

Unit Title: Put it Together and Take it Apart

INSTRUCTIONAL UNIT AUTHORS

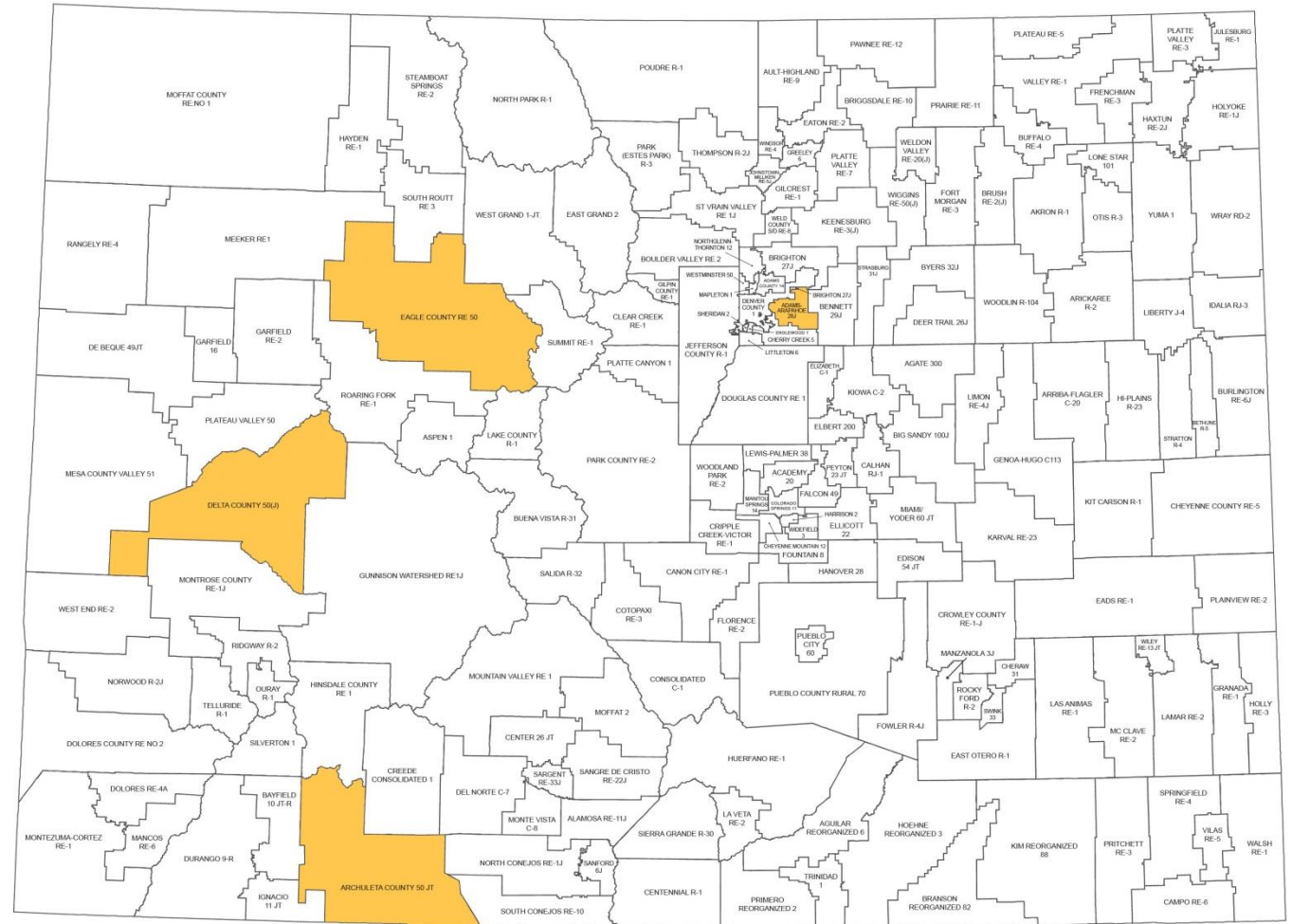
Archuleta School District
Kathy Faber
Nicolle Looper
Colleen Koneman

BASED ON A CURRICULUM OVERVIEW SAMPLE AUTHORED BY

Adams-Arapahoe School District
Jaime Green

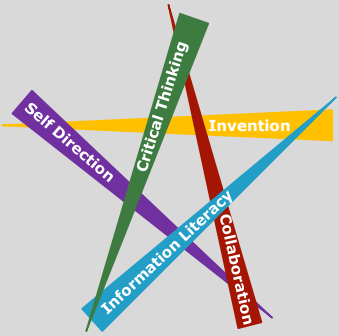
Delta School District
Carol Beers

Eagle School District
Tonya Farmer



This unit was authored by a team of Colorado educators. The template provided one example of unit design that enabled teacher-authors to organize possible learning experiences, resources, differentiation, and assessments. The unit is intended to support teachers, schools, and districts as they make their own local decisions around the best instructional plans and practices for all students.

Colorado Teacher-Authored Sample Instructional Unit

Content Area	Mathematics	Grade Level	Kindergarten
Course Name/Course Code			
Standard	Grade Level Expectations (GLE)	GLE Code	
1. Number Sense, Properties, and Operations	1. Whole numbers can be used to name, count, represent, and order quantity	MA10-GR.K-S.1-GLE.1	
	2. Composing and decomposing quantity forms the foundation for addition and subtraction	MA10-GR.K-S.1-GLE.2	
2. Patterns, Functions, and Algebraic Structures	Expectations for this standard are integrated into the other standards at this grade level.		
3. Data Analysis, Statistics, and Probability	Expectations for this standard are integrated into the other standards at this grade level.		
4. Shape, Dimension, and Geometric Relationships	1. Shapes are described by their characteristics and position and created by composing and decomposing	MA10-GR.K-S.4-GLE.1	
	2. Measurement is used to compare and order objects	MA10-GR.K-S.4-GLE.2	
 <p>Colorado 21st Century Skills</p> <p>Critical Thinking and Reasoning: <i>Thinking Deeply, Thinking Differently</i></p> <p>Information Literacy: <i>Untangling the Web</i></p> <p>Collaboration: <i>Working Together, Learning Together</i></p> <p>Self-Direction: <i>Own Your Learning</i></p> <p>Invention: <i>Creating Solutions</i></p>		<p>Mathematical Practices:</p> <ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. 	
Unit Titles	Length of Unit/Contact Hours	Unit Number/Sequence	
Put it Together and Take it Apart	6 weeks		

Unit Title	Put it Together and Take it Apart		Length of Unit	6 weeks
Focusing Lens(es)	Representation	Standards and Grade Level Expectations Addressed in this Unit	MA10-GR.K-S.1-GLE.2	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> Can any three numbers be put together to make a relationship? (MA10-GR.K-S.1-GLE.2-IQ.1) How do you know when to put things together and when to separate them? 			
Unit Strands	Operations and Algebraic Thinking, Personal Financial Literacy			
Concepts	Compose, decompose, addition, subtraction, model (objects, mental images, drawings, sounds, acting out, verbal explanations, expressions, equations), word problems, symbols, join, put together, add to, separate, take apart, taking from			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
Addition and subtraction problems use numerals, the addition symbol, the subtraction symbol, and the equal symbol to form an equation (+, -, =) (MA10-GR.K-S.1-GLE.2EO.a.i)	What symbol shows addition? What symbol shows subtraction?	Why is the = the correct symbol between $2+3 = 4+1$?
Strategies for solving addition and subtraction word problems include acting out with objects and illustrating with drawings; both can be used to justify/explain an answer (MA10-GR.K-S.1-GLE.2-EO.a.ii, a.iii, a.iv)	What are ways to represent addition and subtraction problems?	How does modeling the actions of a world problem help to solve it?
The operations of addition and subtraction describe actions in the world such as joining, putting together, adding to, separating, taking apart and taking from (MA10-GR.K-S.1-GLE.2-EO.a)	What is the difference between addition and subtraction? What is an example of a problem that can be solved by adding? What is an example of a problem that can be solved by subtraction?	How is a “joining” problem different from a “separating” problem?

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Key Knowledge and Skills: My students will...	<i>What students will know and be able to do are so closely linked in the concept-based discipline of mathematics. Therefore, in the mathematics samples what students should know and do are combined.</i>
<ul style="list-style-type: none"> • Represent addition and subtraction in a variety of ways (with objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, expressions or equations) (MA10-GR.K-S.1-GLE.2-EO.a.i) • Solve addition and subtraction word problems by adding and subtracting within 10 (MA10-GR.K-S.1-GLE.2-EO.a.ii) • Model and solve addition and subtraction problems within the number 10 using objects such as coins and drawings (MA10-GR.K-S.1-GLE.2-EO.a.v)* • Fluently add and subtract within 5 (MA10-GR.K-S.1-GLE.2-EO.b) 	

Critical Language: includes the Academic and Technical vocabulary, semantics, and discourse which are particular to and necessary for accessing a given discipline. EXAMPLE: A student in Language Arts can demonstrate the ability to apply and comprehend critical language through the following statement: <i>“Mark Twain exposes the hypocrisy of slavery through the use of satire.”</i>	
A student in _____ can demonstrate the ability to apply and comprehend critical language through the following statement(s):	<i>I joined 5 red bears with 3 brown bears and I know I have 8 bears, which shows that 5 plus 3 equals 8.</i>
Academic Vocabulary:	count, less than, greater than, equal to, the same as, groups, all together
Technical Vocabulary:	Represent, compose, decompose, number names, addition, subtraction, plus, minus, addition symbol (+), subtraction symbol (-), equal symbol (=), take away, take apart, combine, put together

* Denotes connection to Personal Financial Literacy (PFL)

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Unit Description:	This unit focuses on the concepts of addition and subtraction. Across the six-week unit students begin by decomposing and composing numbers to five. Students explore a variety of visual representations including finger patterns, five-frames, and linking cubes. Students then connect these representations to symbolic addition and subtraction equations. Throughout the unit students are solving word-problems by using these representations. By the end of the unit, students progress to working with numbers to ten using the same visual and symbolic representations.
Unit Generalizations	
Key Generalization:	Strategies for solving addition and subtraction word problems include acting out with objects and illustrating with drawings; both can be used to justify/explain an answer
Supporting Generalizations:	The operations of addition and subtraction describe actions in the world such as joining, putting together, adding to, separating, taking apart and taking from
	Addition and subtraction problems use numerals, the addition symbol, the subtraction symbol, and the equal symbol to form an equation (+, -, =)

Performance Assessment: <i>The capstone/summative assessment for this unit.</i>	
Claims: (Key generalization(s) to be mastered and demonstrated through the capstone assessment.)	Strategies for solving addition and subtraction word problems include acting out with objects and illustrating with drawings; both can be used to justify/explain an answer
Stimulus Material: (Engaging scenario that includes role, audience, goal/outcome and explicitly connects the key generalization)	The kindergarten teachers have hired you as a children’s book author to create a number book for the kindergarteners next year, similar to Ten Little Ladybugs by Laura Huliska-Beith. You will create a page in your book for each number from zero to ten showing either an addition or subtraction word problem with drawings.
Product/Evidence: (Expected product from students)	Students will create a number book for the numbers from zero to ten. High quality books will: <ul style="list-style-type: none"> • Provide a word problem for each of the numbers from zero to ten • Show a visual for each word problem from zero to ten • Write an equation for each word problem from zero to ten • Include at least one addition and subtraction word problem
Differentiation: (Multiple modes for student expression)	Students can create a picture book (i.e., no words). Students can be provided with the equation for each number and asked to write the word problem or draw a visual. Students can create a number book from zero to five. Students can focus on one number (e.g., five) and show all the possible addition and subtraction equations for the number and corresponding visuals such as ten-frames, finger patterns, and dice patterns.

Texts for independent reading or for class read aloud to support the content	
Informational/Non-Fiction	Fiction
	<i>Benny's Pennies</i> by Pat Brisson (Lexile level 360) <i>Ten Little Ladybugs</i> by Laura Huliska-Beith (Wordless picture book) <i>The Shopping Basket</i> by John Burningham (Lexile level 230+) <i>Five Little Monkeys Go Shopping</i> by Eileen Christelow (Lexile level 230+) <i>One Frog Sang</i> by Shirley Parenteau (Lexile level 230+) <i>Animals on Board</i> by Stuart Murphy (Lexile level 270)

Ongoing Discipline-Specific Learning Experiences				
1.	Description:	Think/work like a mathematician – Expressing mathematical reasoning by constructing viable arguments, critiquing the reasoning of others	Teacher Resources:	http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default.htm (lesson plans contains exemplars that could be replicated for students to critique the reasoning of others) http://www.kindergartenkindergarten.com/math-problem-solving/ (math problem-solving prompts and explanations of problem-solving process) http://www.mathwire.com/problemsolving/probs.html (problem-solving resources)
		[Mathematical Practice 3]	Student Resources:	N/A
	Skills:	Present and defend solutions to problems and identify and describe the flaw in reasoning of others	Assessment:	Students choose their strategy for solving addition and subtraction problems and explain why their strategy led to a correct response. Students can also be presented an incorrect solution strategy and describe the error in the strategy (what went wrong).
2.	Description:	Think/work like a mathematician – Engaging in the practice of modeling the solution to real world problems	Teacher Resources:	https://www.sites.google.com/a/cmpso.org/caccss-resources/k-8-modeling-task-force/k-8-modeling-resources (examples of modeling problems and resources for teachers on teaching and scoring them) http://www.dusd.net/cgi/kindergarten-word-problems (kindergarten word problems) http://www.mathwire.com/problemsolving/kfood.pdf (kindergarten word problems)
		[Mathematical Practice 4]	Student Resources:	http://www.turtlediary.com/kindergarten-games/math-games/math-story.html (word problems for students)
	Skills:	Model real world problems with appropriate models, analyze relationships, interpret results and reflect on the results	Assessment:	Modeling Problems Students connect the strategies and models (e.g., five-frames, ten-frames, objects,) they have learned in kindergarten to solve addition and subtraction word problems (join, put together, adding to, separating, taking part, and taking from) and interpret the results in relation to the problem.

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3.	Description:	Mathematicians fluently add and subtract within five	Teacher Resources:	http://www.k-5mathteachingresources.com/kindergarten-math-activities.html (activities for kindergarten to build fluency)
			Student Resources:	http://www.ixl.com/math/kindergarten (games for fluency for kindergarten) http://www.arcademics.com/games/alien/alien.html (game to find combinations for numbers to 20) http://www.turtlediary.com/kindergarten-games/math-games.html (interactive kindergarten games)
	Skills:	Add and subtract within five includes knowing all the ways to compose and decompose each whole number from 1 to 5	Assessment:	Fluency Problems Students build fluency adding and subtracting within five by consistent practice with counting, subitizing (e.g., quick images), word problems, and symbols (e.g., +, -, =).

Prior Knowledge and Experiences

Student familiarity with counting to ten including the concepts of one-to-one correspondence, cardinality, order irrelevance, and stable order of number names provides a strong foundation for this unit. Students would also benefit from prior experience with numeral recognition and printing numerals.

Learning Experience # 1

The teacher may provide five linking cubes of the same colors to partners so that students can practice decomposing the number five.

Enactive: One student can show another student a five stick of cubes and then put the stick behind her back, the other student says “snap” and the first partner breaks the stick into parts and shows her partner one part. The student not holding the cubes then determines the number of cubes hidden behind the back of her partner. The partner shows the hidden cubes to check for accuracy. Partners can repeat this activity for several rounds to practice combos to five.

Teacher Notes:	This activity is a good pre-assessment of a student’s ability to visualize number. This learning experience will be revisited later in the unit and can also be used as a warm-up or as a station for additional practice using either less or more cubes.
Generalization Connection(s):	The operations of addition and subtraction describe actions in the world such as joining, putting together, adding to, separating, taking apart and taking from
Teacher Resources:	http://www.engageny.org/resource/kindergarten-mathematics-module-4 (description of the snap activity, lesson 8)
Student Resources:	N/A
Assessment:	Students mastering the concept and skills of this lesson should be able to answer questions such as: What if I showed you five cubes, how many would be behind my back? How did you find the number of cubes behind your partners back? Why was this activity hard or easy for you?

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Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may provide students with a visual such as five cubes or a five-frame http://www2.carrollk12.org/instruction/elemcurric/math/tframes.HTM	Students can determine the number of cubes by looking at a complete five-stick or five-frame
Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may provide ten cubes for some partners	Students can play snap with a partner using ten cubes
Key Knowledge and Skills:	<ul style="list-style-type: none"> Fluently add and subtract within 5 	
Critical Language:	Decompose, parts, accuracy, compose, hidden	

Learning Experience # 2		
<p>The teacher may bring groups of five students to the front of the classroom:</p> <ul style="list-style-type: none"> one student has an addition symbol one student has an equal symbol two students use fingers to show a quantity on one hand one student shows the sum using his fingers <p>so that students can gain comfort with meaning of the addition and equal symbols and the format of the addition equation.</p> <p><i>Iconic:</i> Students can verbalize the addition equation represented. <i>Symbolic:</i> Students can write the addition equation represented.</p>		
Teacher Notes:	<p>The learning experience connects the enactive, iconic, and symbolic parts of a learning experience in relation to combinations to five. During the first few examples students might only verbalize the equation with their classmates and the teacher may model how to write the equation on the board. As students gain comfort with the symbolic form they can begin to write the equation. Teachers may also want to provide a template for students (e.g., $_ + _ = _$) during the initial part of the learning experience. Over the course of this learning experience students can also explore what happens if the equation is rearranged to begin to develop a fuller meaning of the symbols. For instance, students should see the addition equation written as $_ = _ + _$ and even $_ + _ = _ + _$ to reinforce the equal sign is not just the answer comes next but a balance idea.</p>	
Generalization Connection(s):	Addition and subtraction problems use numerals, the addition symbol, the subtraction symbol, and the equal symbol to form an equation (+, -, =)	
Teacher Resources:	http://mrswheelerfirst.blogspot.com/2012/02/turn-around-facts.html (the activity called Turn-Around Facts has templates for +, =)	
Student Resources:	N/A	
Assessment:	Students mastering the concept and skills of this lesson should be able to answer questions such as:	

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	What does this symbol mean +? What does this symbol mean =? If the two people on either side of the addition symbol switch will the sum remain the same? Why is this a true equation $2 + 3 = 4 + 1$?	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	http://www.schoolexpress.com/create.php (resource to make a template for $_ + _ = _$)	Students can write an addition equation using a template and tally marks to represent the quantities represented by student's fingers
Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	N/A	Students can write two addition equations showing the commutative property for each example (e.g., $2 + 3 = 5$; $3 + 2 = 5$)
Key Knowledge and Skills:	<ul style="list-style-type: none"> Represent addition and subtraction in a variety of ways (with objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, expressions or equations) 	
Critical Language:	Addition symbol, equal symbol, quantities, verbalize, sum, equation, either side, rearrange, numeral	

Learning Experience # 3		
<p>The teacher may provide students with five pennies so that students can begin decomposing the number five.</p> <p><i>Enactive:</i> Students can shake five pennies in a cup and spill out the pennies to find a combination to five looking at heads and tails.</p> <p><i>Iconic:</i> Students can record the combinations of heads and tails on a five-frame.</p> <p><i>Symbolic:</i> Students can write an equation showing the combinations on their five frames.</p>		
Teacher Notes:	When students record combinations on the five-frame it is helpful to group the heads and then the tails from left to right, this provides a visual for the addition equation. If students are not familiar with pennies you may want to do counters first and then repeat the activity with pennies. This learning experience will be revisited with ten pennies later in the unit and it can be used as a station with more or less pennies/counters.	
Generalization Connection(s):	Strategies for solving addition and subtraction word problems include acting out with objects and illustrating with drawings; both can be used to justify/explain an answer The operations of addition and subtraction describe actions in the world such as joining, putting together, adding to, separating, taking apart and taking from Addition and subtraction problems use numerals, the addition symbol, the subtraction symbol, and the equal symbol to form an equation (+, -, =)	
Teacher Resources:	http://www.k-5mathteachingresources.com/support-files/shake5andspill.pdf (shake and spill directions and templates) https://docs.google.com/file/d/0ByBagqlM6QHV2RrZVd5bmdjWjQ/edit?pli=1 (spill and add templates to five and ten with number equation)	
Student Resources:	http://illuminations.nctm.org/Activity.aspx?id=3564 (five-frames practice)	

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	<i>Benny's Pennies</i> by Pat Brisson	
Assessment:	<p>Students mastering the concept and skills of this lesson should be able to answer questions such as:</p> <p>How many different combinations of heads and tails did you find?</p> <p>Do you have the same number of pennies if you have four tails and one head or four heads and one tail?</p> <p>What would you have to shake to have the equation, $2 + 3 = 5$?</p> <p>What would you have to shake to have an equation with a zero?</p> <p>Was it easy or hard to get all heads or all tails?</p> <p>Why was this activity hard or easy for you?</p>	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may pair students to find the combinations to five and provide two-color counters instead of pennies http://www.fisme.science.uu.nl/toepassing/03373/ (speedy pictures for numbers to ten)	Students can find combinations to five working with a partner using two-color counters Students can practice finding combinations to five by looking at visuals such as finger patterns and five-frames
Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	Teachers may provide students with equations such as $5 = 4 + 1$ and ask students to show the combination on their five-frames	Students can show the equations using five-frames and their pennies
Key Knowledge and Skills:	<ul style="list-style-type: none"> Fluently add and subtract within 5 Model and solve addition and subtraction problems within the number 10 using objects such as coins and drawings 	
Critical Language:	Pennies, heads, tails, equation, five-frames, counters, equals, addition symbol, spill, shake	

Learning Experience # 4

The teacher may provide “join” words problems with combinations of numbers to five so that students can represent and solve addition word problems.

Enactive: Students can act out the problems with a partner using manipulatives.

Iconic: Students can draw pictures to represent the problem and share their pictures with a partner.

Symbolic: Students can show the problem using a five-frame template with two different colors and write a number sentence.

Teacher Notes:

Throughout this learning experience teachers may emphasize the connections between words such as join, put together, adding to, plus, and compose with the concept of addition. The extension activity has problems, which are “join” word problems with a missing addend because the change is unknown. Students tend to interpret these problems as addition rather than subtraction. Students can write the number sentence based on the strategy used, which could be either addition or subtraction (e.g, $3 + \underline{\quad} = 5$; $5 - 3 = \underline{\quad}$). Students working on the extension should be paired together and can share their problems and strategies at the end of the class discussion. Throughout this unit students should be provided opportunities to develop their understanding of symbols and in particular their understanding of the equal sign as “same as” rather than the answer comes next. This means the teacher may want to write equations in the form of $5 = 2 + 3$ in addition to $2 + 3 = 5$.

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Generalization Connection(s):	<p>Strategies for solving addition and subtraction word problems include acting out with objects and illustrating with drawings; both can be used to justify/explain an answer</p> <p>The operations of addition and subtraction describe actions in the world such as joining, putting together, adding to, separating, taking apart and taking from</p> <p>Addition and subtraction problems use numerals, the addition symbol, the subtraction symbol, and the equal symbol to form an equation (+, -, =)</p>	
Teacher Resources:	<p>http://www2.carrollk12.org/instruction/elemcurric/math/tframes.HTM (five-frame template)</p> <p>http://maccss.ncdpi.wikispaces.net/file/view/Kindergarten%20Unit.pdf/307156880/Kindergarten%20Unit.pdf (word problem unit for kindergarten, examples of join problems on page five)</p> <p>http://www.education.com/worksheet/article/addition-and-subtraction-for-kids/ (examples of words problems)</p>	
Student Resources:	N/A	
Assessment:	<p>Students that have mastered the concepts of this lesson should be able to answer the following questions:</p> <p>What words come to mind when you think of the word addition?</p> <p>How did you find the answer to the word problem?</p> <p>What is the symbol for joining two numbers?</p> <p>What symbol shows that both sides of the number sentence are the same?</p>	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	<p>The teacher may provide a five-frame template and a blank addition template (e.g., ___ + ___ = ___)</p> <p>http://www.schoolexpress.com/create.php (resource to make a template)</p>	<p>Students can complete the five-frame and addition number sentence using a template</p>
Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	<p>The teacher may provide “join” word problems with the change unknown</p>	<p>Students can solve change unknown “join” word problems</p>
Key Knowledge and Skills:	<ul style="list-style-type: none"> Represent addition and subtraction in a variety of ways (with objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, expressions or equations) 	
Critical Language:	<p>Equal sign, join, put together, gave, add, addition symbol, addition, word problem, equation, subtraction, show, explain, five-frame, number sentence, same, equal sign, equals</p>	

Learning Experience # 5		
<p>The teacher may provide five linking cubes of the same colors so that students can practice decomposing the number five and begin connecting decomposition to subtraction.</p> <p><i>Enactive:</i> One student can show the other student the five stick of cubes and then put the stick behind her back, the other student says “snap” and the first partner breaks the stick into parts and shows her partner one part. The student not holding the cubes then determines the number of cubes hidden behind the back of her partner and verbalizes a subtraction equation (e.g., five minus three equals two). The partner shows the hidden cubes to check for accuracy. Partners can repeat this activity for several rounds to practice combos to five.</p> <p><i>Symbolic:</i> Students record their subtraction equation for each round of the game on a subtraction template (e.g., $5 - \underline{\quad} = \underline{\quad}$).</p>		
Teacher Notes:	<p>This learning experience is designed to bridge the addition work students have been doing to subtraction. The teacher may also want to show to students how to write a subtraction equation in the form $2 = 5 - 3$. Unlike addition however subtraction is not commutative, $5 - 3$ is not equal to $3 - 5$. The concept that subtraction is not commutative is a great conversation to have with students but could take several years for students to fully develop a complete understanding. It is tempting to tell students $3 - 5$ is impossible but this can lead to confusion in later grade levels when working with multi-digit numbers or integers. It is help to refocus on the context of the snap activity and the idea of starting with three cubes and breaking off five cubes. This could lead to some students discussing the idea of owing or needing two more cubes. All these precursor ideas to negative numbers are great discussions and help provide a more well-rounded idea of number for students.</p>	
Generalization Connection(s):	<p>The operations of addition and subtraction describe actions in the world such as joining, putting together, adding to, separating, taking apart and taking from</p>	
Teacher Resources:	<p>http://www.engageny.org/resource/kindergarten-mathematics-module-4 (description of the snap activity, lesson 8)</p>	
Student Resources:	<p>N/A</p>	
Assessment:	<p>Students mastering the concept and skills of this lesson should be able to answer questions such as:</p> <p>What does it mean to subtract?</p> <p>What if I showed you five cubes, how many would be behind my back? How would you write a subtraction equation to show this?</p> <p>How did you find the number of cubes behind your partners back?</p> <p>Why was this activity hard or easy for you?</p>	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	<p>The teacher may provide students with a visual such as five cubes or a five-frame http://www2.carrollk12.org/instruction/elemcurric/math/tframes.HTM.</p>	<p>Students can determine the number of cubes by looking at a complete five-stick or five-frame</p>
Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	<p>Teachers may provide ten cubes for some partners</p>	<p>Students can play snap with a partner using ten cubes</p>
Key Knowledge and Skills:	<ul style="list-style-type: none"> Fluently add and subtract within 5 	
Critical Language:	<p>Decompose, parts, accuracy, compose, hidden, minus, subtract, equation, equal</p>	

Learning Experience # 6		
<p>The teacher may provide “separate” words problems with combinations of numbers to five so that students can represent and solve word problems.</p> <p><i>Enactive:</i> Students can act out the problems with a partner using manipulatives. <i>Iconic:</i> Students can draw pictures to represent the problem and share their pictures with a partner. <i>Symbolic:</i> Students can show the problem using a five-frame template with two different colors and then write the number sentence.</p>		
Teacher Notes:	<p>Throughout this learning experience teachers may emphasize the connections between words such as take away, take apart, minus, decompose, and separate with the concept of subtraction. The extension activity has problems, which are “separate” word with the change unknown. Students tend to interpret these problems as subtraction rather than addition. Students can write their number sentence based on their strategy, which could be either addition or subtraction (e.g., $3 + \underline{\quad} = 5$; $5 - 3 = \underline{\quad}$). Students working on the extension should be paired together and can share their problems and strategies at the end of the class discussion. Throughout this unit students should be provided opportunities to develop their understanding of symbols and in particular their understanding of the equal sign as “same as” rather than the answer comes next. This means the teacher may want to write equations in the form of $5 - 2 = 3$ in addition to $2 = 5 - 3$.</p>	
Generalization Connection(s):	<p>Strategies for solving addition and subtraction word problems include acting out with objects and illustrating with drawings; both can be used to justify/explain an answer The operations of addition and subtraction describe actions in the world such as joining, putting together, adding to, separating, taking apart and taking from Addition and subtraction problems use numerals, the addition symbol, the subtraction symbol, and the equal symbol to form an equation (+, -, =)</p>	
Teacher Resources:	<p>http://www2.carrollk12.org/instruction/elemcurric/math/tframes.HTM (five-frame template) http://maccss.ncdpi.wikispaces.net/file/view/Kindergarten%20Unit.pdf/307156880/Kindergarten%20Unit.pdf (word problem unit for kindergarten with examples of separate problems on page five) http://www.education.com/worksheet/article/addition-and-subtraction-for-kids/ (examples of words problems)</p>	
Student Resources:	N/A	
Assessment:	<p>Students that have mastered the concepts of this lesson should be able to answer the following questions: What words come to mind when you think of the word subtraction? How did you find your answer? What is the symbol for subtracting two numbers?</p>	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may provide five-frame templates with blank subtraction templates (e.g., $\underline{\quad} - \underline{\quad} = \underline{\quad}$)	Students can complete the five-frame and subtraction number sentence using a template
Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may provide “separate” word problems with the change unknown	Students can solve change unknown “separate” word problems

Colorado Teacher-Authored Sample Instructional Unit

Key Knowledge and Skills:	<ul style="list-style-type: none"> Represent addition and subtraction in a variety of ways (with objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, expressions or equations)
Critical Language:	Equal sign, separate, take apart, minus, decompose, take away, taking from, symbol, word problem, equation, subtraction, show, explain, five-frame, number sentence, same

Learning Experience # 7		
<p>The teacher may provide students with ten pennies so that students can begin decomposing the number ten.</p> <p><i>Enactive:</i> Students can shake ten pennies in a cup and spill out the pennies to find a combination to ten looking at heads and tails. <i>Iconic:</i> Students can record the combinations of heads and tails on a ten-frame. <i>Symbolic:</i> Students can write an equation showing the combinations on their ten-frames.</p>		
Teacher Notes:	As students gain comfort with ten-frames they can use them flexibly, such as showing doubles, but during this initial learning experience it is helpful complete the rows from left to right and build the sub-base of five before moving to the bottom row.	
Generalization Connection(s):	The operations of addition and subtraction describe actions in the world such as joining, putting together, adding to, separating, taking apart and taking from Addition and subtraction problems use numerals, the addition symbol, the subtraction symbol, and the equal symbol to form an equation (+, -, =)	
Teacher Resources:	http://www.k-5mathteachingresources.com/support-files/shake5andspill.pdf (shake and spill directions and templates) https://docs.google.com/file/d/0ByBagqlM6QQHV2RrZVd5bmdjWjQ/edit?pli=1 (spill and add templates to five and ten with number equation)	
Student Resources:	http://illuminations.nctm.org/Activity.aspx?id=3565 (ten frames) <i>Benny's Pennies</i> by Pat Brisson	
Assessment:	Students mastering the concept and skills of this lesson should be able to answer questions such as: How many different combinations of heads and tails did you find? Did you find them all? What would you have to shake to have an equation with a zero? What equation shows an equal number of heads and tails? How is a ten-frame similar to a five-frame?	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may pair students to find the combinations to ten and provide two-color counters instead of pennies http://www.fisme.science.uu.nl/toepassing/03373/ (speedy pictures)	Students can find combinations to ten working with a partner using two-color counters Students can practice finding combinations to ten by looking at visuals such as finger patterns and ten-frames
Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may provide students with equations such as $10=9+1$ and ask students to show the combination on their ten-frames	Students can show equations provided by the teacher using ten-frames and their pennies

Colorado Teacher-Authored Sample Instructional Unit

Key Knowledge and Skills:	<ul style="list-style-type: none"> • Represent addition and subtraction in a variety of ways (with objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, expressions or equations) • Model and solve addition and subtraction problems within the number 10 using objects such as coins and drawings
Critical Language:	Pennies, heads, tails, equation, five-frames, ten-frames, counters, equals, addition symbol, spill, shake

Learning Experience # 8

The teacher may demonstrate how to play “race to zero” (or any subtraction from ten game) so that students can practice subtraction within ten.

Enactive: Students can work in partners with ten-frames, counters, and a number cube with dot patterns. Each student can fill his/her ten-frame with counters to start the game. The first student can roll a number cube and remove the number of counters rolled from her ten-frame. The student then verbalizes the number equation (e.g., ten minus six equals four). The second partner then takes their turn. The students can continue to play until all counters have been removed. If a student rolls a number greater than the number of counters remaining the student can realize there are not enough counters and might say: “Three minus four equals not enough counters.” The other partner then takes a turn and play continues.

Iconic/Symbolic: Students can play individually during a subsequent math time and record their initial move by drawing on a ten-frame and writing the corresponding subtraction equation on a template (e.g., $10 - \underline{\quad} = \underline{\quad}$).

Generalization Connection(s):	Addition and subtraction problems use numerals, the addition symbol, the subtraction symbol, and the equal symbol to form an equation (+, -, =)	
Teacher Resources:	http://www.engageny.org/resource/kindergarten-mathematics-module-4 (kindergarten unit the game race to zero is explained in Lesson 28)	
Student Resources:	N/A	
Assessment:	<p>Students mastering the concept and skills of this lesson should be able to answer questions such as:</p> <p>What happens when a number cube shows a quantity larger than the number of chips remaining on your ten-frame?</p> <p>Is it possible to win the game with only one turn?</p> <p>What combinations would win the game in two turns?</p> <p>Why do we always start the game with $10 - \underline{\quad} = \underline{\quad}$?</p>	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	http://www.engageny.org/resource/kindergarten-mathematics-module-4 (race to zero game with directions from five is explained in lesson 28)	Students can play “race to zero” starting from five
Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	N/A	Students can record symbolically the entire game rather than just the initial move (e.g, $10 - 3 = 7$; $7 - 2 = 5$; $5 - 4 = 1$; $1 - 1 = 0$)
Key Knowledge and Skills:	<ul style="list-style-type: none"> • Represent addition and subtraction in a variety of ways (with objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, expressions or equations) 	
Critical Language:	Subtraction, remove, record, initial, minus, ten-frame, equals, counters, number cube	

Learning Experience # 9		
The teacher may provide several representations of the same quantity (equation, finger patterns, ten frames) so that students can connect multiple representations of the same quantities.		
Teacher Notes:	It may be helpful for students to work with partners as they match the representations and explain their matches. Students can be given equations and then different representations one at a time such as ten-frames to match to the equation and then finger patterns. The matching cards from this learning experience can be used to play the game of memory after students have completed the initial matching activity.	
Generalization Connection(s):	Strategies for solving addition and subtraction word problems include acting out with objects and illustrating with drawings; both can be used to justify/explain an answer Addition and subtraction problems use numerals, the addition symbol, the subtraction symbol, and the equal symbol to form an equation (+, -, =)	
Teacher Resources:	http://teresaemmert.weebly.com/uploads/1/3/0/5/13053448/decomposing_numbers_operations_and_algebraic_thinking_kindergarten_spring_2012_revised_4-25-12.pdf (lesson plan with blackline masters for the matching cards)	
Student Resources:	N/A	
Assessment:	Students mastering the concept and skills of this lesson should be able to answer questions such as: What does it mean to be equal? Is three fingers and two fingers the same as two fingers and three fingers? Why or why not? What is another way to show 7 and 1? Which cards were the hardest and easiest to match? Why?	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may provide students with combinations to five rather than ten and fewer combinations and/or fewer types of representations	Students can match cards with combinations to five with a partner
Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may provide blank matching cards http://teresaemmert.weebly.com/uploads/1/3/0/5/13053448/decomposing_numbers_operations_and_algebraic_thinking_kindergarten_spring_2012_revised_4-25-12.pdf (lesson plan with blackline masters for the matching cards)	Students can create additional cards to add to the matching activity
Key Knowledge and Skills:	<ul style="list-style-type: none"> Represent addition and subtraction in a variety of ways (with objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, expressions or equations) 	
Critical Language:	Equation, ten-frame, equal sign, addition, finger patterns, match, quantity, explain	

Learning Experience # 10		
<p>The teacher may provide a variety of addition <i>and</i> subtraction word problems within ten so that students can represent and solve word problems.</p> <p><i>Enactive:</i> Students can act out the problems with a partner using manipulatives. <i>Iconic:</i> Students can draw pictures to represent the problem and share their pictures with a partner and verbalize their strategy. <i>Symbolic:</i> Students can show the problem using a ten-frame template with two different colors and then write the number sentence.</p>		
Teacher Notes:	This learning experience may take a week to allow students time to work with a variety of word problems and gain comfort identifying the operation needed to solve the problem. The goal is for students to make sense of the problem during the enactive stage leading to a fuller understanding of addition and subtraction.	
Generalization Connection(s):	<p>Strategies for solving addition and subtraction word problems include acting out with objects and illustrating with drawings; both can be used to justify/explain an answer</p> <p>The operations of addition and subtraction describe actions in the world such as joining, putting together, adding to, separating, taking apart and taking from</p> <p>Addition and subtraction problems use numerals, the addition symbol, the subtraction symbol, and the equal symbol to form an equation (+, -, =)</p>	
Teacher Resources:	<p>http://maccss.ncdpi.wikispaces.net/file/view/Kindergarten%20Unit.pdf/307156880/Kindergarten%20Unit.pdf (word problem unit for kindergarten with examples of join and separate problems on page five)</p> <p>http://www.education.com/worksheet/article/addition-and-subtraction-for-kids/ (examples of words problems)</p>	
Student Resources:	N/A	
Assessment:	<p>Students that have mastered the concepts of this lesson should be able to answer the following questions:</p> <p>How is addition different and similar to subtraction? What is the symbol for joining two numbers? What is the symbol for separating two numbers? How can your drawing/ten-frame help you solve a word problem?</p>	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may provide only one type of word problem (e.g., join or take away) at a time	Students can solve join problems during one-math session and separate problems during a different math session
Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may provide word problems with the change unknown	Students can solve change unknown word problems
Key Knowledge and Skills:	<ul style="list-style-type: none"> Represent addition and subtraction in a variety of ways (with objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, expressions or equations) 	
Critical Language:	Equal sign, separate, take apart, minus, decompose, take away, taking from, symbol, word problem, equation, subtraction, show, explain, five-frame, number sentence, same, join, put together, gave, add, addition	