CONSTRUCTING TASK: Shake and Spill Subtraction (5 Or 10)

Approximately one day and repeated through centers (adapted from Marilyn Burns' Shake and Spill activity found in About Teaching Mathematics: A K-8 Resource

STANDARDS FOR MATHEMATICAL CONTENT

MCCK.OA.1. Represent addition and subtraction with objects, fingers, mental images, drawings[1], sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.

MCCK.OA.3.Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).

MCCK.OA.4.For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.

MCCK.OA.5. Fluently add and subtract within 5

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

"In part-part-whole model, when the whole and one of the parts are known, subtraction names the other part." (Van de Walle & Lovin 2006) Even when there is a remove action, the situation in this next activity ends with two parts clearly distinct. It is important for you to have a discussion with your students, which includes showing them how an addition and subtraction sentence can be written for the same situation, to help them connect addition and subtraction. (More information can be found in Chapter 3 of Teaching Student-Centered Mathematics: Grades K-3, Van de Walle & Lovin 2006)

ESSENTIAL QUESTIONS

- Does the order of addends change the sum? Give examples to justify your thinking.

- How do you know when your answer makes sense?
- How can I represent problem situations using objects, pictures, and numbers?
- Why is it important that I can build the number combinations for the number 5? 10?

MATERIALS

- Two-color counters
- One small cup, per student (like a mouthwash cup)
- One dry-erase marker per student
- Shake and Spill recording sheet for subtraction
- *Anno's Counting House* by Mitsumasa Anno, or another similar counting book

GROUPING

whole/individual/small group task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Review the activity of *Shake and Spill* from the previous lesson. Ask students to share what patterns they may have noticed while working with the same number. After several students have had an opportunity to share, explain that this time, students will write the total number of counters they begin with and then subtract the number of yellow counters that are spilled.

Before beginning, model the activity for the group. You will be "Player A" and the class will act as "Player B". Using a set of five or ten, spill the counters in the cup and identify how many yellow counters are shown. Then think aloud, "*So, if I started off with 5 (or ten) counters, and there are yellow spilled, how many red counters were spilled*? *How many more do I need to get to 5 (or 10)?*" All students will use their math hands to predict how many red counters were spilled (scan to see who has made a logical prediction and those who's prediction are illogical. Intervention may be needed for those that demonstrate a lack of number sense.). After all students make a prediction with their math hands, reveal the number of red counters that were spilled. Next, ask a volunteer to show the class how to write an addition and subtraction number sentence that would describe the situation you modeled. Encourage them to share their math thinking. Repeat this process until you feel that students are ready to practice this same activity independently (or with a partner).

Once students are ready, assign each student a number that is appropriate for their performance level and allow them to begin working. As you walk around to assess students, stop and ask the following questions (or those similar to assess student learning):

- What number did you start off with? So, if there are ___ yellow counters, how many red counters do you think there are? How do you know without counting?

Have students write in their math journal (or share aloud) the strategies they used to determine how many red counters were spilled. What do they notice about this version of the game that is alike or different from the previous version?

FORMATIVE ASSESSMENT QUESTIONS

- Does the order of the addends change the sum? Explain your thinking.
- How do you know when your answer makes sense?

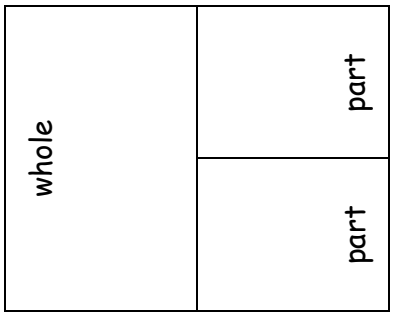
DIFFERENTIATION

Extension

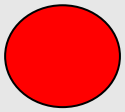
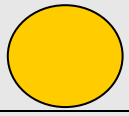
- "Grab Bag Subtraction"-adapted (Burns 2007) Children can work in pairs or independently for this activity. Fill a paper bag with any set of tiles or cubes (to 5 or 10) and write the quantity of items in the bag on the front of the sack. Students will reach in the bag and take some out, showing how many were removed. Both students will predict how many they think are left inside of the bag. Then they will check their predictions and record the addition and subtraction number sentences.

Intervention

- Students may use a part-part-whole mat for this activity. Make sure that students flip the mat so that the "whole" section is first, showing that the one part is removed from the whole. A part-part-whole mat can be as simple as the table below on white paper.



Shake and Spill: Subtraction

Number of Red Counters 	−	Number of Yellow Counters 	= is the same as:	Total Number of Counters