Building Fact Fluency

A TOOLKIT FOR ADDITION & SUBTRACTION

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CORRELATION TO

Common Core State Standards for Mathematics

CONTENTS

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Common Core State Standards for Mathematics

– STANDARDS FOR MATHEMATICAL PRACTICE, GRADES K–12 –

CCSS.MATH.PRACTICE.MP1 Make sense of problems and persevere in solving them.	***Building Fact Fluency:*** Embedded throughout the toolkit, especially in these routines: · Contextualized Practice Problems · Anchor Problems · 3-Act Math Tasks Journaling and Reflection
CCSS.MATH.PRACTICE.MP2 Reason abstractly and quantitatively.	***Building Fact Fluency:*** Embedded throughout the toolkit, especially in these routines: · Image Talks · Tool Talks · Number Talks · Contextualized Practice Problems · Anchor Problems · 3-Act Math Tasks · Games · Journaling and Reflection
CCSS.MATH.PRACTICE.MP3 Construct viable arguments and critique the reasoning of others.	***Building Fact Fluency:*** Embedded throughout the toolkit, especially in problem-based lesson discussions, student representations, and the following routines: · Image Talks · Tool Talks · Number Talks · Contextualized Practice Problems · Anchor Problems · 3-Act Math Tasks
CCSS.MATH.PRACTICE.MP4 Model with mathematics.	***Building Fact Fluency:*** Embedded throughout the toolkit, especially in these problem-based routines: · Contextualized Practice Problems · Anchor Problems · 3-Act Math Tasks
CCSS.MATH.PRACTICE.MP5 Use appropriate tools strategically.	***Building Fact Fluency:*** Embedded throughout the toolkit, especially in these routines: · Tool Talks · Games · Anchor Problems · Contextualized Practice Problems

CCSS.MATH.PRACTICE.MP6 Attend to precision.	***Building Fact Fluency:*** Embedded throughout the toolkit, especially in these routines: · Image Talks · Tool Talks · Number Talks · Contextualized Practice Problems · Anchor Problems · 3-Act Math Tasks · Games
CCSS.MATH.PRACTICE.MP7 Look for and make use of structure.	***Building Fact Fluency:*** Embedded throughout the toolkit, especially in these routines: · Image Talks · Tool Talks · Number Talks · Games · Journaling and Reflection
CCSS.MATH.PRACTICE.MP8 Look for and express regularity in repeated reasoning.	***Building Fact Fluency:*** Embedded throughout the toolkit, especially in these routines: · Image Talks · Tool Talks · Number Talks · Anchor Problems · Games · Journaling and Reflection

Common Core State Standards for Mathematics

– KINDERGARTEN –

Count to tell the number of objects.	
CCSS.MATH.CONTENT.K.CC.B.4 Understand the relationship between numbers and quantities; connect counting to cardinality.	***Building Fact Fluency:*** Emphasized in all Image Talks and Tool Talks. Number Talks build off the more concrete counting experiences in Image and Tool Talks, encouraging connections between symbolic representations and quantities.
CCSS.MATH.CONTENT.K.CC.B.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.	***Building Fact Fluency:*** Every Image and Tool Talk has 1--20 objects to count in different configurations, including lines (e.g. Marbles, Markers, Bears, Rekenreks, Blocks, Linking Cubes, Lemonade), arrays (e.g. Buttons, Toy Cars, Shells, Apples, Coins, Eggs, Ten Frames), circles (e.g., Pizza, Beads on a ring, Peppers), or scattered configurations (e.g., Crayons, Dice, Dominoes, Tennis Balls, Pattern Block Flowers).
Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.	
CCSS.MATH.CONTENT.K.OA.A.1 Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.	***Building Fact Fluency:*** Students discuss the actions of addition and subtraction in every Image, Tool, and Number Talk, with teachers recording a variety of representations. Anchor Problems, Contextualized Practice Problems, and 3-Act Tasks invite students to create their own representations and learn from one another's representations through discussion. Journaling and reflection are opportunities for connections and metacognitive representations of the big ideas within addition and subtraction.
CCSS.MATH.CONTENT.K.OA.A.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.	***Building Fact Fluency:*** The Contextualized Practice Problems and Anchor Problems provide ample practice with word problems of every problem type. Numbers are offered within 5, 10, 20, and multidigit, so students can solve problems of appropriate challenge.
CCSS.MATH.CONTENT.K.OA.A.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).	***Building Fact Fluency:*** The Image, Tool, and Number Talks intentionally encourage this decomposition throughout. For example, the Peppers Lesson String Image Talk shows 10 peppers on two plates: 6 red and 4 yellow, then 4 red and 6 yellow, 7 red and 3 yellow, 3 red and 7 yellow, and so on. Teachers record representations and equations.

CCSS.MATH.CONTENT.K.OA.A.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.	***Building Fact Fluency:*** The Buttons (4), Markers (8), and Peppers (10) Lesson Strings are explicitly focused on the "Combinations for Ten" strategy, with plenty of embedded practice. The two "Partners for Ten" games specifically target this standard.
CCSS.MATH.CONTENT.K.OA.A.5 Fluently add and subtract within 5.	***Building Fact Fluency:*** The Crayons (1), Marbles (3), and Toy Cars (7) Lesson Strings specifically focus on Sums within 5. Contextualized Practice Problems include numbers within 5, 10, 20, and multidigit. The games Cover the Difference, Sum It Up, and Making More and Less provide fluency practice for this standard.
Work with numbers 11-19 to gain foundations for place value.	
CCSS.MATH.CONTENT.K.NBT.A.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 (such as 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.	***Building Fact Fluency:*** The Markers (5), Pizza (11), and Coins (15) Lesson Strings explicitly focus on the "Ten and Some More" numbers. Anchor Problems and Contextualized Practice Problems provide opportunities for students to work within 20, and also to work with multidigit numbers and notice connections between "10 and some more" and "20 and some more," and so on. The Teen Game provides additional practice.

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– 1ST GRADE –

Represent and solve problems involving addition and subtraction.	
CCSS.MATH.CONTENT.1.OA.A.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]	***Building Fact Fluency:*** The Contextualized Practice Problems and Anchor Problems provide ample practice with word problems of every problem type. Numbers are offered within 5, 10, 20, and multidigit so students can solve problems of appropriate challenge. Students represent the operations with objects, drawings, and equations.
Understand and apply properties of operations and the relationship between addition and subtraction.	
CCSS.MATH.CONTENT.1.OA.B.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.)*	***Building Fact Fluency:*** The Image, Tool, and Number Talks are designed to reveal these properties, each with a series of problems that invites students to notice patterns and make generalizations. The Contextualized Practice Problems and Anchor Problems provide ample applied practice with word problems of every problem type.
CCSS.MATH.CONTENT.1.OA.B.4 Understand subtraction as an unknown-addend problem. *For example, subtract 10 - 8 by finding the number that makes 10 when added to 8.*	***Building Fact Fluency:*** The Contextualized Practice Problems and Anchor Problems provide ample practice with word problems of every problem type, so students are joining, separating, comparing, and analyzing parts and wholes. The variety of problem types encourages relational thinking. For example, a "join change unknown" problem can be thought of as 4 + ? = 10, or as 10 - 4 = ?
Add and subtract within 20.	
CCSS.MATH.CONTENT.1.OA.C.5 Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).	***Building Fact Fluency:*** The Image, Tool, and Number Talks build in a series that often involves counting up or down by some number and invites the connection to addition. The Shells (2), Bears (6), and Blocks (13) Lesson Strings focus specifically on adding or subtracting 0, 1, or 2. Many of the games invite this relationship using dice, ten-frames, or numerals.

CCSS.MATH.CONTENT.1.OA.C.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).	***Building Fact Fluency:*** Every single task in *Building Fact Fluency* aligns to this standard.
Work with addition and subtraction equations.	
CCSS.MATH.CONTENT.1.OA.D.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.	***Building Fact Fluency:*** The connections from Image to Tool to Number Talk invite much discussion about the symbolic representation of addition and subtraction. In addition, there are many opportunities to compare expressions, leading to equations such as 5 + 3 = 3 + 5 and 7 + 3 = 8 + 2, which invite relational thinking about the equals sign (as opposed to thinking the equals sign means "the answer comes next").
CCSS.MATH.CONTENT.1.OA.D.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 = _.*	***Building Fact Fluency:*** The Contextualized Practice Problems provide practice opportunities in every problem type, with unknowns in all positions.
Understand place value.	
CCSS.MATH.CONTENT.1.NBT.B.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:	***Building Fact Fluency*:** The Combinations for Ten, Ten and Some More, and Make-10/ Pretend-10 Lesson Strings emphasize the bundling of ones into tens, including numeric representation of tens and ones. The multi-digit numbers in Contextualized Practice Problems encourage extension of these ideas into higher tens.
CCSS.MATH.CONTENT.1.NBT.B.2.A 10 can be thought of as a bundle of ten ones — called a "ten."	***Building Fact Fluency:*** The Buttons (4), Markers (8), and Peppers (10) Lesson Strings are specifically focused on decomposing and composing ten. Throughout the toolkit, use of ten-frames, linking cubes, and Rekenreks encourage students to explore ten.

CCSS.MATH.CONTENT.1.NBT.B.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.	***Building Fact Fluency:*** The Markers (5), Pizza (11), and Coins (15) Lesson Strings contain problems, games, and tasks that encourage students to understand the structure of the teen numbers. In additional Lesson Strings, ten-frames, linking cubes, and Rekenreks build on students understanding of ten and extend into the teen numbers.
CCSS.MATH.CONTENT.1.NBT.B.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).	***Building Fact Fluency:*** Wherever appropriate, the Contextualized Practice Problems include a multi-digit option that encourages students to extend their understanding of addition, subtraction, and place value into larger tens (e.g., number selection might include 4 + 6, 14 + 6, 24 + 6).
Use place value understanding and properties of operations to add and subtract.	
CCSS.MATH.CONTENT.1.NBT.C.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.	***Building Fact Fluency:*** Wherever possible, Contextualized Practice Problems include multi-digit number choices where students add and subtract within 100 in context. Students are encouraged to represent their thinking in a variety of ways and discuss the strategies they develop, as well as reflect on the bigger ideas through journaling and reflection.

Common Core State Standards for Mathematics

– 2ND GRADE –

Represent and solve problems involving addition and subtraction.	
CCSS.MATH.CONTENT.2.OA.A.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.	***Building Fact Fluency:*** The *Building Fact Fluency* problem-based lessons--Contextualized Practice Problems, Anchor Problems, and 3-Act Tasks--provide hundreds of opportunities for students to solve addition and subtraction word problems within 100 in all problem types and with unknowns in all positions. Students' representations of their work are core to these lessons and to formative assessment within the toolkit.
Add and subtract within 20.	
CCSS.MATH.CONTENT.2.OA.B.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.	***Building Fact Fluency:*** Every single task in *Building Fact Fluency* is designed to build fluency within 20 while building conceptual understanding of addition and subtraction.
Use place value understanding and properties of operations to add and subtract.	
CCSS.MATH.CONTENT.2.NBT.B.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	***Building Fact Fluency:*** The multi-digit options of the Contextualized Practice Problems and Anchor Problems offer hundreds of opportunities to practice adding and subtracting within 100 using strategies based on place value, the properties, and relationships between the operations.
CCSS.MATH.CONTENT.2.NBT.B.9 Explain why addition and subtraction strategies work, using place value and the properties of operations.	***Building Fact Fluency:*** The assessment strategies in *Building Fact Fluency*---including metacognitive journaling and reflection, student self-assessment, observations during games and problem-based lessons, and interviews---offer students multiple opportunities to articulate and explain the meaning of the operations, their properties, and solution strategies. In addition, all the Lesson String components (Image Talks, Tool Talks, Number Talks, Anchor Problems, Contextualized Practice Problems, 3-Act Tasks, and Games) invite discussion about the meaning of the operations and provide opportunities for students to explain their thinking in both writing and talk.

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