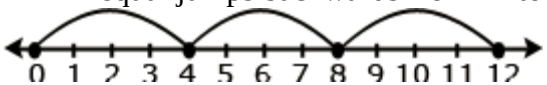
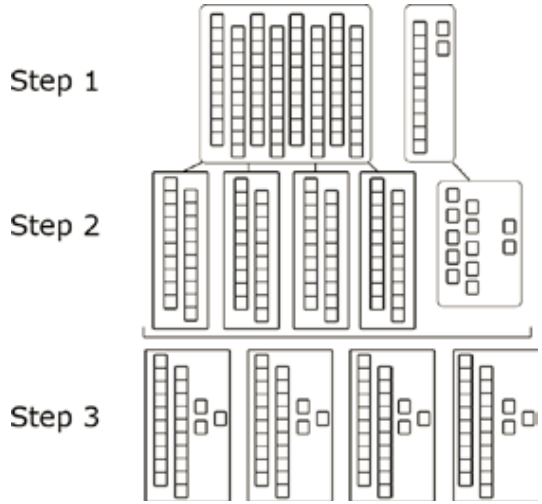
Grade: 3 **Unit 6 – Problem Solving**	**Subject: Math** • **Time Frame: 21 days** • **Domains: Operations and Algebraic Thinking; Number and Operation in Base Ten**	
Standards	Content Standards: 3.OA.3, 3.OA.4, 3.OA.8, 3.NBT.1, 3.NBT.2 http://www.corestandards.org/wp-content/uploads/Math_Standards.pdf	Practice Standards: MP 1, 2, 3, 4, 5, 6, 7, 8
Enduring Understandings	1. Multiplication and division can be used to solve problems. 2. Multiplication and division are related. 3. More than one step or operation may be needed to solve a problem. 4. Thinking is needed to solve problems. Thinking about our answers and their reasonableness helps us determine if our solution could be correct. 5. Rounding is useful when exact numbers are not needed. 6. Addition and subtraction of numbers can be done with place value and strategy understanding. 7. Understanding place value can lead to number sense and efficient strategies for computing with numbers.	
Essential Questions	1. How can different strategies be helpful when solving a problem? 2. How are multiplication and division related? 3. How can different strategies be helpful when solving a problem? 4. How do we solve problems? 5. How does rounding help us make sense of numbers? 6. How can I add/subtract 2 numbers?	
Vocabulary	unknown addend, equation, total, sum, equality, inequality, addend, add to, take from, put together/take apart, expression, unknown start, situation equation, solution equation, compare, equal to =, greater than, less than, comparison problem, comparison bars, unknown amount, Associative Property of Addition, Commutative Property of Addition, Identity Property of Addition, Associative Property of Multiplication, Commutative Property of Multiplication, Identity Property of Multiplication, Zero Property of Multiplication, Distributive Property of Multiplication	

Priority and Supporting CCSS	Explanations and Examples*
3.OA.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	3.OA.3. Students use a variety of representations for creating and solving one-step word problems, i.e., numbers, words, pictures, physical objects, or equations. They use multiplication and division of whole numbers up to 10 x10. Students explain their thinking, show their work by using at least one representation, and verify that their answer is reasonable. Word problems may be represented in multiple ways: • Equations: 3 x 4 = __, 4 x 3 = __, 12 ÷ 4 = __ and 12 ÷ 3 = __ • Array:  • Equal groups  • Repeated addition: 4 + 4 + 4 or repeated subtraction • Three equal jumps forward from 0 on the number line to 12 or three equal jumps backwards from 12 to 0  Examples of division problems: • Determining the number of objects in each share (partitive division, where the size of the groups is unknown): o The bag has 92 hair clips, and Laura and her three friends want to share them equally. How many hair clips will each person receive?

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



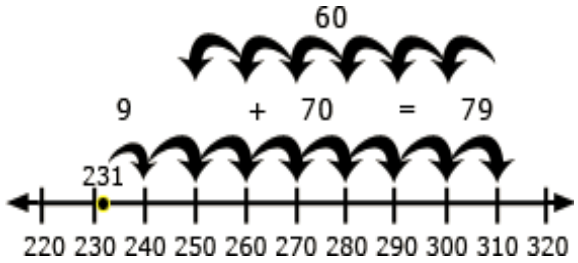
- Determining the number of shares (measurement division, where the number of groups is unknown)
    - Max the monkey loves bananas. Molly, his trainer, has 24 bananas. If she gives Max 4 bananas each day, how many days will the bananas last?

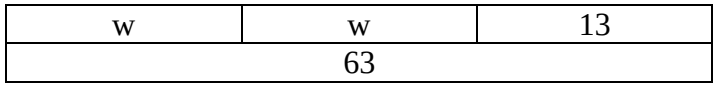
Starting	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
24	24-4=20	20-4=16	16-4=12	12-4=8	8-4=4	4-4=0

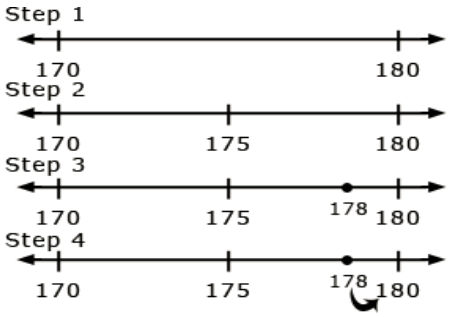
Solution: The bananas will last for 6 days.

Students may use interactive whiteboards to show work and justify their thinking.

Priority and Supporting CCSS	Explanations and Examples*
3.OA.4 .Determine the unknown whole number in a multiplication or division equation relating three whole numbers. ***For example, determine the unknown number that makes the equation true in each of the equations 8 × __ = 48, 5 = __ ÷ 3, 6 × 6 = __***	**3.OA.4.** This standard is strongly connected to 3.AO.3 when students solve problems and determine unknowns in equations. Students should also experience creating story problems for given equations. When crafting story problems, they should carefully consider the question(s) to be asked and answered to write an appropriate equation. Students may approach the same story problem differently and write either a multiplication equation or division equation. Students apply their understanding of the meaning of the equal sign as "the same as" to interpret an equation with an unknown. When given 4 x __ = 40, they might think: • 4 groups of some number is the same as 40 • 4 times some number is the same as 40 • I know that 4 groups of 10 is 40 so the unknown number is 10 • The missing factor is 10 because 4 times 10 equals 40. Equations in the form of a x b = c and c = a x b should be used interchangeably, with the unknown in different positions. Examples: • Solve the equations below: 24 = __ x 6 72÷9= __ • Rachel has 3 bags. There are 4 marbles in each bag. How many marbles does Rachel have altogether? 3 x 4 = __ Students may use interactive whiteboards to create digital models to explain and justify their thinking.

Priority and Supporting CCSS	Explanations and Examples*
3.OA.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding*. *This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations).	**3.OA.8**. Students should be exposed to multiple problem-solving strategies (using any combination of words, numbers, diagrams, physical objects or symbols) and be able to choose which ones to use. Examples: • Jerry earned 231 points at school last week. This week he earned 79 points. If he uses 60 points to earn free time on a computer, how many points will he have left?  A student may use the number line above to describe his/her thinking, "231 + 9 = 240 so now I need to add 70 more. 240, 250 (10 more), 260 (20 more), 270, 280, 290, 300, 310 (70 more). Now I need to count back 60. 310, 300 (back 10), 290 (back 20), 280, 270, 260, 250 (back 60)." A student writes the equation, 231 + 79 – 60 = __ and uses rounding (230 + 80 – 60) to estimate. A student writes the equation, 231 + 79 – 60 = m and calculates 79 – 60 = 19 and then calculates 231 + 19 = __.

	• The soccer club is going on a trip to the water park. The cost of attending the trip is $63. Included in that price is $13 for lunch and the cost of 2 wristbands, one for the morning and one for the afternoon. Write an equation representing the cost of the field trip and determine the price of one wristband.  The above diagram helps the student write the equation, w + w + 13 = 63. Using the diagram, a student might think, "I know that the two wristbands cost $50 ($63-$13) so one wristband costs $25." To check for reasonableness, a student might use front end estimation and say 60-10 = 50 and 50 ÷ 2 = 25. When students solve word problems, they use various estimation skills which include identifying when estimation is appropriate, determining the level of accuracy needed, selecting the appropriate method of estimation, and verifying solutions or determining the reasonableness of solutions. Estimation strategies include, but are not limited to: • using benchmark numbers that are easy to compute • front-end estimation with adjusting (using the highest place value and estimating from the front end making adjustments to the estimate by taking into account the remaining amounts) • rounding and adjusting (students round down or round up and then adjust their estimate depending on how much the rounding changed the original values)

Priority and Supporting CCSS	Explanations and Examples*
3.NBT.1.Use place value understanding to round whole numbers to the nearest 10 or 100.	**3.NBT.1.** Students learn when and why to round numbers. They identify possible answers and halfway points. Then they narrow where the given number falls between the possible answers and halfway points. They also understand that by convention if a number is exactly at the halfway point of the two possible answers, the number is rounded up. Example: Round 178 to the nearest 10.  Step 1: The answer is either 170 or 180. Step 2: The halfway point is 175. Step 3: 178 is between 175 and 180. Step 4: Therefore, the rounded number is 180.
3.NBT.2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.* *A range of algorithms may be used.	**3.NBT.2.** Problems should include both vertical and horizontal forms, including opportunities for students to apply the commutative and associative properties. 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 explain their thinking and show their work by using strategies and algorithms, and verify that their answer is reasonable. An interactive whiteboard or document camera may be used to show and share student thinking.

	Example: • Mary read 573 pages during her summer reading challenge. She was only required to read 399 pages. How many extra pages did Mary read beyond the challenge requirements? Students may use several approaches to solve the problem including the traditional algorithm. Examples of other methods students may use are listed below: • 399 + 1 = 400, 400 + 100 = 500, 500 + 73 = 573, therefore 1+ 100 + 73 = 174 pages (Adding up strategy) • 400 + 100 is 500; 500 + 73 is 573; 100 + 73 is 173 plus 1 (for 399, not 400) is 174 (Compensating strategy) • Take away 73 from 573 to get to 500, take away 100 to get to 400, and take away 1 to get to 399. Then 73 +100 + 1 = 174 (Subtracting to count down strategy) • 399 + 1 is 400, 500 (that's 100 more). 510, 520, 530, 540, 550, 560, 570, (that's 70 more), 571, 572, 573 (that's 3 more) so the total is 1+100+70+3 = 174 (Adding by tens or hundreds strategy)

Resources
Math Expressions – Unit 6, Lessons 1-11 Soar to Success Math Intervention Mega Math Common Core Mathematics-Newmark Learning- Units - 1-5, 12, and 13 Xtramath.org

Unit Assessments
Unit Test Quick Quizzes Formative Assessments Performance Task

Technology: Videos, Websites, Links
https://grade3commoncoremath.wikispaces.hcpss.org/home www.thinkcentral.com www.learnzillion.com http://worksheetsland.com/3/