PRACTICE TASK: Dropping Pennies

Approximately 1-2 days

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.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.

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

Numbers are related to each other through a variety of number relationships. The number 7, for example, is 3 more than 4, two less than 9, composed of 3 and 4 as well as 2 and 5, is three away from 10, and can be quickly recognized in several patterned arrangements of dots. These ideas further extend to an understanding of 17, 99, and beyond. Number concepts are intimately tied to the world around us. Application of number relationships to the real world marks the beginning of making sense of the world in a mathematical manner (Van de Walle, 2010).

ESSENTIAL QUESTIONS

- What happens when I decompose a quantity?

- How can I use different combinations of numbers to represent the same quantity?
- How can I represent problems using objects, pictures, and numbers?
- Why is it important that I can build the number combinations for the number 5?
- How do you know when your answer makes sense?

MATERIALS

- Pencil
- Recording sheet and pennies

GROUPING

Whole/individual/small group task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Part I
Review or introduce a penny and discuss how both sides of the penny are different. Be sure that students understand which side is heads on the coin and which side is tails. Draw a chart that is similar to the *Dropping Pennies* recording sheet. Give each student 3 coins and have them explore all the ways that the coins can drop and record the possible combinations. DO NOT complete the chart. Take only a few combinations and then present students with Part II.

Part II
Comment: there are more squares provided on the recording sheet than actual combinations. This is so that students can justify their answer.

> *Sam dropped 5 pennies on the ground. Some were heads up and some were tails up. How might the pennies have fallen? Show all the ways the coins could have landed on the ground.*

In closing have students share the combinations they found and any strategies they used to solve the problem.

FORMATIVE ASSESSMENT QUESTIONS

- Are there any more was to decompose the number 5? How do you know?
- Why did you decide to do it his way?
- Are you sure that you have found them all? Why do you think so? How do you know?
- Did you develop a strategy to find your answers?
- Did you identify any patterns or rules? Explain!

DIFFERENTIATION

Extension

- Instead of giving the student 5 pennies, they could use 5 coins that have total value of 20 cents or less. At the end of the task, students would be asked to add up their coins and justify their total value using numerals, pictures, and words. This could be recorded on the back side of the page or in the student's math journal.

Intervention

- Have the students act out the problem by dropping pennies on the ground and recording the result. No result can be repeated. Because all combinations may never be the result of acting out this task, have the student determine the missing solution(s) through questioning.

Dropping Pennies

Sam dropped 5 pennies on the ground. Some were heads up and some were tails up. How might the pennies have fallen? Show all the ways the coins have landed on the ground.

Heads	Tails	Total

Dropping Pennies

Sam dropped 10 pennies on the ground. Some were heads up and some were tails up. How might the pennies have fallen? Show all the ways the coins have landed on the ground.

Heads	Tails	Total