PERFORMANCE TASK: The Magic Pot

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

Identifying and extending patterns is an important process in algebraic thinking. When possible, patterning activities should involve some form of physical concrete manipulative. ***When patterns are built with material and not on paper, children are able to test a hypothesis or the extension of the pattern and make changes without fear of being wrong.*** Using concrete manipulatives allows students to engage in growing patterns as opposed to just repeating patterns because testing is able to take place. (Van de Walle p. 276)

ESSENTIAL QUESTIONS

- Can patterns be found in numbers?
- Can you describe the patterns you find?
- Are some patterns the same?
- How are the number patterns different?
- How can I prove that groups are equal?
- How can you model a math problem?
- What is a number relationship? How can number relationships help me?
- What is a pattern and where can you find patterns?
- What is a strategy?
- Why do we use mathematical symbols?
- Why is it important that I can build the number combinations for the number 5? 10?

MATERIALS

- *The Magic Pot* work mat
- 20 counters per student
- Double ten-frame or Rekenrek
- 0-99 chart
- 10-sided dice or spinners (0-9)

GROUPING

Individual, Small group task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Comment: *Two of Everything,* is a story about an old couple that finds a magic pot. Everything that goes into the pot is doubled. Although the book is about doubling in particular, this task asks students to focus on the number relationship between what goes in the pot, and what comes out.

Part I
Come together at a meeting place and read *Two of Everything,* by Lil Toy Hong, or a similar book. As you are reading the story, have students make predictions about what will happen. Discuss/review the rule of doubling and what double means (if it hasn't already been discussed). Give students T*he Magic Pot* work mat and double ten-frame and provide students an opportunity to explore doubling numbers 0-10. Allow students to time to share strategies for combining doubles.

Comment: Students can develop and refine strategies as they hear other students' descriptions of their thinking about number combinations. For example, a student might compute 8 + 8 by

counting on from 8: "..., 9, 10, 11, 12, 13, 14, 15, 16." But during a class discussion of solutions for this problem, she might hear another student's strategy, in which he uses knowledge about 10; namely, 8 and 2 make 10, and 6 more is 16 (NCTM Principles and Standards, 2012).

Part II (Race to 100)

In partners, each player places a counter in the "0" square on the hundreds board. Students take turns rolling a ten-sided dice or spinner and doubling the amount. The students must mentally solve the addition sentence and share the answer with their partner. The partner verifies that the answer given is correct using the double ten-frame or Rekenrek. If the answer is correct, the player moves their chip that many spaces on the number board. If the player is incorrect, they do not move and lose their turn. The first player to go past 99 and off the board wins.

Part III

Be sure each student has their Magic Pot work mat. Present students with the following set of 3 numbers in sequence and have students model using the mat:

- Say "2 went in the pot and 4 came out of the pot. What's the rule?" (take and record suggestions)
  - Have students model using the mat. (initiate class discussion for students to share their predictions of the rule and they will almost immediately relate back to doubles)

- Say "4 went in the pot (take predictions) and 6 came out of the pot. What's the rule?" (take and record suggestions)
  - Have students model and discuss what they think the rule is based on the number relationships they see.

- Say "10 went in the pot and 12 came out of the pot. What's the rule?" (take and record suggestions)
  - Have students model and discuss what they think the rule is based on the number relationships they see.

Using the recording sheet, have students create an example of the rule being used and record it on their recording sheet. The student's example must be modeled with different combinations than those used on the *Magic Pot* card. There are only 7 (a- g)rows on the chart and 8 *Magic Pot* cards. Have students problem solve where they can record the 8th card (h). (back of sheet or journal)

The rule	In the pot	Out of the pot
2 more	6	6 and 2 more is 8 Or 6+2 =8

After students are familiar with identifying the magic pot's rule, place the Magic Pot playing cards around the classroom and have students identify the rule for the other pots and create an example of how it works.

Part IV (Race to 100 *revisited*)

The only difference from *Race to 100* in Part II is that students get to choose the rule for moving (doubles, plus 5, etc…) In partners, each player places a counter in the "0" square on the hundreds board. Students take turns rolling a ten-sided dice or spinner and using the rule they created. The students must mentally solve the addition sentence and share the answer with their partner. The partner verifies that the answer given is correct using the double ten-frame or Rekenrek. If the answer is correct the player moves their chip that many spaces on the number board. If the player is incorrect, they do not move and lose their turn. The first player to go past 99 and off the board wins.

FORMATIVE ASSESSMENT QUESTIONS

- What strategy are you using to solve the problem?
- How are you comparing numbers?
- Can you suggest some numbers that could be included in this pot?
- According to your rule, if I put ____in, what would come out of the pot?
- According to your rule, if I took ____out of the pot, what did I put in the pot?

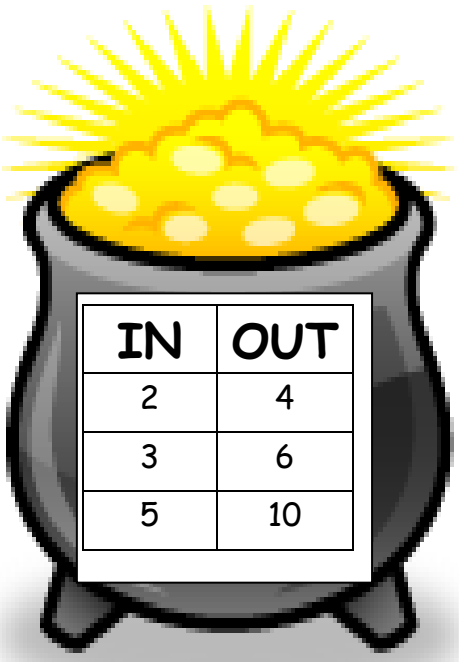
DIFFERENTIATION

Extension

- Create Magic Pots where the number relationship between the *in* and *out* rule are greater in difference and more algebraic. Be sure that students have continued access to manipulatives to model the relationship.

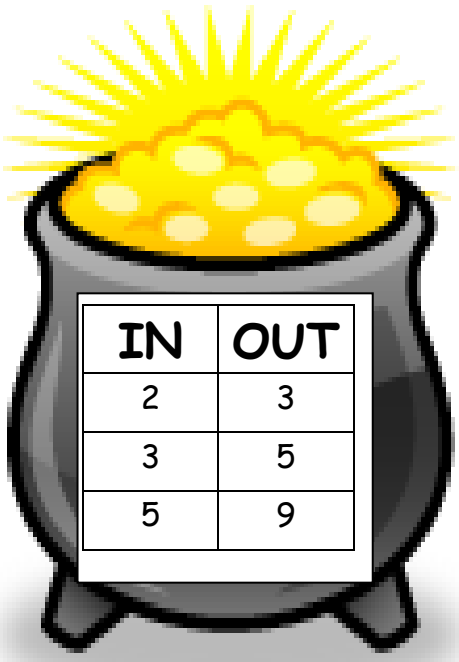
Intervention

- In both versions of *Race to 100,* students can play *Race to 50* and use a 6-sided die for the applied rule.
- If the student is having difficulty navigating the 0-99 chart, cut the 0-99 chart up into strips by the rows of 10 and glue them together to make a straight number line.



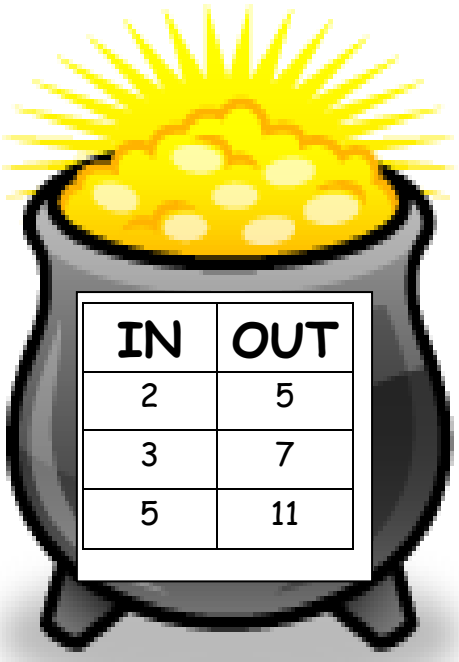
IN	OUT
2	4
3	6
5	10

a



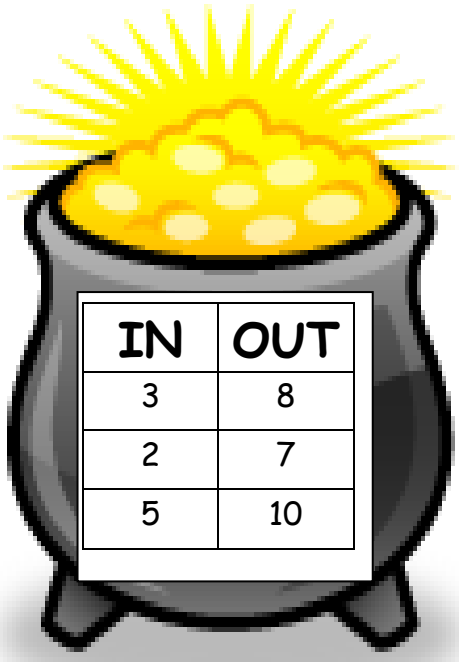
IN	OUT
2	3
3	5
5	9

b



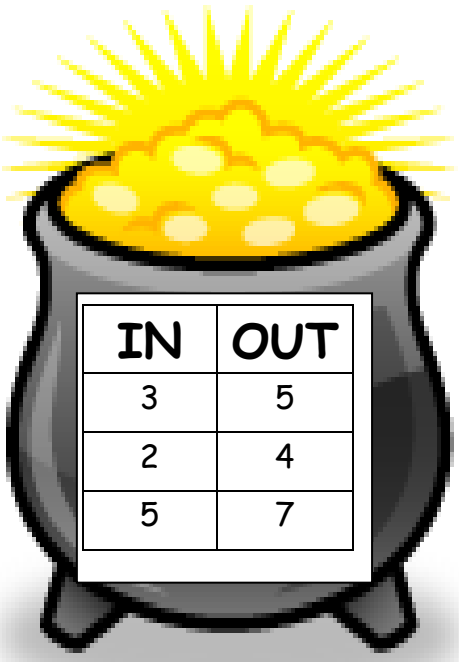
IN	OUT
2	5
3	7
5	11

c



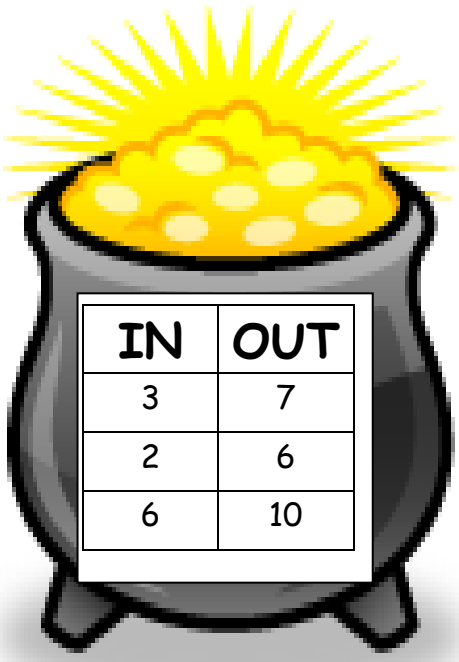
IN	OUT
3	8
2	7
5	10

d



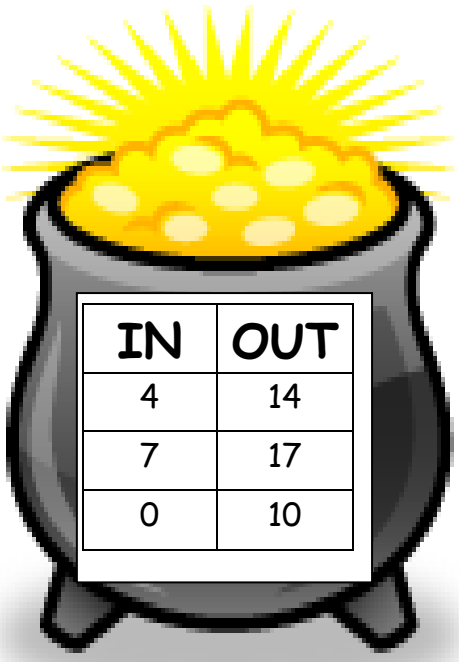
IN	OUT
3	5
2	4
5	7

e



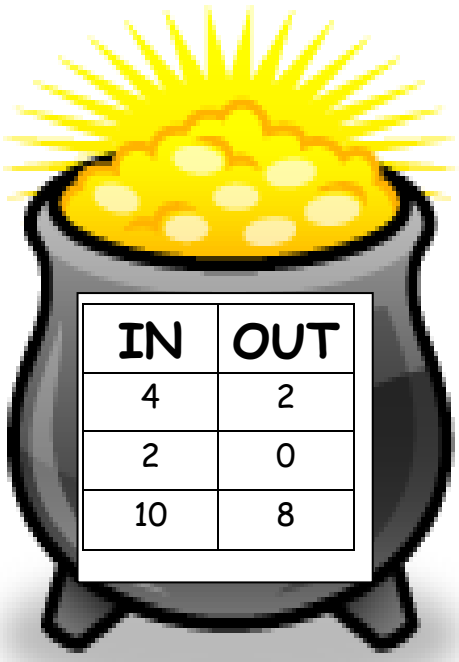
IN	OUT
3	7
2	6
6	10

f



IN	OUT
4	14
7	17
0	10

g



IN	OUT
4	2
2	0
10	8

h

The Magic Pot

Put into the pot	Take out of the pot
	
	
	

The Magic Pot Name:_____

	The rule	In the pot	Out of the pot
	1 more	4	4 + 1 = 5
a			
b			
c			
d			
e			
f			
g			