Lauren Ka'ae
Assignment 10-Rich Tasks

Original Lesson: Investigation's 3rd Grade, Unit 1, Lesson 1.3 "Solving Multiplication Problems"

Launch-Introduce the game "Counting Around the Class", where students begin skip counting by 2's. Ask if students can figure out how many students have counted when 20 is reached. 48? Take predictions then count students.

Students solve picture problems students have designed in previous lesson. Ask to define factors and product. Discuss information in a multiplication situations. Show table including spaces for number of groups, number in each group, number in all groups and equation.

Workshop-Students work in groups of two or on their own to complete pages 9-11, 6 problems. For example, problem one says, "There are 10 apples in a basket. Each apple has 4 worms. How many worms do that apples have in all?"

Student Response: Generally, students are pretty successful with this. Some common errors include drawing out the problems and miscounting, or making a mistake in drawing. These problems all include two factors given, and finding the product. Other times, students make make a mistake in how they write the equation, for example, a student may write "10x40=4".

This lesson gives some context, as they are working with word problems. However, it is mostly about calculating. Students do not have to reason much, and the problems are not representations of low floor high ceiling tasks. Also, there isn't much discussion to help students reason about connections between strategies, and deepen their understandings.

Revised Lesson:

Intro-Start by having several students share the problems they have written from last class. Have them discuss the three parts of the problem-the two factors-and the product. As students explain record their thinking and color code it by student-drawing a model based on their words and recording some of what they say. Encourage students to make connections between the two student's problems-how they solved them (skip counting, relational thinking, drawing, repeated addition, multiplication), and what they're trying to solve. What parts we know. Encourage students to solve in creative ways, and see connections between the strategies. Let them know we'll have a math discussion after workshop. Have students complete page 9, with the added changes for problem 2, shown below.

Workshop-

Modify from problem 2-”There are 4 sports bags. Each bag as 9 balls inside. How many balls are there in all?”

Change to: “A van full of soccer players has sports bags with 9 balls in each bag. When the team gets to the field for a tournament-they count 36 balls . How many bags did the team bring?

Another team arrives at the tournament. Now there are 72 balls on the field. How many bags are there now? How many did the team bring?

How many balls will be on the field when the 3rd team arrives if they bring the same number of bags?

How many balls will be on the field with the 10th team? Nth team?”

Students are encouraged to work in their math groups or partnerships. They work to come up with a solution that includes solving for “how many groups” when they know the number in each group.

Discussion-Begin by leading a math talk where you have selected and sequenced different strategies for solving. Encourage students to ask questions and make connections. Essentially, students solve to realize each time is bringing 4 bags balls, which then is added to the whole number of bags on the field. The first team had 4 bags of 9 balls, or 36 balls. The second had 4x9+4x9, or 2(4x9)...Thus the Nth team could have N(4x9). Students generalize to realize we’re really talking about repeated addition, or multiplication of the number 36, but that they can also see that flexibly. I can imagine leading a math talk and uncovering some creative thinking and ideas, and being about to draw connections by composing and decomposing numbers-18-36-72, etc, , and relate to the associative property of multiplication if students notice that (2x4)x9 is equivalent to 2x(4x9). We could discuss further what each of the numbers mean, and students would be asked to draw and visualize what the arrangements of balls could look like, and this would help to make the connection visually with the associative property as students see the patterns and connections.

Fill in a class chart together, and make connections between patterns students notice.

Team Number	Number of Balls in 1 Bag	Number of Total Bags on Field	Total Number of Balls on Field
1	9	4	36
2	9	8	72
n	9	nx4	nx4x9

*See rubric in a separate document.