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**Amanda Bean’s Amazing Dream**

**Grade level:** 3rd

**Objectives:**

Students will use multiplication and arrays to solve open ended problems.

Students will demonstrate understanding of multiplication number sentences by writing one.

**Common Core Standards Addressed:**

3.OA3 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.

**Materials:**

· Amanda Bean’s Amazing Dream by Cindy Neuschwander

· Pencils

· Paper

· Whiteboards and dry-erase markers OR clipboards

· Any type of counter (pennies, poker chips, etc); enough for each student to have 35.

· Amanda Bean’s Amazing Dream handout, 1 per student

(<http://www.k-5mathteachingresources.com/support-files/amandabeansamazingdream.pdf>)

**Procedure:**

**Introduction:**

1. Ask students to get a whiteboard and dry-erase marker OR clipboard and sheet of paper [whichever you have in the classroom], pencil and take a seat in the community area.

2. Tell students the lesson’s objective and related Common Core Standard (above).

3. Hook: Tell students about a dream you once had after you had spent all day trying to solve a problem and could not. [For example, you were going to have a party with 6 friends and you were going to order a pizza with 20 slices. You kept trying all day to figure out how to make sure everyone got a fair share of pizza and how much that would be. You went to sleep and the answer came to you – fractions!]

**Activate prior knowledge:**

-Remind students what an array is and show a picture.

Array - an arrangement of objects in rows and columns; each row has the same number of objects and each column has the same number of objects. They help us show equal groups of objects.

 X X X X X X

 X X X X X X

 X X X X X X this is a 3-by-6 array

 Tell students to be thinking of how we can use them to help us count things quickly.

-Remind students about writing number sentences. Ask a student to tell what the number sentence would be for a 3-by-6 array.

**Instruction/Exploration:**

1. Read the book Amanda Bean’s Amazing Dream by Cindy Neuschwander to the whole group adding these tasks as you read:

- After reading page 8 (the one with the bowl of popcorn), ask students to think of how else the tiles could be counted and use their whiteboard/clipboard and paper to jot down their answer and thinking. Ask certain students to share their answer and write them on the board. Be sure to have students attend to precision when providing their answers. Student’s methods may include add nine sevens, skip counting by sevens, skip counting by nines, or multiplying.

- After reading page 10 (the one in the library), ask students how many books are on the shelf. Again, ask certain students to share their answer and write it on the board while attending to precision.

- After reading page 18 (the first one with sheep on bicycles), ask a couple students to go to the board and draw an array that we could use to solve the problem of how many legs do those sheep have altogether [they should draw and 8-by-4 array; 8 bicycles and 4 legs per sheep]. Ask students how we can use the array to solve the problem.

2. Give each student a copy of the Amanda Bean worksheet and allot them 10 minutes to work on it. Tell them that along with their solution they must show a number sentence (not indicated on the sheet in the link above). Have manipulatives ready for the students that need them, but the goal would be for students to be creating arrays and using multiplication sentences.

-If students finish early, they can solve each other’s “Which has more” problems. Higher level learners can be directed to the Gearing Up questions below.

**Closing:**

Revisit page 8 of the story. Ask students for ideas on how we could count the popcorn in a bowl. It isn’t organized in any way that makes our multiplication useful. Do a think-pair-share and then ask for pairs to share with the class. Students may suggest organizing/grouping the popcorn by twos, fives or other ways. The teacher should circulate during the think-pair-share time and listen to answers as an informal formative assessment.

**Assessment:**

The worksheet the students complete serves as one formative assessment. Collect worksheets at the end of the allotted time. The closing activity is another assessment. Student achievement can be gauged from the correctness of the answers during the think-pair-share and the students can be grouped accordingly for the next day’s lesson.

**Differentiation:**

**Gearing Up:** For students that finish early, present the following challenge problem:

* Suppose that 24 musicians in a marching band were getting ready for a parade. How many different ways could the musicians in the marching band arrange themselves into

equal rows?

**Gearing Down**:

* Modify the numbers in the tasks to be smaller.
* Some students may need a multiplication chart or a calculator with them to help with the math.

**Lesson Justification:**

This lesson supports teaching for understanding for a number of reasons. The lesson contains numerous CCSSM practice standards including allowing students to make sense of problems and persevere in solving them, model with math (using multiplication), and attend to precision while telling others how they would solve the task. The tasks allow students to investigate a numeric concept without direct instruction. There are a couple different strategies that could be used to solve them which allows students of differing abilities and stages to attack them. Students in the concrete stage could use manipulatives to solve them while others will start using abstract thinking and their multiplication facts. The literature helps keep the students engaged as does the link to real-life in the tasks.