section 1: Attributes, Measuring Length by Direct Comparison***
K.MD.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.		
K.MD.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference.		
	1.MD.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object.	
Section 2: Length Measurement using Units and Tools	***Section 2: Length Measurement using Units and Tools***	***Section 2: Length Measurement using Units and Tools***
	1.MD.2 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.	2.MD.1 Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
		2.MD.2 Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.
		2.MD.3 Estimate lengths using units of inches, feet, centimeters, and meters.
		2.MD.4 Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

MEASUREMENT AND DATA (MD)		
KINDERGARTEN	**FIRST GRADE**	**SECOND GRADE**
ELEMENTARY DATA AND MONITORING		
Section 1: Attributes and Categories	***Section 1: Attributes and Categories***	***Section 1: Attributes and Categories***
		2.MD.5 Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.
		2.MD.6 Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2,..., and represent whole-number sums and differences within 100 on a number line diagram.
K.MD.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.	1.MD.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.	
		2.MD.9 Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.
		2.MD.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

Source: turnonccmath.net, NC State University College of Education

CLUSTER	**1. Measure lengths indirectly and by iterating length units. (MD)**
	Students 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.1 1Students should apply the principle of transitivity of measurement to make indirect comparisons, but they need not use this technical term.
BIG IDEA	Length of objects can be compared directly, with or without measuring, and indirectly by using a third object.
ACADEMIC VOCABULARY	measure, order, length, height, more, less, longer than, shorter than, first, second, third, gap, overlap, about, a little less than, a little more than

STANDARD AND DECONSTRUCTION

1.MD.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object.

DESCRIPTION

First Grade students continue to use direct comparison to compare lengths. Direct comparison means that students compare the amount of an attribute in two objects without measurement.

Example: Who is taller?

Student: Let's stand back to back and compare our heights. Look! I'm taller!

Example: Find at least 3 objects in the classroom that are the same length as, longer than, and shorter than your forearm.

Sometimes, a third object can be used as an intermediary, allowing indirect comparison. For example, if we know that Aleisha is taller than Barbara and that Barbara is taller than Callie, then we know (due to the transitivity of "taller than') that Aleisha is taller than Callie, even if Aleisha and Callie never stand back to back. This concept is referred to as the transitivity principle for indirect measurement.

Example: The snake handler is trying to put the snakes in order- from shortest to longest. She knows that the red snake is longer than the green snake. She also knows that the green snake is longer than the blue snake. What order should she put the snakes?

Student: Ok. I know that the red snake is longer than the green snake and the blue snake because, since it's longer than the green, that means that it's also longer than the blue snake. So the longest snake is the red snake. I also know that the green snake and red snake are both longer than the blue snake. So, the blue snake is the shortest snake. That means that the green snake is the medium sized snake.

Snakes		
Shortest	⟵ ⟶	Longest
blue	green	red

NOTE: The Transitivity Principle ("transitivity")1: If the length of object A is greater than the length of object B, and the length of object B is greater than the length of object C, then the length of object A is greater than the length of object C.

This principle applies to measurement of other quantities as well.

DESCRIPTION (continued)	Example: Which is longer: the height of the bookshelf or the height of a desk? Student A: I used a pencil to measure the height of the bookshelf and it was 6 pencils long. I used the same pencil to measure the height of the desk and the desk was 4 pencils long. Therefore, the bookshelf is taller than the desk. Student B: I used a book to measure the bookshelf and it was 3 books long. I used the same book to measure the height of the desk and it was a little less than 2 books long. Therefore, the bookshelf is taller than the desk. Another important set of skills and understandings is ordering a set of objects by length. Such sequencing requires multiple comparisons (no more than 6 objects). Students need to understand that each object in a seriation is larger than those that come before it, and shorter than those that come after. Example: The snake handler is trying to put the snakes in order- from shortest to longest. Here are the three snakes (3 strings of different length and color). What order should she put the snakes? Student: Ok. I will lay the snakes next to each other. I need to make sure to be careful and line them up so they all start at the same place. So, the blue snake is the shortest. The green snake is the longest. And the red snake is medium-sized. So, I'll put them in order from shortest to longest: blue, red, green. (Progressions for CCSSM: Geometric Measurement, The CCSS Writing Team, June 2012.)
ESSENTIAL QUESTION(S)	What can I tell about these objects' lengths? Why do I know an object is longer or shorter than another object?
MATHEMATICAL PRACTICE(S)	1.MP.6. Attend to precision. 1.MP.7. Look for and make use of structure.
DOK Range Target for Instruction & Assessment	☒ 1 ☐ 2 ☐ 3 ☐ 4

Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Identify the measurement known as the length of an object. Directly compare the length of three objects.	Order three objects by length. Compare the lengths of two objects indirectly by using a third object.	

EXPLANATIONS AND EXAMPLES

In order for students to be able to compare objects, students need to understand that length is measured from one end point to another end point. They determine which of two objects is longer, by physically aligning the objects. Typical language of length includes taller, shorter, longer, and higher. When students use bigger or smaller as a comparison, they should explain what they mean by the word. Some objects may have more than one measurement of length, so students identify the length they are measuring. Both the length and the width of an object are measurements of length..

Examples:

- Order three students by their height.
- Order pencils, crayons, and/or markers by length.
- Build three towers (with cubes) and order them from shortest to tallest.
- Three students each draw one line, then order the lines from longest to shortest.

Example for comparing indirectly:

- Two students each make a dough "snake." Given a tower of cubes, each student compares his/her snake to the tower. Then students make statements such as, "My snake is longer than the cube tower and your snake is shorter than the cube tower. So, my snake is longer than your snake."

Students may use interactive whiteboard or document camera to demonstrate and justify comparisons.

STANDARD AND DECONSTRUCTION

1.MD.2

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.

DESCRIPTION

First Graders use objects to measure items to help students focus on the attribute being measured. Objects also lends itself to future discussions regarding the need for a standard unit. First Grade students use multiple copies of one object to measure the length of a larger object. They learn to lay physical units such as centimeter or inch manipulatives end-to-end and count them to measure a length. Through numerous experiences and careful questioning by the teacher, students will recognize the importance of careful measuring so that there are not any gaps or overlaps in order to get an accurate measurement. This concept is a foundational building block for the concept of area in 3rd Grade.

Example: How long is the pencil, using paper clips to measure?

Student: I carefully placed paper clips end to end.

The pencil is 5 paper clips long. I thought it would take about 6 paperclips.

When students use different sized units to measure the same object, they learn that the sizes of the units must be considered, rather than relying solely on the amount of objects counted.

Example: Which row is longer?

Student Incorrect Response: The row with 6 sticks is longer. Row B is longer.

Student Correct Response: They are both the same length. See, they match up end to end.

In addition, understanding that the results of measurement and direct comparison have the same results encourages children to use measurement strategies.

Example: Which string is longer? Justify your reasoning.

Student: I placed the two strings side by side. The red string is longer than the blue string. But, to make sure, I used color tiles to measure both strings. The red string measured 8 color tiles. The blue string measure 6 color tiles. So, I was right. The red string is longer.

NOTE: The instructional progression for teaching measurement begins by ensuring that students can perform direct comparisons. Then, children should engage in experiences that allow them to connect number to length, using manipulative units that have a standard unit of length, such as centimeter cubes. These can be labeled "length-units" with the students. Students learn to lay such physical units end-to-end and count them to measure a length. They compare the results of measuring to direct and indirect comparisons.

(Progressions for CCSSM: Geometric Measurement, The CCSS Writing Team, June 2012.)

ESSENTIAL QUESTION(S)	Why does measuring an object help me tell about its length? How can I represent an object's length?		
MATHEMATICAL PRACTICE(S)	1.MP.5. Use appropriate tools strategically. 1.MP.6. Attend to precision. 1.MP.7. Look for and make use of structure.		
DOK Range Target for Instruction & Assessment	☒ 1 ☒ 2 ☐ 3 ☐ 4		
Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Know to use the same size non-standard objects as repeating units. Know that length can be measured with various units.	Compare a smaller unit of measurement to a larger object. Determine the length of a measured object to be the number of smaller iterated or repeated objects that equal its length.	Demonstrate the measurement of an object using non-standard units by laying the units of measurement end to end with no gaps or overlaps.

EXPLANATIONS AND EXAMPLES

Students use their counting skills while measuring with non-standard units. While this standard limits measurement to whole numbers of length, in a natural environment, not all objects will measure to an exact whole unit. When students determine that the length of a pencil is six to seven paperclips long, they can state that it is about six paperclips long.

Examples:

- Ask students to use multiple units of the same object to measure the length of a pencil. (How many paper clips will it take to measure how long the pencil is?)

Students may use the document camera or interactive whiteboard to demonstrate their counting and measuring skills.

MEASUREMENT & DATA

FIRST GRADE

LEXILE GRADE LEVEL BAND: 190L TO 530L

CLUSTER	2. Tell and write time. (MD)
BIG IDEA	Analog and digital clocks can be used to tell and show time.
ACADEMIC VOCABULARY	time, hour, half-hour, about, o'clock, past, "six"-thirty

STANDARD AND DECONSTRUCTION

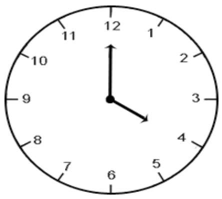
1.MD.3	**Tell and write time in hours and half-hours using analog and digital clocks.**		
DESCRIPTION	For young children, reading a clock can be a difficult skill to learn. In particular, they must understand the differences between the two hands on the clock and the functions of these hands. By carefully watching and talking about a clock with only the hour hand, First Graders notice when the hour hand is directly pointing at a number, or when it is slightly ahead/behind a number. In addition, using language, such as "about 5 o'clock" and "a little bit past 6 o'clock", and "almost 8 o'clock" helps children begin to read an hour clock with some accuracy. Through rich experiences, First Grade students read both analog (numbers and hands) and digital clocks, orally tell the time, and write the time to the hour and half-hour.  All of these clocks indicate the hour of "two", although they look slightly different. This is an important idea for students as they learn to tell time.		
ESSENTIAL QUESTION(S)	How do the hands on a clock help me tell time?		
MATHEMATICAL PRACTICE(S)	1.MP.5. Use appropriate tools strategically. 1.MP.6. Attend to precision. 1.MP.7. Look for and make use of structure.		
DOK Range Target for Instruction & Assessment	☒ 1 ☐ 2 ☐ 3 ☐ 4		
Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Recognize that analog and digital clocks are objects that measure time. Know hour hand and minute hand and distinguish between the two.	Determine where the minute hand must be when the time is to the hour (o'clock). Determine where the minute hand must be when the time is to the half-hour (thirty).	Tell and write the time to the hour and half-hour correctly using analog and digital clocks.

EXPLANATIONS AND EXAMPLES

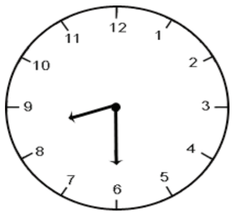
Ideas to support telling time:

- within a day, the hour hand goes around a clock twice (the hand moves only in one direction)
- when the hour hand points exactly to a number, the time is exactly on the hour
- time on the hour is written in the same manner as it appears on a digital clock
- the hour hand moves as time passes, so when it is half way between two numbers it is at the half hour
- there are 60 minutes in one hour; so halfway between an hour, 30 minutes have passed
- half hour is written with "30" after the colon

"It is 4 o'clock."



"It is halfway between 8 o'clock and 9 o'clock. It is 8:30."



The idea of 30 being "halfway" is difficult for students to grasp. Students can write the numbers from 0 - 60 counting by tens on a sentence strip. Fold the paper in half and determine that halfway between 0 and 60 is 30. A number line on an interactive whiteboard may also be used to demonstrate this.

FIRST GRADE

LEXILE GRADE LEVEL BAND: 190L TO 530L

CLUSTER	**3. Represent and interpret data. (MD)**
BIG IDEA	Data can be represented in categories and analyzed to gather information.
ACADEMIC VOCABULARY	data, more, most, less, least, same, different, category, question, collect

STANDARD AND DECONSTRUCTION

1.MD.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.**

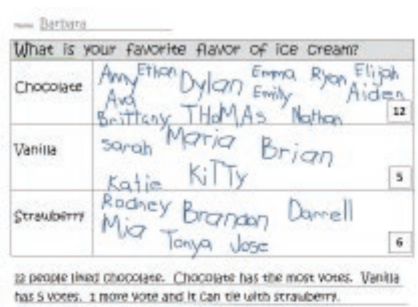
DESCRIPTION

First Grade students collect and use categorical data (e.g., eye color, shoe size, age) to answer a question. The data collected are often organized in a chart or table. Once the data are collected, First Graders interpret the data to determine the answer to the question posed. They also describe the data noting particular aspects such as the total number of answers, which category had the most/least responses, and interesting differences/similarities between the categories. As the teacher provides numerous opportunities for students to create questions, determine up to 3 categories of possible responses, collect data, organize data, and interpret the results, First Graders build a solid foundation for future data representations (picture and bar graphs) in Second Grade.

Example: Survey Station

During Literacy Block, a group of students work at the Survey Station. Each student writes a question, creates up to 3 possible answers, and walks around the room collecting data from classmates.

Each student then interprets the data and writes 2-4 sentences describing the results. When all of the students in the Survey Station have completed their own data collection, they each share with one another what they discovered. They ask clarifying questions of one another regarding the data, and make revisions as needed. They later share their results with the whole class.



What is your favorite flavor of ice cream?		
Chocolate	Amy Ethan Dylan Emma Ryan Elijah Ava Emily Aiden Brittany THOMAS Nathan	12
Vanilla	Sarah Maria Brian Katie KiTTy	5
Strawberry	Rodney Brandon Darrell Mia Tonya Jose	6

12 people liked chocolate. Chocolate has the most votes. Vanilla has 5 votes. 1 more vote and it can tie with strawberry.

Student: The question, "What is your favorite flavor of ice cream?" is posed and recorded. The categories chocolate, vanilla and strawberry are determined as anticipated responses and written down on the recording sheet.

When asking each classmate about their favorite flavor, the student's name is written in the appropriate category.

Once the data are collected, the student counts up the amounts for each category and records the amount. The student then analyzes the data by carefully looking at the data and writes 4 sentences about the data.

ESSENTIAL QUESTION(S)	How can I best show a set of data? What does the data tell me? Why does showing the data this way help me tell about it?		
MATHEMATICAL PRACTICE(S)	1.MP.2. Reason abstractly and quantitatively. 1.MP.3. Construct viable arguments and critique the reasoning of others. 1.MP.4. Model with mathematics. 1.MP.5. Use appropriate tools strategically. 1.MP.6. Attend to precision.		
DOK Range Target for Instruction & Assessment	☒ 1 ☒ 2 ☐ 3 ☐ 4		
Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Recognize different methods to organize data. Recognize different methods to represent data.	Organize data with up to three categories. Represent data with up to three categories. Interpret data representation by asking and answering questions about the data.	

EXPLANATIONS AND EXAMPLES

Students create object graphs and tally charts using data relevant to their lives (e.g., favorite ice cream, eye color, pets, etc.). Graphs may be constructed by groups of students as well as by individual students.

Counting objects should be reinforced when collecting, representing, and interpreting data. Students describe the object graphs and tally charts they create. They should also ask and answer questions based on these charts or graphs that reinforce other mathematics concepts such as sorting and comparing. The data chosen or questions asked give students opportunities to reinforce their understanding of place value, identifying ten more and ten less, relating counting to addition and subtraction and using comparative language and symbols.

Students may use an interactive whiteboard to place objects onto a graph. This gives them the opportunity to communicate and justify their thinking.

DOMAIN:

GEOMETRY (G)

FIRST GRADE

MATHEMATICS

DOMAINS	G Geometry (G)
CLUSTERS	1. Reason with shapes and their attributes.

GEOMETRY (G)		
KINDERGARTEN	**FIRST GRADE**	**SECOND GRADE**
EQUAPARTITIONING		
Section 1: Equipartitioning Wholes	***Section 1: Equipartitioning Wholes***	***Section 1: Equipartitioning Wholes***
	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.	2.G.3 Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.
		2.G.2 Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.
SHAPES AND ANGLES		
Section 1: Shapes and Properties	***Section 1: Shapes and Properties***	***Section 1: Shapes and Properties***
K.G.1 Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.	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.	2.G.1 Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
K.G.2 Correctly name shapes regardless of their orientations or overall size.	1.G.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.	
K.G.3 Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").		
K.G.4 Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).		

GEOMETRY (G)		
KINDERGARTEN	**FIRST GRADE**	**SECOND GRADE**
SHAPES AND ANGLES		
Section 2: Composing and Decomposing Shapes	***Section 2: Composing and Decomposing Shapes***	***Section 2: Composing and Decomposing Shapes***
K.G.5 Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.	1.G.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.	
K.G.6 Compose simple shapes to form larger shapes.		
K.G.5 Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.	1.G.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.	

Source: turnonccmath.net, NC State University College of Education

CLUSTER	**1. Reason with shapes and their attributes.**
	Students compose and decompose plane or solid figures (e.g., put two triangles together to make a quadrilateral) and build understanding of part-whole relationships as well as the properties of the original and composite shapes. As they combine shapes, they recognize them from different perspectives and orientations, describe their geometric attributes, and determine how they are alike and different, to develop the background for measurement and for initial understandings of properties such as congruence and symmetry.
BIG IDEA	Shapes can be described with defining and non-defining and non-defining attributes.
ACADEMIC VOCABULARY	shape, closed, open, side, attribute1, feature1, two-dimensional, rectangle, square, trapezoid, triangle, half-circle, and quarter-circle, three-dimensional, cube, cone, prism, cylinder, equal shares, halves, fourths, quarters, half of, fourth of, quarter of From previous grades: circle, rectangle, hexagon, sphere.

STANDARD AND DECONSTRUCTION

1.G.1 Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus nondefining attributes (e.g., color, orientation, overall size) ; build and draw shapes to possess defining attributes.

DESCRIPTION

First Grade students use their beginning knowledge of defining and non-defining attributes of shapes to identify, name, build, and draw shapes (including triangles, squares, rectangles, and trapezoids). They understand that defining attributes are always-present features that classify a particular object (e.g., number of sides, angles, etc.). They also understand that non-defining attributes are features that may be present, but do not identify what the shape is called (e.g., color, size, orientation, etc.).

Example:

All triangles must be closed figures and have 3 sides. These are defining attributes.

Triangles can be different colors, sizes, and be turned in different directions. These are non-defining attributes.

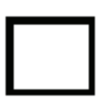
Student:

I know that this shape is a triangle because it has 3 sides.

It's also closed, not open.

Student

I used toothpicks to build a square. I know it's a square because it has 4 sides. And, all 4 sides are the same size.



TEACHER NOTE: In the U.S., the term "trapezoid" may have two different meanings. Research identifies these as inclusive and exclusive definitions. The inclusive definition states: A trapezoid is a quadrilateral with at least one pair of parallel sides. The exclusive definition states: A trapezoid is a quadrilateral with exactly one pair of parallel sides. With this definition, a parallelogram is not a trapezoid. North Carolina has adopted the exclusive definition. (Progressions for the CCSSM: Geometry, The Common Core Standards Writing Team, June 2012.)

ESSENTIAL QUESTION(S)	Why is this shape its name? What makes a shape its shape?		
MATHEMATICAL PRACTICE(S)	1.MP.1. Make sense of problems and persevere in solving them. 1.MP.3. Construct viable arguments and critique the reasoning of others. 1.MP.4. Model with mathematics. 1.MP.7. Look for and make use of structure.		
DOK Range Target for Instruction & Assessment	☒ 1 ☒ 2 ☐ 3 ☐ 4		
Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Identify defining and non-defining attributes of shapes.	Compare and contrast defining and non-defining attributes of shapes.	Draw shapes to show defining attributes. Build shapes to show defining attributes.

EXPLANATIONS AND EXAMPLES

dimensional shape: number of sides, number of vertices/points, straight sides, closed. A child might describe a triangle as "right side up" or "red." These attributes are not defining because they are not relevant to whether a shape is a triangle or not. Students should articulate ideas such as, "A triangle is a triangle because it has three straight sides and is closed." It is important that students are exposed to both regular and irregular shapes so that they can communicate defining attributes. Students should use attribute language to describe why these shapes are not triangles.

Students should also use appropriate language to describe a given three-dimensional shape: number of faces, number of vertices/points, number of edges.

Example: A cylinder may be described as a solid that has two circular faces connected by a curved surface (which is not considered a face). Students may say, "It looks like a can."

Students should compare and contrast two-and three-dimensional figures using defining attributes.

Examples:

- • List two things that are the same and two things that are different between a triangle and a cube.
- • Given a circle and a sphere, students identify the sphere as being three-dimensional but both are round.
- • Given a trapezoid, find another two-dimensional shape that has two things that are the same.

Students may use interactive whiteboards or computer environments to move shapes into different orientations and to enlarge or decrease the size of a shape still keeping the same shape. They can also move a point/vertex of a triangle and identify that the new shape is still a triangle. When they move one point/vertex of a rectangle they should recognize that the resulting shape is no longer a rectangle.

STANDARD AND DECONSTRUCTION

1.G.2

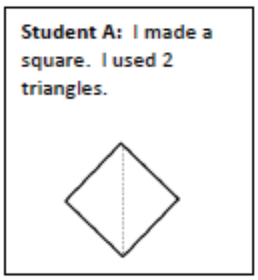
Compose two dimensional shapes (rectangles, squares, trapezoids, triangles, halfcircles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.1

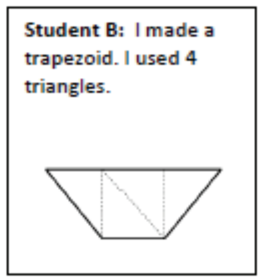
1 Students do not need to learn formal names such as "right rectangular prism."

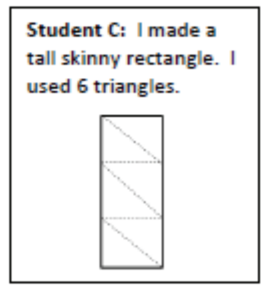
DESCRIPTION

As First Graders create composite shapes, a figure made up of two or more geometric shapes, they begin to see how shapes fit together to create different shapes. They also begin to notice shapes within an already existing shape. They may use such tools as pattern blocks, tangrams, attribute blocks, or virtual shapes to compose different shapes.

Example: What shapes can you create with triangles?







First Graders learn to perceive a combination of shapes as a single new shape (e.g., recognizing that two isosceles triangles can be combined to make a rhombus, and simultaneously seeing the rhombus and the two triangles). Thus, they develop competencies that include:

☐ Solving shape puzzles

☐ Constructing designs with shapes

☐ Creating and maintaining a shape as a unit

As students combine shapes, they continue to develop their sophistication in describing geometric attributes and properties determining how shapes are alike and different, building foundations for measurement, and initial understandings of properties such as congruence and symmetry.

(Progressions for the CCSS in Mathematics: Geometry, The Common Core Standards Writing Team, June 2012)

ESSENTIAL QUESTION(S)

How can smaller shapes make a larger shape?

MATHEMATICAL PRACTICE(S)

1.MP.1. Make sense of problems and persevere in solving them.

1.MP.4. Model with mathematics.

1.MP.7. Look for and make use of structure.

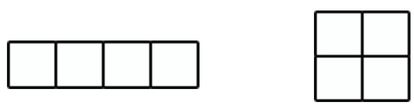
DOK Range Target for Instruction & Assessment	☒ 1 ☒ 2 ☒ 3 ☐ 4		
Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Know that shapes can be decomposed to create composite shapes. Describe properties of original, decomposed and composite shapes.	Determine how the original and created composite shapes are alike and different.	Create two- and three-dimensional composite shapes. Compose new shapes from a composite shape.

EXPLANATIONS AND EXAMPLES

The ability to describe, use, and visualize the effect of composing and decomposing shapes is an important mathematical skill. It is not only relevant to geometry, but is related to children's ability to compose and decompose numbers. Students may use pattern blocks, plastic shapes, tangrams, or computer environments to make new shapes. The teacher can provide students with cutouts of shapes and ask them to combine them to make a particular shape.

Examples:

- What shapes can be made from four squares?



Students can make three-dimensional shapes with clay or dough, slice into two pieces (not necessarily congruent) and describe the two resulting shapes. For example, slicing a cylinder will result in two smaller cylinders.

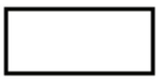
STANDARD AND DECONSTRUCTION

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.**

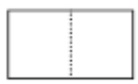
DESCRIPTION

First Graders begin to partition regions into equal shares using a context (e.g., cookies, pies, pizza). This is a foundational building block of fractions, which will be extended in future grades. Through ample experiences with multiple representations, students use the words, halves, fourths, and quarters, and the phrases half of, fourth of, and quarter of to describe their thinking and solutions. Working with the "the whole", students understand that "the whole" is composed of two halves, or four fourths, or four quarters.

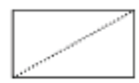
Example: How can you and a friend share equally (partition) this piece of paper so that you both have the same amount of paper to paint a picture?



Student 1
I would split the paper right down the middle. That gives us 2 halves. I have half of the paper and my friend has the other half of the paper.

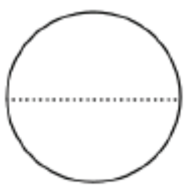


Student 2
I would split it from corner to corner (diagonally). She gets half of the paper and I get half of the paper. See, if we cut on the line, the parts are the same size.



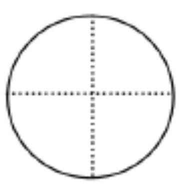
Example: Let's take a look at this pizza.

Teacher: There is pizza for dinner. What do you notice about the slices on the pizza?



Student: There are two slices on the pizza. Each slice is the same size. Those are big slices!

Teacher: If we cut the same pizza into four slices (fourths), do you think the slices would be the same size, larger, or smaller as the slices on this pizza?



Student: When you cut the pizza into fourths, the slices are smaller than the other pizza. More slices mean that the slices get smaller and smaller. I want a slice from that first pizza!

ESSENTIAL QUESTION(S)	How can I describe the equal shares of this shape? What happens to the equal shares as more equal shares are made within a shape?		
MATHEMATICAL PRACTICE(S)	1.MP.2. Reason abstractly and quantitatively. 1.MP.3. Construct viable arguments and critique the reasoning of others. 1.MP.6. Attend to precision. 1.MP.7. Look for and make use of structure.		
DOK Range Target for Instruction & Assessment	☒ 1 ☒ 2 ☐ 3 ☐ 4		
Learning Expectations	**Know: Concepts/Skills**	**Think**	**Do**
Assessment Types	Tasks assessing concepts, skills, and procedures.	Tasks assessing expressing mathematical reasoning.	Tasks assessing modeling/applications.
Students should be able to:	Partition circles and squares into two and four equal shares. Identify when shares are equal. Describe equal shares using vocabulary: halves, fourths, and quarters, half of, fourth of, and quarter of. Describe the whole as two of two or four of four equal shares.	Analyze that dividing a circle or rectangle into more equal pieces creates smaller shares.	

EXPLANATIONS AND EXAMPLES

Students need experiences with different sized circles and rectangles to recognize that when they cut something into two equal pieces, each piece will equal one half of its original whole. Children should recognize that halves of two different wholes are not necessarily the same size. Also they should reason that decomposing equal shares into more equal shares results in smaller equal shares.

Examples:

- Student partitions a rectangular candy bar to share equally with one friend and thinks "I cut the rectangle into two equal parts. When I put the two parts back together, they equal the whole candy bar. One half of the candy bar is smaller than the whole candy bar."

- Student partitions an identical rectangular candy bar to share equally with 3 friends and thinks "I cut the rectangle into four equal parts. Each piece is one fourth of or one quarter of the whole candy bar. When I put the four parts back together, they equal the whole candy bar. I can compare the pieces (one half and one fourth) by placing them side-by-side. One fourth of the candy bar is smaller than one half of the candy bar.

Students partition a pizza to share equally with three friends. They recognize that they now have four equal pieces and each will receive a fourth or quarter of the pizza.

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