FIFTH GRADE MATHEMATICS
UNIT 7 STANDARDS

Dear Parents,
We want to make sure that you have an understanding of the mathematics your child will be learning this year. Below you will find the standards we will be learning in Unit Seven. Each standard is in bold print and underlined and below it is an explanation with student examples. Your child is not learning math the way we did when we were in school, so hopefully this will assist you when you help your child at home. Please let your teacher know if you have any questions. ☺

MGSE5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate
Common Misconceptions:

- Teachers and students often assume that the coordinate system is limited to one quadrant, Quadrant I. However, the initial understanding of the first quadrant provides the foundation for work in the other three quadrants, which includes negative numbers introduced in Grade Six.
- Students reverse the points when plotting them on a coordinate plane. They count up first on the y-axis and then count over on the x-axis. The location of every point in the plane has a specific place.

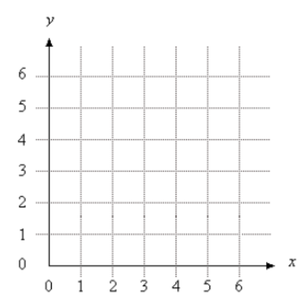
MGSE5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
CCGPS.5.G.1 and CCGPS.5.G.2:
These standards deal with only the first quadrant (positive numbers) in the coordinate plane.

Example:

Connect these points in order on the coordinate grid at the right:

(2, 2) (2, 4) (2, 6) (2, 8) (4, 5) (6, 8) (6, 6) (6, 4) and (6, 2).

What letter is formed on the grid?



Solution: "M" is formed.

Example:

Plot these points on a coordinate grid.

- Point A: (2,6)
- Point B: (4,6)
- Point C: (6,3)

- Point D: (2,3)

Connect the points in order. Make sure to connect Point D back to Point A.

1. What geometric figure is formed? What attributes did you use to identify it?
2. What line segments in this figure are parallel?
3. What line segments in this figure are perpendicular?

Solutions:

1. *Trapezoid*
2. *line segments AB and DC are parallel*
3. *segments AD and DC are perpendicular*

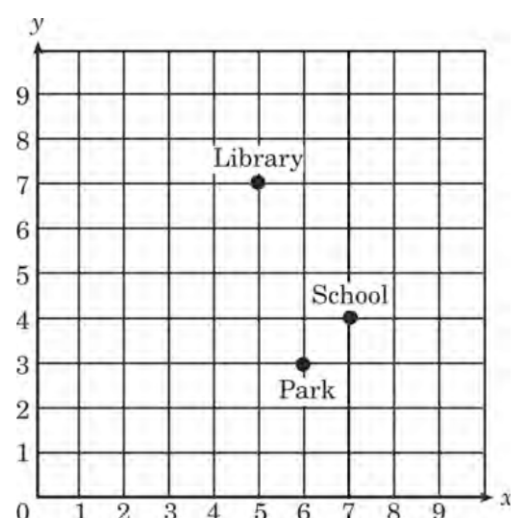
Example:

Emanuel draws a line segment from (1, 3) to (8, 10). He then draws a line segment from (0, 2) to (7, 9). If he wants to draw another line segment that is parallel to those two segments what points will he use?

This standard references real-world and mathematical problems, including the traveling from one point to another and identifying the coordinates of missing points in geometric figures, such as squares, rectangles, and parallelograms.

Example:

Using the coordinate grid, which ordered pair represents the location of the school? Explain a possible path from the school to the library.



Example:

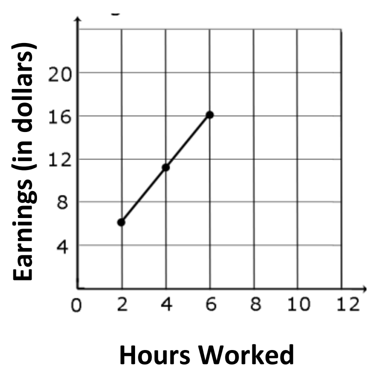
Sara has saved \$20. She earns \$8 for each hour she works.

1. If Sara saves all of her money, how much will she have after working each of the following
   a. 3 hours?
   b. 5 hours?
   c. 10 hours?
2. Create a graph that shows the relationship between the hours Sara worked and the amount of money she has saved.
3. What other information do you know from analyzing the graph?

Example:

Use the graph below to determine how much money Jack makes after working exactly 9 hours.

Earnings and Hours Worked



<u>MGSE.5.OA.3 Generate two numerical patterns using a given rule. Identify apparent relationships between corresponding terms by completing a function table or input/output table. Using the terms created, form and graph ordered pairs on a coordinate plane</u>.

This standard extends the work from 4th grade, where students generate numerical patterns when they are given one rule. In 5th grade, students are given two rules and generate two numerical patterns. In 5th grade, the graphs that are created should be line graphs to represent the pattern.

Example:

Sam and Terri live by a lake and enjoy going fishing together every day for five days. Sam catches 2 fish every day, and Terri catches 4 fish every day.

1. Make a chart (table) to represent the number of fish that Sam and Terri catch.

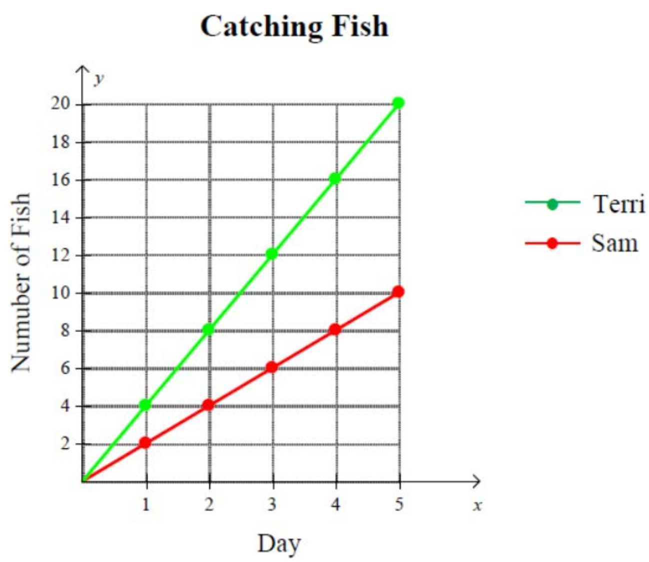
Days	Sam's Total Number of Fish	Terri's Total Number of Fish
0	0	0
1	2	4
2	4	8
3	6	12
4	8	16
5	10	20

This is a linear function which is why we get the straight lines. The Days are the independent variable, Fish are the dependent variables, and the constant rate is what the rule identifies in the table.

2. Describe the pattern.

Since Terri catches 4 fish each day, and Sam catches 2 fish, the amount of Terri's fish is always greater. Terri's fish is also always twice as much as Sam's fish.

3. Make a graph of the number of fish. Plot the points on a coordinate plane and make a line graph, and then interpret the graph.



My graph shows that Terri always has more fish than Sam. Terri's fish increases at a higher rate since she catches 4 fish every day. Sam only catches 2 fish every day, so his number of fish increases at a smaller rate than Terri.

Important to note: The lines become increasingly further apart. Identify apparent relationships between corresponding terms. (*Additional relationships:* The two lines will never intersect; there will not be a day in which the two friends have the same total of fish. Explain the relationship between the number of days that has passed and the number of fish each friend has: Sam catches 2*n* fish, Terri catches 4*n* fish, where *n* is the number of days.)

Example:

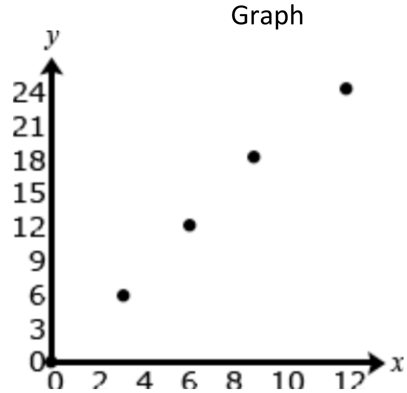
• Use the rule "add 3" to write a sequence of numbers.

Starting with a 0, students write 0, 3, 6, 9, 12, . . .
• Use the rule "add 6" to write a sequence of numbers.

Starting with 0, students write 0, 6, 12, 18, 24, . . .
After comparing these two sequences, the students notice that each term in the second sequence is twice the corresponding terms of the first sequence. One way they justify this is by describing the patterns of the terms. Their justification may include some mathematical notation (See example below). A student may explain that both sequences start with zero and to generate each term of the second sequence he/she added 6, which is twice as much as was added to produce the terms in the first sequence. Students may also use the distributive property to describe the relationship between the two numerical patterns by reasoning that 6 + 6 + 6 = 2 (3 + 3 + 3).
0, $^{+3}$ 3, $^{+3}$ 6, $^{+3}$ 9, $^{+3}$ 12, . . . 0, $^{+6}$ 6, $^{+6}$ 12, $^{+6}$ 18, $^{+6}$ 24, . . .
Once students can describe that the second sequence of numbers is twice the corresponding terms of the first sequence, the terms can be written in ordered pairs and then graphed on a coordinate grid. They should recognize that each point on the graph represents two quantities in which the second quantity is twice the first quantity.

Ordered pairs
(0,0)
(3,6)
(6,12)
(9,18)

Graph



Common Misconceptions
Students reverse the points when plotting them on a coordinate plane. They count up first on the y-axis and then count over on the x-axis. The location of every point in the plane has a specific place. Have students plot points where the numbers are reversed such as (4, 5) and (5, 4). Begin with students providing a verbal description of how to plot each point. Then, have them follow the verbal description and plot each point.