Subject: Math  
Grade level: 3

Lesson Title: My Math Story Problems  
(This project will be completed after proficiency is demonstrated of the following standards):

Common Core/State Curriculum Standards:

- **CCSS.Math.Content.3.OA.D.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.

- **CCSS.Math.Content.3.OA.A.1** Interpret products of whole numbers, e.g., interpret \(5 \times 7\) as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as \(5 \times 7\).*

- **CCSS.Math.Content.3.OA.A.2** Interpret whole-number quotients of whole numbers, e.g., interpret \(56 \div 8\) as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number of groups can be expressed as \(56 \div 8\).*

- **CCSS.Math.Content.3.OA.A.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.

- **CCSS.Math.Content.3.OA.A.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 \(8 \times ? = 48\), \(5 = _ \div 3\), \(6 \times 6 = ?\)

- **CCSS.Math.Content.3.OA.B.5** Apply properties of operations as strategies to multiply and divide. *Examples: If \(6 \times 4 = 24\) is known, then \(4 \times 6 = 24\) is also known. (Commutative property of multiplication.) \(3 \times 5 \times 2\) can be found by \(3 \times 5 = 15\), then \(15 \times 2 = 30\), or by \(5 \times 2 = 10\), then \(3 \times 10 = 30\). (Associative property of multiplication.) Knowing that \(8 \times 5 = 40\) and \(8 \times 2 = 16\), one can find \(8 \times 7\) as \(8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56\). (Distributive property.)*

- **CCSS.Math.Content.3.OA.B.6** Understand division as an unknown-factor problem. *For example, find \(32 \div 8\) by finding the number that makes 32 when multiplied by 8.*

- **CCSS.Math.Content.3.OA.C.7** Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that \(8 \times 5 = 40\), one knows \(40 \div 5 = 8\)) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

- **CCSS.Math.Content.3.OA.D.9** Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.
For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.

• **CCSS.ELA-Literacy.RL.3.4** Determine the meaning of words and phrases as they are used in a text, distinguishing literal from nonliteral language.

• **CCSS.ELA-Literacy.W.3.4** With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose. (Grade-specific expectations for writing types are defined in standards 1–3 above.)

• **CCSS.ELA-Literacy.W.3.5** With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. (Editing for conventions should demonstrate command of Language standards 1-3 up to and including grade 3 here.)

• **CCSS.ELA-Literacy.W.3.6** With guidance and support from adults, use technology to produce and publish writing (using keyboarding skills) as well as to interact and collaborate with others.

**Learning Objectives:**
- Students will create and solve two step word problems
- Students will demonstrate knowledge of the four operations with whole numbers
- Students will demonstrate an understanding of arithmetic patterns through the word problems
- Students will be able to identify the unknown number in a problem
- Students will create models of two step word problems
- Students will display their word problems and solutions in a digital format utilizing the Shutterfly Photo Story app.

**Students Learning Targets:**
With the completion of this lesson students will have progressed towards mastery of solving two-step word problems. They will be proficient in all four operations in relation to whole numbers. Students will also work towards proficiency in identifying arithmetic patterns.

**Instructional Strategies:** *(Project-based learning, direct instruction, inquiry-based instruction, cooperative learning, etc.)*

Direct Instruction
Independent Practice
Collaborative learning

**How Students Will Use Shutterfly Photo Story:**
Students will use the Shutterfly Photo Story app to illustrate and publish their two-step word problems in a multimedia format. In addition to writing out their word problems, students will use the audio recording feature to record the reading of their word problems. They will use the camera and/or the doodle feature to illustrate both the word problems and the solutions.

**Required Materials/Lesson Length:**
Materials:
- Paper
- Pencil
- Manipulatives (to model and illustrate word problems)
- iPads/digital camera to capture drawings or images
- iPads with Shutterfly Photo Story app to create their Photo Story
Length: 3.5 class periods
• Warm Up- 10 minutes in class
• Instructions for Project – 10 minutes in class
• Brainstorm Session – 15 minutes in class
• Creation of Project – 2 60 minutes class periods/homework
• Editing/Revising Project – 30 minutes in class/homework
• Publish/Share Project – 30 minutes in class

Resources: (Photos, drawings, student created stories; reference books, articles, website URLs, etc. for citation)
• Examples of illustrated word stories
• Operational problems for warm up activity

Procedures/Activities: (What will the teacher and students do?) (Prior Knowledge. Opening Activity, Step-by-Step Learning Activities, Closure, Post-Instruction Reflection)

Warm-Up:
• Provide students with 3-4 problems of each operation (addition, subtraction, multiplication, division) utilizing whole numbers
• Have students solve 1 word problem that requires students to apply properties or operations as strategies.

Introduction of Project:
• Have students participate in a whole group discussion on what is required to create solid and quality word problems.
• Model and demonstrate through a class discussion a proper word story model including the solution
• Outline the project requirements:
  o A minimum of 10 two-step word problems utilizing all four operations with whole numbers.
    • Each word problem must be written, modelled/illustrated and solved.
    • Word problems must include equations with a letter standing for the unknown quantity.
    • Word stories will be recorded using the audio record feature in the Shutterfly Photostory app.
  o Identify the use of arithmetic patterns in your word stories.
  o Students will work with a partner or partners to solve one another’s word problems. These solutions will be used in the Photo Story book.
  o Storybook not to exceed 20 pages.
  o Time in class will be provided for brainstorming, editing, revising and publishing.
  o Students will present their Photo Story book to the class.
• Begin the project by allowing students to explore using manipulatives and create an outline for their word problems

Differentiation: (Lesson suggestions for enrichment or re-teaching. Scaffolding needed as a result of misunderstandings noted during formative assessment.)

To be determined
Special Education/ESL Accommodations & Modifications:
• Have students work closely with an adult to write the word problems
• Reduce the number of required story problems according to the needs of each student
• Allow students to collaborate and create word problems with a partner

Extensions: (Additional activities, follow-up lesson ideas, how the Photo Story book will be shared)
To extend the complexity of word problems, have students use larger numbers to include fractions.
Challenge students to create word problems starting with a solution or an illustration.

Assessment: (How will you determine if students have met the lesson objectives? How will your students know if they have successfully met the lesson objectives? Incorporate formative as well as summative assessments – rubrics, etc.)

A rubric is provided to determine progression to mastery. The learning goal for each student is to achieve Step 4 mastery. These steps are meant to help teachers and students identify and celebrate what the student CAN do now, and what they need to work on next.

<table>
<thead>
<tr>
<th>STEP 1</th>
<th>STEP 2</th>
<th>STEP 3</th>
<th>STEP 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Little evidence of proficiency is demonstrated.</strong></td>
<td><strong>Some evidence of proficiency is demonstrated.</strong></td>
<td><strong>Evidence towards proficiency is demonstrated.</strong></td>
<td><strong>Solid evidence towards proficiency is demonstrated.</strong></td>
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<tr>
<td>(1 Point)</td>
<td>(2 Points)</td>
<td>(3 Points)</td>
<td>(4 Points)</td>
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<tr>
<td>▪ Student not able to write two-step word problems.</td>
<td>▪ Student able to write two-step word problems but the word problem is not sufficient with the standards.</td>
<td>▪ Student writes two-step word problems.</td>
<td>▪ Student writes complex two-step word problems.</td>
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<tr>
<td>▪ Student not able to solve two-step word problems</td>
<td>▪ Student attempts to solve two-step word problems but solution is incorrect.</td>
<td>▪ Student solves most of the two-step word problems presented to them.</td>
<td>▪ Student able to solve each two-step word problem presented to them.</td>
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<tr>
<td>▪ Student does not demonstrate knowledge of the four operations with whole numbers</td>
<td>▪ Student has difficulty with some or all of the four operations with whole numbers</td>
<td>▪ Student demonstrates knowledge of the four operations with whole numbers.</td>
<td>▪ Student displays with ease knowledge of the four operations with whole numbers.</td>
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<tr>
<td>▪ Student does not demonstrate an understanding of arithmetic patterns through the word problems</td>
<td>▪ Student struggles to identify arithmetic patterns in word problems</td>
<td>▪ Student identifies some arithmetic patterns.</td>
<td>▪ Student accurately identifies arithmetic patterns.</td>
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<tr>
<td>▪ Student does not use or identify the unknown number in a problem</td>
<td>▪ Student attempts to identify the number but is unsuccessful.</td>
<td>▪ Student is able to identify the unknown number in a problem.</td>
<td>▪ Student is able to use and solve the unknown number in a problem.</td>
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<tr>
<td>▪ Student attempts to draw the picture. The attempt, however, shows the student may not understand the meaning of the questions.</td>
<td>▪ Student inaccurately draws a model of the problem.</td>
<td>▪ Student correctly draws models of the word problems.</td>
<td>▪ Student used detailed drawings to model a two-step problem.</td>
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