

Key Vocabulary:

Corresponding terms: terms in two different patterns that fall on the same step at the starting point

Arithmetic sequence:

numerical pattern where the same amount is either being added or subtracted each time

**Input/Output table:**

A table that shows two sets of numbers that are related by a rule

Input	Output
8	19
12	23
15	26

Geometric sequence: a

number pattern where the rule is multiplication or division

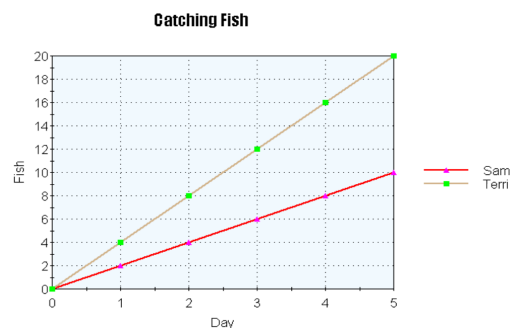
**Key Ideas:**

Students learned to create numerical or geometric patterns given a rule in 4th grade. For example, they solved tasks such as: *There are 4 beans in the jar. Each day 3 beans are added. How many beans are in the jar for each of the first 5 days? Describe the rule for the pattern.* 5th graders extend this expectation by **generating two numerical patterns using two given rules, creating a table and analyzing the relationships between those terms.** An example task is: *Sam and Terri went fishing each day for 5 days. Each day, Sam caught 2 fish and Terri caught 4 fish. How many fish do they have after each of the five days? Make a table to represent the number of fish that Sam and Terri catch. Then, plot the points on a coordinate plane to make a line graph and interpret the graph.*

Days	Sam's Total Number of Fish	Terri's Total Number of Fish
0	0	0
1	2	4
2	4	8
3	6	12
4	8	16
5	10	20

This table shows one way that students might organize the patterns of +2 fish for Sam and +4 fish for Terri. Once students can extend two patterns and organize them in tables, they can use the corresponding terms from the two patterns to form ordered pairs. In this example, we consider the day to be the step number in the pattern, and it will be the x

coordinate in each of the ordered pairs such that (x, y) is (day, total number of fish). For example, we can plot these points on a coordinate grid for Sam: (1, 2), (2, 4), (3, 6), and so on, and these points for Terri: (1, 4), (2, 8), (3, 12), and so on. Finally, students can analyze the relationships between the points on the graph, e.g., *Terri's fish is always twice as much as Sam's fish.*

**Sample Problems:**

Marcello and Johan are both walking on the track. Marcello is 15 feet ahead of Johan. Marcello walks 5 feet per second and Johan walks 7 feet per second. Complete a table that shows their distance for the first 10 seconds that they walk. Will Johan ever be in front of Marcello? If so, how long will it take for Johan to get ahead of Marcello?

Mary spends \$20 a month buying magazines. Tammy spends \$15 a month buying magazines.

Mary spends \$60 in 3 months. How long does it take Tammy to spend \$60? Make a table to show the amount each woman spends on magazines. Plot the points on a coordinate plane and interpret the graph.

Cora and Cecilia each make their own number pattern that is 10 boxes long. They line their patterns up so they are next to each other. Cora puts 0 in her first box and adds 3 every time to get the next number. Cecilia puts 0 in her first box and adds 9 every time to get the next number.

- Complete each girl's sidewalk pattern.
- How many times greater is Cecilia's number in the 5th box than Cora's number in the 5th box? What about the numbers in the 8th box? The 10th box?
- What pattern do you notice in your answers for part b? Why do you think that pattern exists?
- Write your data as ordered pairs and graph the points on a coordinate plane.
- What pattern do you notice in your graph? Why do you think that pattern exists?