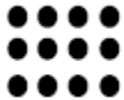
Grade: 2 **Unit 7--Arrays, Equal Shares, and Calculating Lengths**	**Subject: Math** • **Time Frame: 15 days** • **Domains: Operations in Algebraic Thinking, Number and Operations in Base Ten, Measurement and Data, Geometry**	
Standards	Content Standards: 2.OA.1, 2.OA.3, 2.OA.4, 2.NBT.5, 2.NBT.6, 2.MD.5, 2.MD.1, 2.MD.5, 2.MD.6, 2.G.1, 2.G.2, 2.G.3 http://www.corestandards.org/wp-content/uploads/Math_Standards.pdf	Practice Standards: MP 1, 2, 3, 4, 5, 6, 7, 8
Enduring Understandings	1. Use fraction language to describe partitions of shapes into equal shares. 2. Use addition to find the total number of objects in an array.	
Essential Questions	1. How can I arrange items in rectangular arrays and partition rectangles into equal shares? 2. How can I fold and draw equal shares to shave halves, thirds, and fourths? 3. How can I add three and four lengths to solve word problems?	
Vocabulary	array, row, column, half, halves, thirds, fourths, equal shares, number line diagram	

Priority and Supporting CCSS	Explanations and Examples*
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.1.** Word problems that are connected to students' lives can be used to develop fluency with addition and subtraction. Table 1 (Appendix A) describes the four different addition and subtraction situations and their relationship to the position of the unknown. Examples: • Take-from example: David had 63 stickers. He gave 37 to Susan. How many stickers does David have now? 63 – 37 = __ • Add to example: David had $37. His grandpa gave him some money for his birthday. Now he has $63. How much money did David's grandpa give him? $37 +__ = $63 • Compare example: David has 63 stickers. Susan has 37 stickers. How many more stickers does David have than Susan? 63 – 37 = __ Even though the modeling of the two problems above is different, the equation, 63 - 37 = __, can represent both situations (How many more do I need to make 63?) • Take-from (Start Unknown) David had some stickers. He gave 37 to Susan. Now he has 26 stickers. How many stickers did David have before? __- 37 = 26 It is important to attend to the difficulty level of the problem situations in relation to the position of the unknown. • Result Unknown problems are the least complex for students followed by Total Unknown and Difference Unknown • The next level of difficulty includes Change Unknown, Addend Unknown, followed by Bigger Unknown • The most difficult are Start Unknown, Both Addends Unknown, and Smaller Unknown Second grade students should work on ALL problem types regardless of the level of difficulty. Students can use interactive whiteboard or document camera

*Source – Connecticut Core Standards for Mathematics as adapted from the Arizona Academic Content Standards

	to demonstrate and justify their thinking. This standard focuses on developing an algebraic representation of a word problem through addition and subtraction --the intent is not to introduce traditional algorithms or rules.

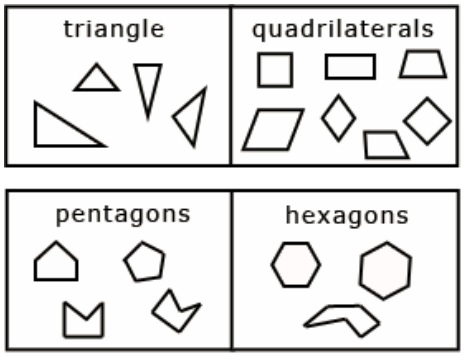
Priority and Supporting CCSS	Explanations and Examples*
2.OA.3. Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.	**2.OA.3.** Students explore odd and even numbers in a variety of ways including the following: students may investigate if a number is odd or even by determining if the number of objects can be divided into two equal sets, arranged into pairs or counted by twos. After the above experiences, students may derive that they only need to look at the digit in the ones place to determine if a number is odd or even since any number of tens will always split into two even groups Example: Students need opportunities writing equations representing sums of two equal addends, such as: 2 + 2 = 4, 3 + 3 = 6, 5 + 5 = 10, 6 + 6 = 12, or 8 + 8 =16. This understanding will lay the foundation for multiplication and is closely connected to 2.OA.4. The use of objects and/or interactive whiteboards will help students develop and demonstrate various strategies to determine even and odd numbers.

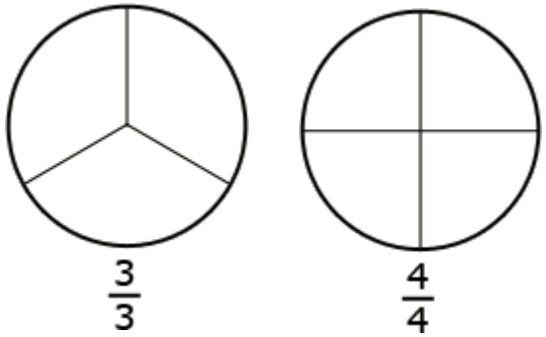
2.OA.4. Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.	**2.OA.4.** Students may arrange any set of objects into a rectangular array. Objects can be cubes, buttons, counters, etc. Objects do not have to be square to make an array. Geoboards can also be used to demonstrate rectangular arrays. Students then write equations that represent the total as the sum of equal addends as shown below.  4 + 4 + 4 = 12  5 + 5 + 5 + 5 = 20 Interactive whiteboards and document cameras may be used to help students visualize and create arrays.

Priority and Supporting CCSS	Explanations and Examples*
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.5.** 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. Students should have experiences solving problems written both horizontally and vertically. They need to communicate their thinking and be able to justify their strategies both verbally and with paper and pencil. Addition strategies based on place value for 48 + 37 may include: • Adding by place value: 40 + 30 = 70 and 8 + 7 = 15 and 70 + 15 = 85. • Incremental adding (breaking one number into tens and ones); 48 + 10 = 58, 58 + 10 = 68, 68 + 10 = 78, 78 + 7 = 85 • Compensation (making a friendly number): 48 + 2 = 50, 37 – 2 = 35, 50 + 35 = 85 Subtraction strategies based on place value for 81 - 37 may include: • Adding Up (from smaller number to larger number): 37 + 3 = 40, 40 + 40 = 80, 80 + 1 = 81, and 3 + 40 + 1 = 44. • Incremental subtracting: 81 -10 = 71, 71 – 10 = 61, 61 – 10 = 51, 51 – 7 = 44 • Subtracting by place value: 81 – 30 = 51, 51 – 7 = 44 Properties that students should know and use are: • Commutative Property of Addition (Example: 3 + 5 = 5 + 3) • Associative Property of Addition (Example: (2 + 7) + 3 = 2 + (7+3)) • Identity Property of 0 (Example: 8 + 0 = 8) Students in second grade need to communicate their understanding of why some properties work for some operations and not for others. • Commutative Property: In first grade, students investigated whether the Commutative Property works with subtraction. The intent was for students to recognize that taking 5 from 8 is not the same as taking 8 from 5. Students should also understand that they will be working with numbers in later grades that will allow them to subtract larger numbers from smaller numbers. This

	exploration of the commutative property continues in second grade. Associative Property: Recognizing that the Associative Property does not work for subtraction is difficult for students to consider at this grade level as it is challenging to determine all the possibilities.
2.NTB.6. Add up to four two-digit numbers using strategies based on place value and properties of operations.	**2.NTB.6**. Students demonstrate addition strategies with up to four two-digit numbers either with or without regrouping. Problems may be written in a story problem format to help develop a stronger understanding of larger numbers and their values. Interactive whiteboards and document cameras may also be used to model and justify student thinking.
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.1.** Students in second grade will build upon what they learned in first grade from measuring length with non-standard units to the new skill of measuring length in metric and U.S. Customary with standard units of measure. They should have many experiences measuring the length of objects with rulers, yardsticks, meter sticks, and tape measures. They will need to be taught how to actually use a ruler appropriately to measure the length of an object especially as to where to begin the measuring. Do you start at the end of the ruler or at the zero?

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.5**. Students need experience working with addition and subtraction to solve word problems which include measures of length. It is important that word problems stay within the same unit of measure. Counting on and/or counting back on a number line will help tie this concept to previous knowledge. Some representations students can use include drawings, rulers, pictures, and/or physical objects. An interactive whiteboard or document camera may be used to help students develop and demonstrate their thinking. Equations include: • 20 + 35 = __ • __ - 20 = 35 • __ – 35 = 20 • 20 + __ = 55 • 35 + __ = 55 • 55 = __ + 35 • 55 = 20 + __ Example: • A word problem for 5 – __ = *2* could be: Mary is making a dress. She has 5 yards of fabric. She uses some of the fabric and has 2 yards left. How many yards did Mary use? There is a strong connection between this standard and demonstrating fluency of addition and subtraction facts. Addition facts through 10 + 10 and the related subtraction facts should be included.
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.	**2.MD.6**. Students represent their thinking when adding and subtracting within 100 by using a number line. An interactive whiteboard or document camera can be used to help students demonstrate their thinking. Example: 10 – 6 = 4

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.	**2.G.1.** Students identify, describe, and draw triangles, quadrilaterals, pentagons, and hexagons. Pentagons, triangles, and hexagons should appear as both regular (equal sides and equal angles) and irregular. Students recognize all four sided shapes as quadrilaterals. Students use the vocabulary word "angle" in place of "corner" but they do not need to name angle types. Interactive whiteboards and document cameras may be used to help identify shapes and their attributes. Shapes should be presented in a variety of orientations and configurations. 
2.G.2. Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.	**2.G.2.** This standard is a precursor to learning about the area of a rectangle and using arrays for multiplication. An interactive whiteboard or manipulatives such as square tiles, cubes, or other square shaped objects can be used to help students partition rectangles. Rows are horizontal and columns are vertical.

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.3** This standard introduces fractions in an area model. Students need experiences with different sizes, circles, and rectangles. For example, students should recognize that when they cut a circle into three equal pieces, each piece will equal one third of its original whole. In this case, students should describe the whole as three thirds. If a circle is cut into four equal pieces, each piece will equal one fourth of its original whole and the whole is described as four fourths.  Students should see circles and rectangles partitioned in multiple ways so they learn to recognize that equal shares can be different shapes within the same whole. An interactive whiteboard may be used to show partitions of shapes. 

Resources
Math Expressions – Unit 7 Lessons 1-6 Soar to Success Math Intervention Mega Math Destination Math Common Core Mathematics-Newmark Learning- Xtramath.org Learnzillion.com Think Central

Unit Assessments
Unit Test Quick Quizzes Formative Assessments Performance Task

Technology: Videos, Websites, Links
https://grade2commoncoremath.wikispaces.hcpss.org/2.OA.1 https://grade2commoncoremath.wikispaces.hcpss.org/2.OA.3 https://grade2commoncoremath.wikispaces.hcpss.org/2.OA.4 https://grade2commoncoremath.wikispaces.hcpss.org/2.NBT.5 https://grade2commoncoremath.wikispaces.hcpss.org/2.NBT.6 https://grade2commoncoremath.wikispaces.hcpss.org/2.MD.1 https://grade2commoncoremath.wikispaces.hcpss.org/2.MD.5 https://grade2commoncoremath.wikispaces.hcpss.org/2.MD.6 https://grade2commoncoremath.wikispaces.hcpss.org/2.G.1 https://grade2commoncoremath.wikispaces.hcpss.org/2.G.2 https://grade2commoncoremath.wikispaces.hcpss.org/2.G.3

APPENDIX A—TABLE 1

TABLE 1. Common addition and subtraction situations.[6]

	Result Unknown	Change Unknown	Start Unknown
Add to	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? 2 + 3 = ?	Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? 2 + ? = 5	Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? ? + 3 = 5
Take from	Five apples were on the table. I ate two apples. How many apples are on the table now? 5 – 2 = ?	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? 5 – ? = 3	Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? ? – 2 = 3

	Total Unknown	Addend Unknown	Both Addends Unknown[1]
Put Together/ Take Apart[2]	Three red apples and two green apples are on the table. How many apples are on the table? 3 + 2 = ?	Five apples are on the table. Three are red and the rest are green. How many apples are green? 3 + ? = 5, 5 – 3 = ?	Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? 5 = 0 + 5, 5 = 5 + 0 5 = 1 + 4, 5 = 4 + 1 5 = 2 + 3, 5 = 3 + 2

	Difference Unknown	Bigger Unknown	Smaller Unknown
Compare[3]	("How many more?" version): Lucy has two apples. Julie has five apples. How many more apples does Julie have than Lucy? ("How many fewer?" version): Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie? 2 + ? = 5, 5 – 2 = ?	(Version with "more"): Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Lucy has two apples. How many apples does Julie have? 2 + 3 = ?, 3 + 2 = ?	(Version with "more"): Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Julie has five apples. How many apples does Lucy have? 5 – 3 = ?, ? + 3 = 5

[1]These take apart situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean makes or results in but always does mean is the same number as.
[2]Either addend can be unknown, so there are three variations of these problem situations. Both Addends Unknown is a productive extension of this basic situation, especially for small numbers less than or equal to 10.
[3]For the Bigger Unknown or Smaller Unknown situations, one version directs the correct operation (the version using more for the bigger unknown and using less for the smaller unknown). The other versions are more difficult.