

Name: _____

IN THIS LESSON, YOU WILL:

- Explore and describe linear functions using pattern recognition
- Identify the initial value and rate of change of a linear pattern
- Write an equation for a linear function based on pattern



INTRO

CALCULATE: How Does the Pattern Grow?

Study the pattern of circles below, then answer the questions.

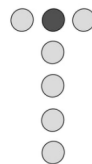


Figure 1

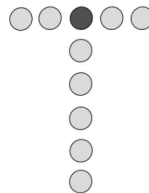


Figure 2

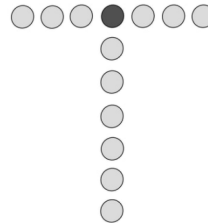


Figure 3

1. How do you see the shapes changing?
2. What would Figure 5 look like? Draw it.
3. What would Figure 0 look like? Draw it.
4. What would Figure 20 look like?



LEARN IT

Recognizing Linear Patterns

Follow your teacher's instructions to work through the example below.



Figure 1

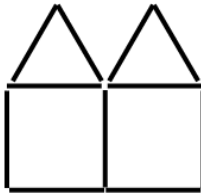


Figure 2

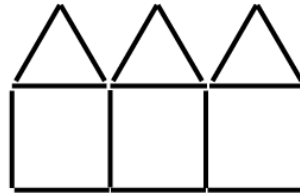


Figure 3

1. What does Figure 4 look like?
2. How many matchsticks are added in each step?
3. What does Figure 0 look like? How did you find that answer?
4. How could we find the number of matches in Figure 100?

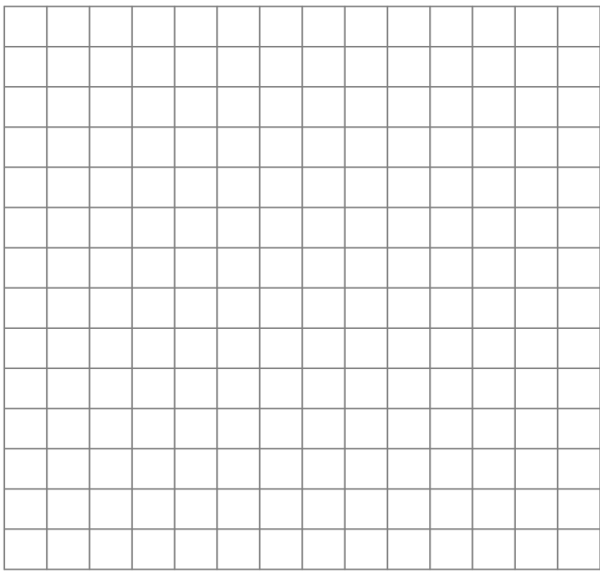


EXPLORE IT

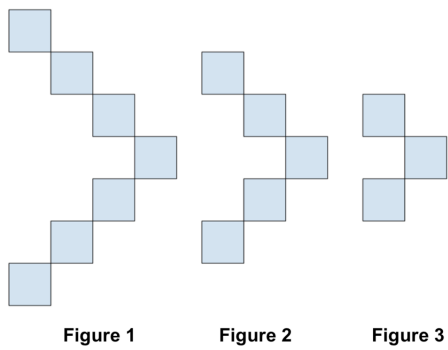
Reasoning with Linear Patterns

Now that you're familiar with linear patterns, you'll have some time to explore their different representations with your group. It's okay if some parts seem new or confusing; it might take some work to figure out.

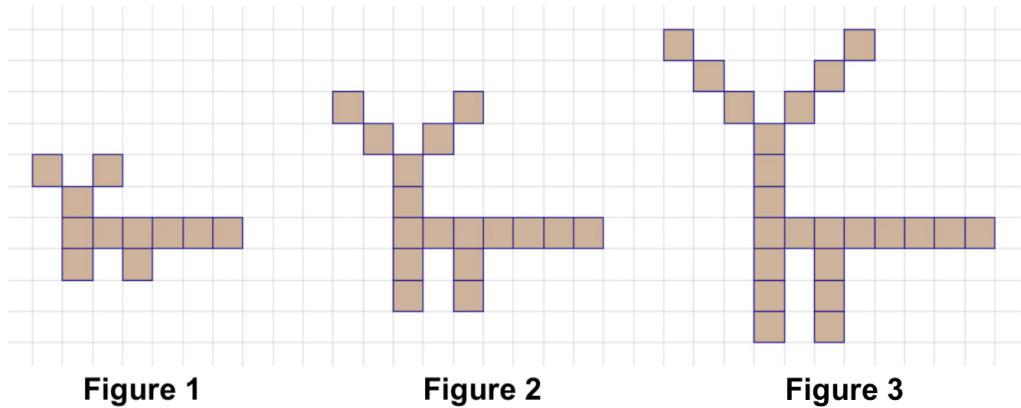
1. Work with your group to complete the table below based on your assigned pattern

Create a table representing the pattern with numbers.	Make a graph on the coordinate plane to illustrate the pattern. 
Describe the way the pattern is increasing or decreasing.	Rate of change: _____ Initial value/ zero term: _____ Describe your pattern using an algebraic expression that shows the number of blocks (or circles or matches) in any figure.

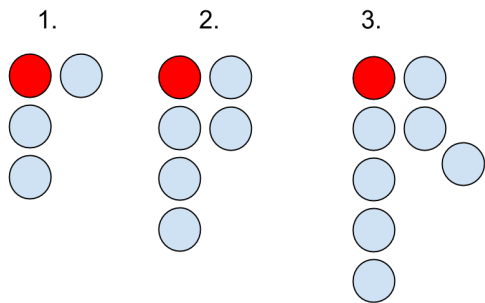
Pattern A



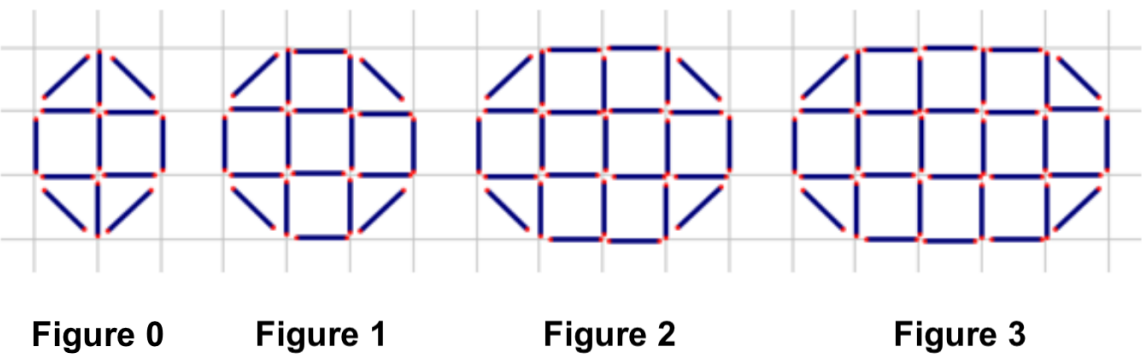
Pattern B



Pattern C



Pattern D



Reflection Questions

After completing the activity with your pattern, answer the reflection questions below.

2. **What connections did you find between the pattern, table, graph, and equation?**
3. **Your group found many different ways to represent that same function. Use those different representations to answer the questions below.**
 - a. What would Figure 15 look like in your pattern?
 - b. When finding Figure 15, which representation is most useful for you? Why?
4. **Another term for “rate of change” is slope. Where did you see slope in this activity?**

Consider how you could find the rate of change from the pattern, table, graph, or equation.
5. **Why was it helpful to find the zeroth term (initial value)?**



APPLY IT

Follow your teacher’s directions to complete the Application Problems.