

Lesson Title: Math Problem Solving **Class Time Required:** 2 – 1 hour sessions

Overview and Purpose: In this lesson, students will create multiplication story problems in small groups. They will then work in partners to share and solve each other's multiplication story problems. Students will model the process of multiplication. Students will practice solving story problems.

California Content Standards: California 3rd Grade State Standards

Math

Number Sense

- Students calculate and solve problems involving addition, subtraction, multiplication, and division:
 - Memorize to automaticity the multiplication table for numbers between 1 and 10.
- Use the inverse relationship of multiplication and division to compute and check results.

Algebra and Functions

- Students select appropriate symbols, operations, and properties to represent, describe, simplify, and solve simple number relationships:
- Represent relationships of quantities in the form of mathematical expressions, equations, or inequalities.
- Solve problems involving numeric equations or inequalities.

Mathematical Reasoning

- Students use strategies, skills, and concepts in finding solutions:
- Use estimation to verify the reasonableness of calculated results.
- Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.

Language Arts

Structural Features of Informational Materials

- Use titles, tables of contents, chapter headings, glossaries, and indexes to locate information in text.

Comprehension and Analysis of Grade-Level-Appropriate Text

- Extract appropriate and significant information from the text, including problems and solutions.

Writing

- Students write clear and coherent sentences and paragraphs that develop a central idea. Their writing shows they consider the audience and purpose. Students progress through the stages of the writing process (e.g. prewriting, drafting, revising, editing successive versions).

Specific Objectives:

Upon completion of this lesson the participants will be able to:

1. Students will model multiplication problems using manipulatives.
2. Students will calculate and solve word problems.
3. Students will understand how to use division, the inverse property, to check their work.
4. Students will begin to work with multiplication facts.
5. Students will create a class book using titles, tables of contents, and indexes to organize the information.

General Goals: Students will practice multiplication facts by creating their own word problems. They will share these word problems with other students in the class and take turns solving problems using manipulatives and drawings. With practice, students will develop a more concrete understanding of multiplication and begin to become familiar with multiplication facts.

Materials Needed:

1. Paper
2. Pencils
3. Student Sheet
4. Copy of rubric
5. Construction Paper
6. Binder Ring Clips
7. Math Manipulatives

Activities:

1. Introduce lesson: Inform students that they will be working in cooperative groups to create multiplication story problems for the class to solve.

2. Whole class example: As a class, we will make an example of a multiplication story problem. During this time, I can specify the difficulty level that is required for the students. I will model how to write the story problem, create a number sentence to solve the story problem, and how to create a picture that will help the students solve the story problem.

3. Group work: Students will work in small groups, with assistance from the classroom teacher, to create story problems at the appropriate level. Students will be asked to show a solution to the problem using manipulatives and pictures. Students will be asked to check their work, using the inverse properties of division. Students will then be asked to make a "final copy" so it will be ready to "publish" in a class book.

4. Publishing the class book: Groups will nominate one student to read the story problem out loud to the class. We will organize the story problems into logical groups. Then we will discuss the way in which we can create a table of contents for the book. Students will vote on a title for our book. Each group will be responsible for adding one definition to our glossary. Some examples could include: multiplication, division, number sentence, equation, label, etc.

5. Solving peer story problems: After the class book is published, students will pair up with a new partner. The students will solve the problem that their partner created. The students will be required to use manipulatives to show how to arrive at the answer. The students will also need to check their work using division. The author of the story problem will be required to oversee his/her partner's work to ensure he/she completing the problem correctly.

Teaching Strategies

1. If students are working with particularly large numbers, drawing pictures and modeling with manipulatives will be difficult. The first time I introduce this project, we work with smaller numbers to make this portion of the lesson easier for the children.
2. Specify the range of numbers students should use. For example, I asked the students to use numbers ranging between 5 and 30.
3. Allow students who understand the concept to use larger numbers in subsequent lessons. Allow students who are struggling to use smaller numbers so they can focus on the modeling with manipulatives.
4. Make the published book available in the class library. This will allow students to look at other problems at a later time.

Assessment/Evaluation

One handout for students will be created. On this handout, students will have an example of a story problem and the list of required elements for their story problem.

A rubric will be created to score the students' solutions to the story problems. This rubric will include the required elements for the story problem. This will allow the teacher to assess the student's understanding of the story problem. The rubric will consist of four categories: the number sentence, the use of manipulatives, the final answer, and checking the answer using division. It will be scored on a four point scale: 4 - extending the concept, 3 - grasping the concept, 2 - beginning to grasp the concept, and 1 - not grasping the concept.

Adaptations/Extensions

1. Crosscurricular – Explore the possibility of using literature to create story problems. Students could read picture books in groups, then create story problems based on the main characters of the story.
2. Learning Disabilities – Use smaller numbers and allow students to understand the process of multiplication. Students could use repeated addition or skip counting to solve the problem. Emphasize the use of manipulatives to model the solutions.
3. Gifted – Students can use larger numbers. They can create their own methods of solving problems with multi-digit numbers. (Example: 25×37)

Resources and References

Websites – The following websites provide students opportunities to solve different types of problems. Many of the sites contain thought provoking “real life” problems or fun challenges.

www.coolmath.com or www.coolmath4kids.com - This website contains several interactive games. One example is Lemonade Stand where students make business decisions to successfully run a lemonade stand. It also contains great resources for teachers and parents.

www.figurethis.org - This website contains fun and interesting challenges for kids to figure out with clues to help them when they are stumped.

www.learner.org/exhibits/dailymath - This website looks at the language of numbers in situations such as cooking, savings, gambling and other everyday situations.

www.brainpop.com - This website contains short quizzes and animations to explain many mathematical concepts.

Author page

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