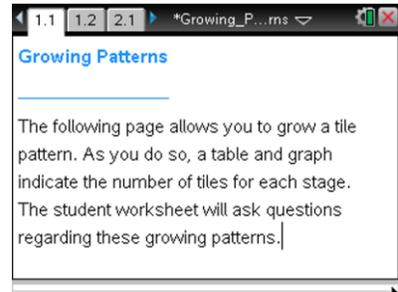




Open the TI-Nspire document *Growing\_Patterns.tns*.

In this activity, you will explore growing patterns through pictures, graphs, and tables. You will represent these growing patterns algebraically.



Move to page 1.2.

Press **ctrl** **▶** and **ctrl** **◀** to navigate through the lesson.

1. On Page 1.2, the first stage of a tile pattern is shown. Click on the slider for  $x$ , to 'grow' the pattern.
  - a. What remains the same **in the pattern**, and what changes as it grows?
  
  - b. In the table, what do the variables  $x$  and  $y$  represent?
  
  - c. What remains the same, and what changes **in the table** as the pattern grows?
  
  - d. In the graph, what do the  $x$ - and  $y$ - coordinates of the ordered pairs represent?
  
  - e. What remains the same, and what changes **in the graph** as the pattern grows?
  
2. On Page 1.2, you are limited to showing 5 or fewer stages of growth for the pattern.
  - a. If the pattern continued to grow in the same way, draw the 6th stage, and determine the number of tiles needed.
  
  - b. How many tiles would be in the 10th stage? How do you know?
  
  - c. Write an algebraic rule to state the number of tiles in the  $x$ th stage.
  
  - d. Would there ever be a stage in which there were 58 tiles? Why or why not?



3. When you write the rule from part 2c as an equation in which,  $y$ , the number of tiles, is related to  $x$ , the stage number, you are writing  $y$  as a function of  $x$ .
  - a. Write the function that represents this pattern.
  - b. Check that your function is correct by typing it in the box after “ $y=$ ”. Press . How can you tell if your rule is correct or incorrect by looking at the table and graph?
  - c. If your rule was correct, move on to Question 3d. If your rule was incorrect, find a new rule to relate the stage number and number of tiles. Check your rule.
  - d. The growth rate of the pattern is the change in the amount of tiles needed per stage. What is the growth rate for this pattern?
  - e. Where does the growth rate appear in the function? In the table? In the graph?
  - f. Move to stage zero. Where does the number of tiles in this stage show up in your function? In the growing pattern? In the graph?

**Move to page 2.2.**

4. On Page 2.2, click on the slider for  $x$  to grow a second pattern. Determine the growth rate, and write a function that represents the number of tiles in relation to the stage number.

**Move to page 3.2.**

5. On Page 3.2, click on the slider for  $x$  to grow a third pattern. Determine the growth rate, and write a function that represents the number of tiles in relation to the stage number.



# Growing Patterns

## Student Activity

Name \_\_\_\_\_

Class \_\_\_\_\_

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6. Design a pattern that grows at a constant rate but more quickly than all of the previous patterns. Draw the first 4 stages of your pattern, and write a function that represents the number of tiles in relation to the stage number.