



Practice Task: Pattern Block Drop

Approximately 2 days

Adapted from Even/Odd Pattern Block Grab from
K5MathTeachingResources.com

STANDARDS FOR MATHEMATICAL CONTENT

MCC2.OA.3. Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.

MCC2.OA.4. Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

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.

*****Mathematical Practices 1 and 6 should be evident in EVERY lesson*****

BACKGROUND KNOWLEDGE

(Information adapted from Mathematics Common Core State Standards and Model Curriculum, Ohio Department of Education Teaching)

Build on knowledge of composing and decomposing numbers to investigate arrays with up to 5 rows and up to 5 columns in different orientations. For example, form an array with 3 rows and 4 objects in each row. Represent the total number of objects with equations showing a sum of equal addends two different ways: by rows, $12 = 4 + 4 + 4$; by columns, $12 = 3 + 3 + 3 + 3$. Rotate the array 90° to form 4 rows with 3 objects in each row. Write two different equations to represent 12 as a sum of equal addends: by rows, $12 = 3 + 3 + 3 + 3$; by columns, $12 = 4 + 4 + 4$. Have students discuss this statement and explain their reasoning: The two arrays are different and yet the same.

Ask students to think of a full ten-frame showing 10 circles as an array. One view of the ten-frame is 5 rows with 2 circles in each row. Students count by rows to 10 and write the equation $10 = 2 + 2 + 2 + 2 + 2$. Then students put two full ten-frames together end-to-end so they form 10 rows of 2 circles or 10 columns of 2 circles. They use this larger array to count by 2s up to 20 and write an equation that shows 20 equal to the sum of ten 2s.

ESSENTIAL QUESTIONS

- What is an array?
- What is repeated addition?
- How can rectangular arrays help us with repeated addition?
- How are arrays and repeated addition related?
- How does skip counting help us solve repeated addition problems?
- How can we use model repeated addition equation with an array?

MATERIALS

- 1 inch Graph paper
- Glue

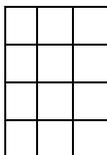
GROUPING

Small Group

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Part I

Review with the students what arrays are and why we use arrays to organize things. Ask students to describe what they know about rows and columns. Use the cereal arrays from the last task to review how to write repeated addition equations to represent arrays. Review how to use arrays to represent objects. You may wish to model creating an array to represent the number of sides on 4 triangles. Say something like, “I have 4 triangles. I want to create an array that represents how many sides I have on these triangles. How many columns will I have in my array? How many rows in each column? Draw the 4 by 3 array and write repeated addition sentences for the array.



Part II

Each student will reach into a bag of pattern blocks and grab a handful. They will drop the handful of blocks onto their workspace and sort them by shape. They will then take each group of shapes (make sure to have all the same shapes in each group) and create an array to represent the number of sides included in the group. For example, I might grab 3 triangles, 7 squares and 5 hexagons. After sorting them, I will choose the first group to represent with an array. I choose the 5 hexagons. I have 5 sets of 6 sides in the hexagon group. I will create an array of 5 columns with 6 in each row. I will then describe the array with a repeated addition equation. As students create their arrays, circulate the room and ask questions from the formative assessment list.

Part III

After students have completed part II of the task, allow them time to share their arrays. Invite discussion about the different strategies they might use to count the number of sides represented by the array. Encourage students to ask questions of their peers and make comments about the work and strategy used to figure out how to make their arrays. Lead a class discussion about how if you rotated these arrays $\frac{1}{4}$ of a turn that they would not represent the same group of pattern blocks. In this activity, allow students to describe their thinking and then lead them to an understanding of the columns represent the number of blocks and the rows represent the number of sides. If you rotate the array, it changes what is represented.

FORMATIVE ASSESSMENT QUESTIONS

- Is the same information represented when you rotate the array? Why or why not?
- What is your repeated addition number sentence?
- How many rows should you include?
- How many columns should you include?
- Why are arrays important?
- How can arrays help us to multiply?

DIFFERENTIATION

Extension

- Have students create a graph to represent the shapes they drew from the bag.

Intervention

- Some students may need to use other strategies like counting by 1s, skip counting or repeated addition to determine the number of sides in the group instead of creating arrays.