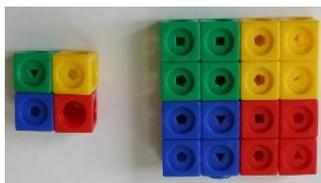


Exploring Patterns



Activity 1: Repeating Patterns

- 1) Using the manipulatives at your table, create a **repeating pattern**. Do not make a ABABAB pattern, but you can make any other pattern. Place out at least 2 repetitions.
- 2) Predict what the 31st element will be in the pattern you drew on your worksheet. This is the manipulative that will be in the 31st position. On your paper, write down a reason for your prediction. Then use the manipulatives to test out your prediction.
- 3) Draw the objects in one of the patterns at your table in a 3-, 4-, 5-, and 6- grid on one big piece of paper. Write down what trends you discover in the grids, AND how they relate to the pattern's underlying structure.
- 4) Answer the following questions on your regular paper: A. What grid sizes will result in the same objects being drawn down each column? B. If you know the grid size, how could you figure out what rows will be the same as the first row for your pattern? C. If you know the grid size, how could you figure out what would be in the 100th row for your pattern?

Activity 2: Growing Patterns

- 1) Using the manipulatives at your table, create a **growing pattern**. You can make any pattern except a simple 1, 2, 3, 4, 5.... pattern. Make sure your pattern gets bigger in EVERY step. Place out at least 3-4 repetitions, and draw the pattern on a big piece of paper.
- 2) In order to figure out the relationship between the step of the pattern (1, 2, 3, ...) and the number of manipulatives in the pattern, make a table on your big paper that shows this relationship.
- 3) Describe this relationship in both recursive and explicit (closed) form on your big piece of paper. For example, recursive might be "you add 2 manipulatives each time," and explicit might be $y = 2x - 1$, where x is how many steps you've gone out, and y is how many total manipulatives you have on that step.
- 4) Using your table, sketch a coordinate graph on your big piece of paper that plots number of steps on the x-axis, and total number of manipulatives on the y-axis.

Activity 3: Wrap Up

- 1) Describe how these activities with repeating and growing patterns relate to what students will be doing in algebra, and how these activities can help prepare students for algebra.
- 2) Algebra involves a lot of abstract thinking and generalization. What elements of our activities with patterns might prepare students to do this kind of abstract thinking?
- 3) Algebra involves understanding different representations of the same underlying relationship. What elements of our activities with patterns might prepare students to navigate multiple representations?