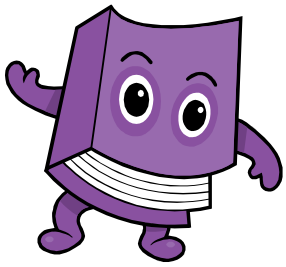


Performance Task: Tell Me a Story

Adapted from NCTM Illuminations lesson:
http://illuminations.nctm.org/LessonDetail.aspx?id=L777

In this lesson students will review plotting points and labeling axis. Students generate a set of random points all located within the first quadrant. Students will plot and connect the points and then create a short story that could describe the graph. Students must ensure that the graph is labeled correctly and that someone could recreate their graph from their story.

STANDARDS FOR MATHEMATICAL CONTENT

Graph points on the coordinate plane to solve real-world and mathematical problems.

MCC5.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).

MCC5.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.

STANDARDS FOR MATHEMATICAL PRACTICE

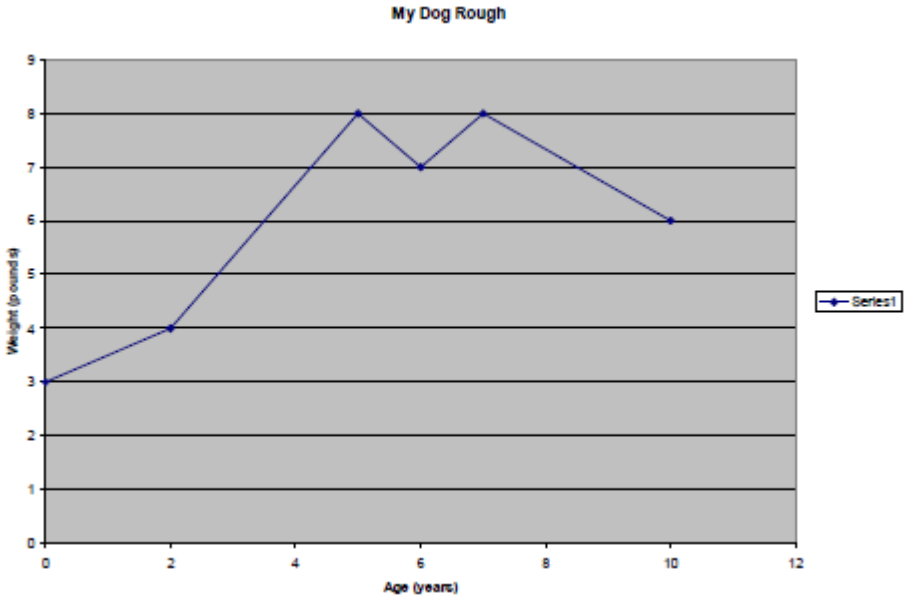
1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Here is a sample graph and story that was created by generating 6 random ordered pairs.
This example could serve as the whole class model for students.
Ordered pairs:

(_7__, _8__), (_2__, __4_), (_5__, __8_), (_10__, __6__), (_0__, _3__), (_6__, _7__)

Graphical representation:



Short story:

My Dog Rough

My dog only weighed 3 pounds when he was born so I named him Rough because I thought he would have a rough go at life. Rough's first couple years matched his name as he only managed to gain a pound during those first 2 years. Rough did much better over the next few years so that by the time he was 5 years old he had doubled his weight from the 2 year mark. The next year we spent a lot of time outside playing and running and he managed to lose a pound. The next year I made sure he ate healthier and Rough managed to gain back that pound he had lost the year before. Eight pounds was the most Rough ever weighed because during his 7^{th} year he began to steadily lose weight and only weighed 6 pounds when he died at age 10.

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.
- When playing games with coordinates or looking at maps, students may think the order in plotting a coordinate point is not important. Have students plot points so that the position

of the coordinates is switched. For example, have students plot (3, 4) and (4, 3) and discuss the order used to plot the points. Have students create directions for others to follow so that they become aware of the importance of direction and distance.

ESSENTIAL QUESTIONS

- How does the coordinate system work?
- How can the coordinate system help you better understand other map systems?
- How do coordinate grids help you organize information?

MATERIALS

- "Tell Me a Story" recording sheet
- Playing cards (#'s 1-10, Ace serves as 1)
- Graph paper (for students to recreate other's graphs)

GROUPING

Individual task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Comments: Identifying points on a coordinate grid is important in understanding how the coordinate system works and in constructing simple line graphs to display data or to plot points. These skills further help us to examine algebraic functions and relationships. The skills developed in this lesson can be applied cross-curricular to reading latitude and longitude on a map and to plotting data points.

TASK

- Each student will pull 12 playing cards to generate ordered pairs randomly. Be sure that no ordered pairs are repeated. If so, pull another card to generate new coordinates. List the ordered pairs on the recording sheet.
- Students will plot their points on their coordinate grid and connect them with line segments from left to right.
- Have the students observe their graph and determine labels for each axis as well as a title for their graph.
- Students will then create a short story to depict what is occurring in their graph. Encourage students to write with enough detail that another student reading their story would be able to recreate the graph. Having students write a rough draft on a separate sheet of paper first is suggested.
- When students are finished they may share their stories with the class and see if the students can recreate their graph on graph paper or students may switch papers and recreate each other's graphs.

FORMATIVE ASSESSMENT QUESTIONS

- What is the coordinate for the horizontal axis?
- How did you decide to label your axes?
- What is the coordinate for the vertical axis?
- Why do you need to plot your point where two lines intersect?
- How do you graph a point on the coordinate plane?
- How do you name a point on the coordinate plane?
- How do you use an ordered pair to identify a point on the coordinate plane?
- How do you use an ordered pair to locate a point on the coordinate plane?

DIFFERENTIATION

Extension

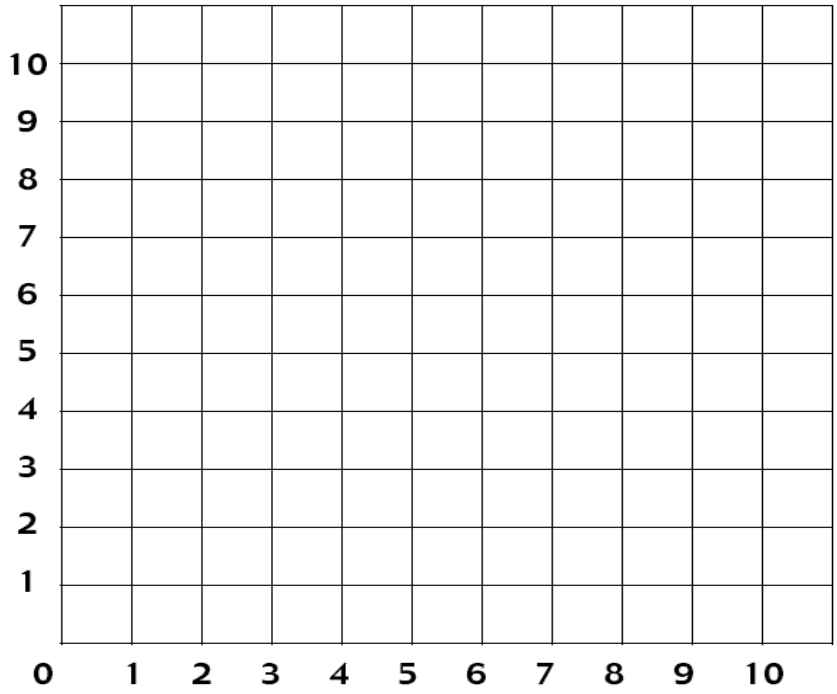
- Have students create a short story with two sets of given rules which would require another student or themselves to continue the numerical pattern and graph them on the coordinate grid.

Intervention

- Have students decrease the number of coordinates created and work in small groups to create their graph and short story.

Name _____ Date _____

Tell Me a Story



Ordered Pairs:
(____ , ____) (____ , ____) (____ , ____) (____ , ____) (____ , ____) (____ , ____)

Short Story: