

Algebra

Activity 2a - Recursion and Abstraction

Go to <http://www.visualpatterns.org/> and open the pattern corresponding to your table number. Answer the following questions. When you have a clear understanding, present your work on your white board in an effort to describe to students from other tables what your pattern is.

1. What objects are in your picture that can be counted? List as many as possible.
2. Make a table for the objects in your first three pictures. Your left column should have the numbers 1, 2, 3... (and space for more lines). Your second column should be labelled with the thing you are counting. You may have more than two columns if you are counting multiple things.

n	Object1
1	
2	
3	

3. What do you see in the pattern that is changing? (List as many as possible)
4. What do you see in the pattern that is staying the same? (List as many as possible)
5. Describe the pattern. How do you get from one picture to the next?
6. Draw (or describe) the fourth picture.
7. Draw (or describe, or diagram) the 43rd picture. (Note: At this point, I assume that drawing the entire picture is going to be too long and boring that you will want to take short cuts. Decompose the picture into smaller components.)
8. Describe how you could calculate the number of objects in the 43rd picture.
9. Verify that your calculation is correct.
10. Find a general formula to count the number of objects in the n^{th} picture.
11. If possible, connect this formula to other things you have encountered. (Hint: Some of these sequences are related to the equation of a line $y = mx + b$. What is the 'slope'?)