

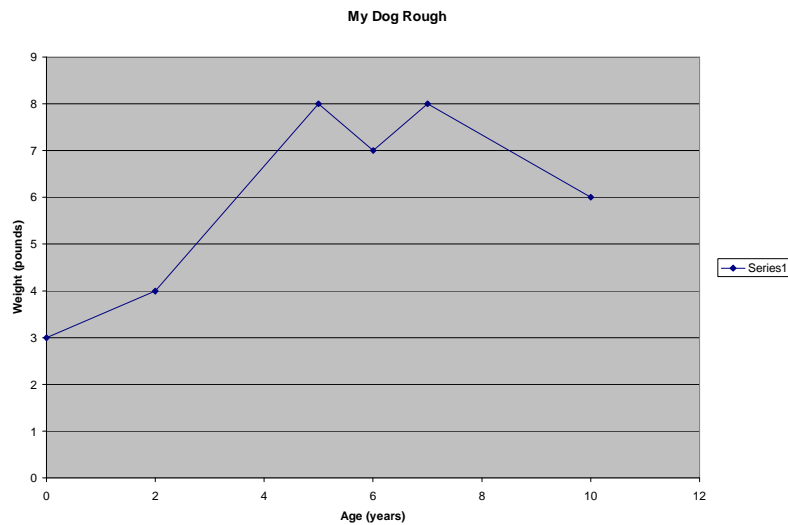
Coordinate Plane	
Enrichment Investigation #1	
<p>Common Core State Standard(s): 6.NS.8</p> <p>Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.</p>	<p>Standard(s) for Mathematical Practice:</p> <p>MP.1 Make sense of problems and persevere in solving them</p> <p>MP.2 Reason abstractly and quantitatively</p> <p>MP.6 Attend to precision</p> <p>MP.8 Look for and express regularity in repeated reasoning</p>
<p>Materials Needed:</p> <ul style="list-style-type: none"> • Number cubes • Graph paper • Rulers • Markers or colored pencils • Describe the Graph activity sheet • Describe the Graph teaching example 	
<p>Instructions:</p> <ol style="list-style-type: none"> 1. Each student will need a <i>Describe the Graph</i> activity sheet and a number cube to generate random numbers between 0 and 10. 2. Students will each generate 12 random numbers between 0 and 10 and write them in the order they are generated in the spaces provided on the activity sheet. One thing to be careful of is having duplicate domain values. If this happens just have the student generate an additional number for that spot. 3. Each student will then plot their unique points and connect them in order from left to right with line segments on the graph provided on their activity sheet. This is a second chance to catch any duplicate domain values as they graph. 4. Now students will need to decide what is represented by each axis of their graph and label them as such. It may be helpful to give an example to the class here for clarification, so this is a good place to use the Describe the Graph teaching example. 5. Students are then ready to write a short story that describes what is being depicted in the graph. The activity sheet provides lines for students to write their story on. 	
<p>Sources:</p> <ul style="list-style-type: none"> • NCTM Illuminations Activity “Describe the Graph”: http://illuminations.nctm.org/LessonDetail.aspx?id=L777 	

Describe the Graph

1. Generate 12 random numbers between 0 and 10. Record them in the order they appear.

(7 , 8), (2 , 4), (5 , 8), (10 , 6), (0 , 3), (6 , 7)

2. Plot the above points and connect them in order from left to right with line segments.



3. Title and label the graph accordingly. Write a story to describe what is happening in the graph.

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 7th year he began to steadily lose weight and only weighed 6 pounds when he died at age 10.

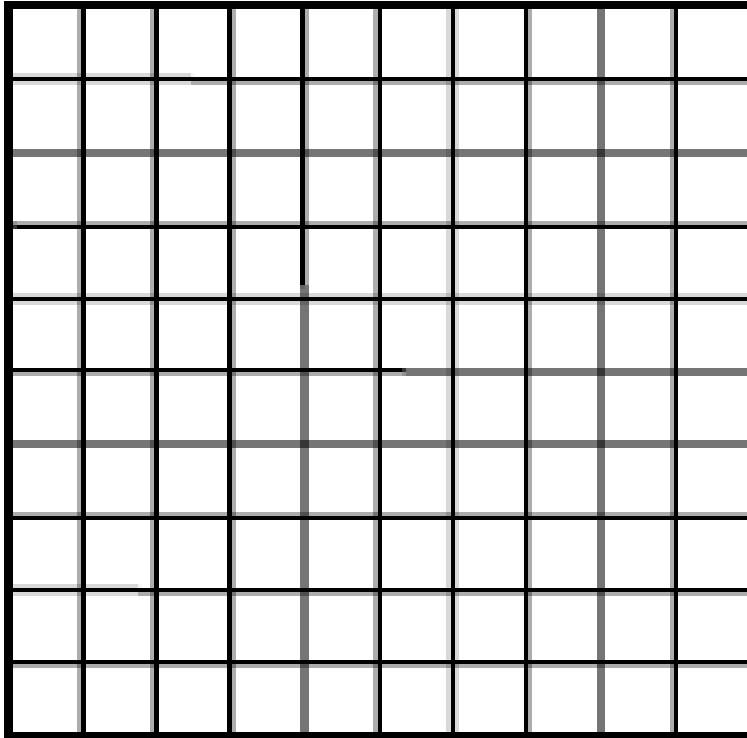
Describe the Graph

NAME _____

1. Generate 12 random numbers between 0 and 10. Record them in the order they appear.

(____, ____), (____, ____), (____, ____), (____, ____), (____, ____), (____, ____)

2. Plot the above points and connect them in order from left to right with line segments.



3. Title and label the graph accordingly. Write a story to describe what is happening in the graph.

Coordinate Plane

Enrichment Investigation #2

Common Core State Standard(s):

6.NS.6b

Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

- b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.

6.NS.8

Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

Standard(s) for Mathematical Practice:

- MP.1 Make sense of problems and persevere in solving them
- MP.2 Reason abstractly and quantitatively
- MP.6 Attend to precision
- MP.8 Look for and express regularity in repeated reasoning

Materials Needed:

- Slammin' Sammy activity pages (3)

Instructions:

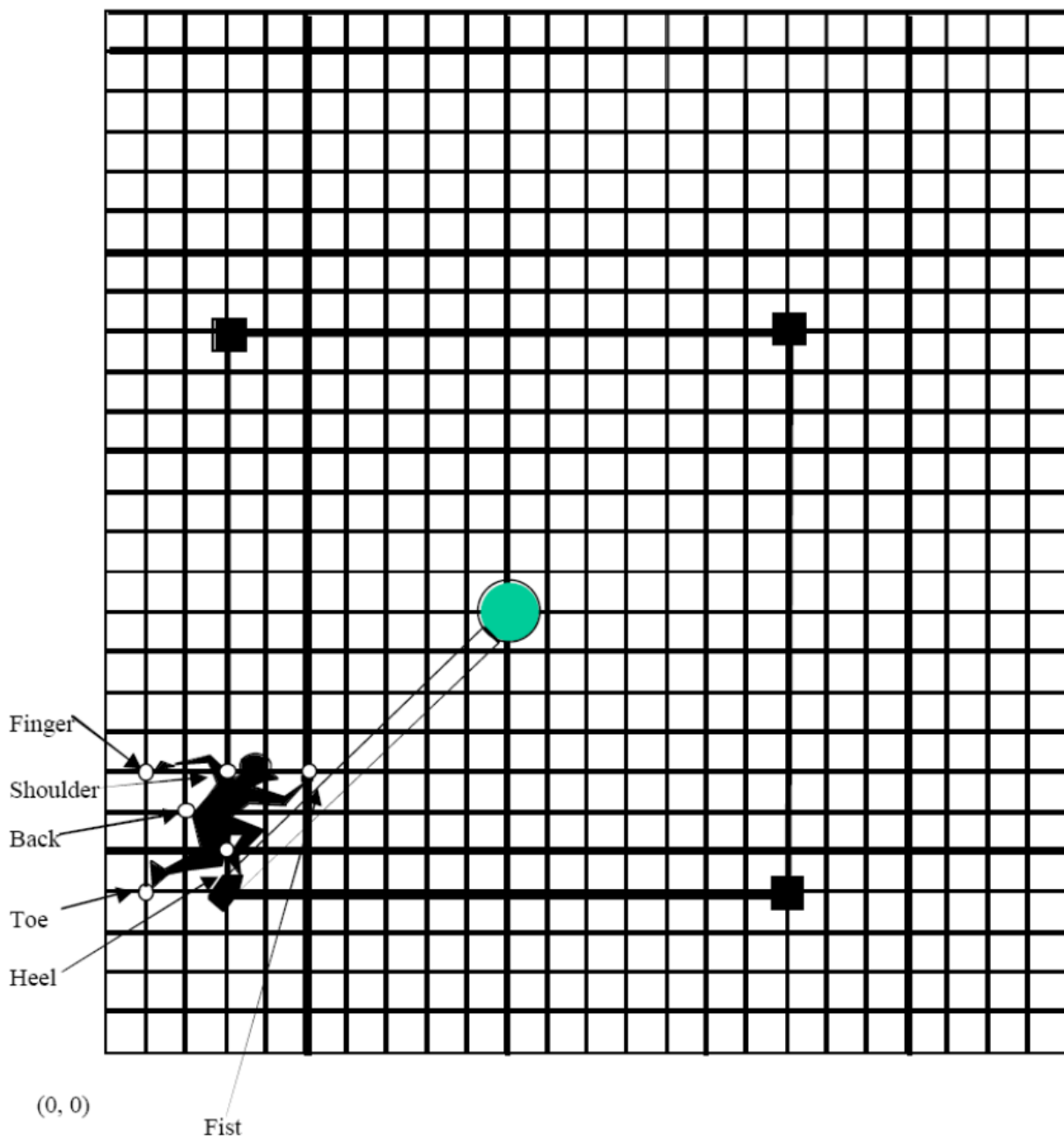
1. Students complete the Slammin' Sammy activity pages 1 and 2. These activities allow them to explore the coordinate grid by letting Sammy run the bases. His finger, shoulder, back, toe, heel, and fist are the points used to map his journey around the diamond.
2. On activity page 3 students begin by reproducing the figure of Sam in a different quadrant of the plane. The students will then draw a reflection of Sam in quadrant III. Students will list original and new coordinates of each point. Then students draw their own simple sketch and reproduce it as a translation in quadrant IV and as a reflection in quadrant III. Again, they will provide original and translated coordinates.

Sources:

- Slammin' Sammy taken from NC DPI Resources for Mathematics Grade 6 (2003 SCS) Blackline masters p. 127-128:
http://mathlearnnc.sharpschool.com/UserFiles/Servers/Server_4507209/File/Instructional%20Resources/G6V2BL6.pdf

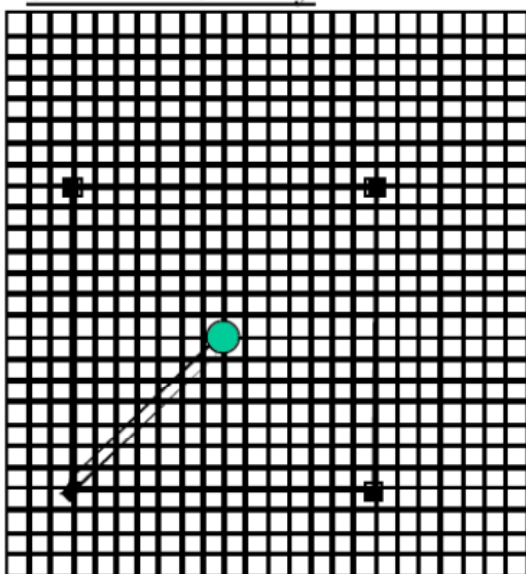
Name _____ Date _____

Slammin' Sammy

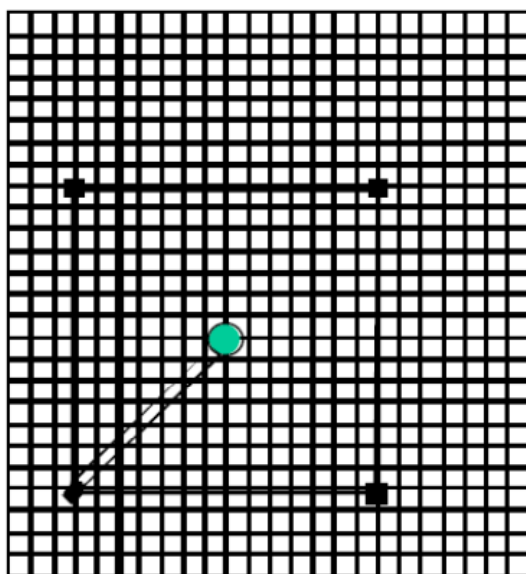


1. Give the coordinates of Sammy's six body parts:
Finger (,) Shoulder (,) Back (,) Toe (,) Heel (,) Fist (,)

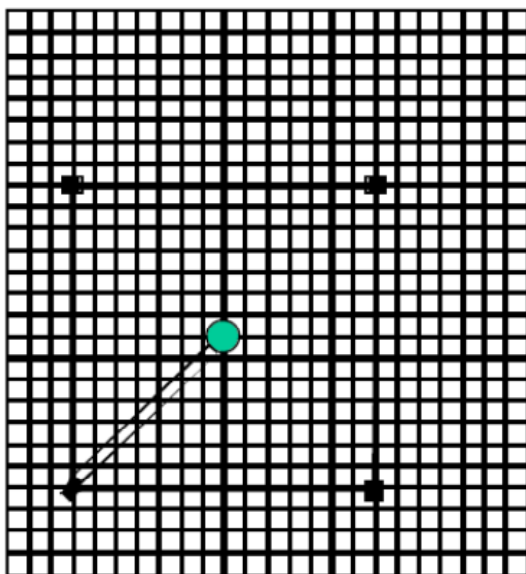
Slammin' Sammy



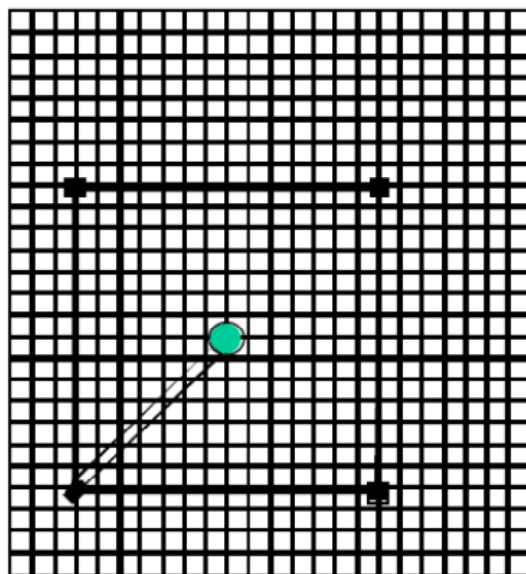
2. Draw Sammy at 1st base and give the coordinates of his five other body parts.
Toe (15, 4)



3. Draw Sammy at 3rd base and give the coordinates of his five other body parts.
Toe (1, 18)

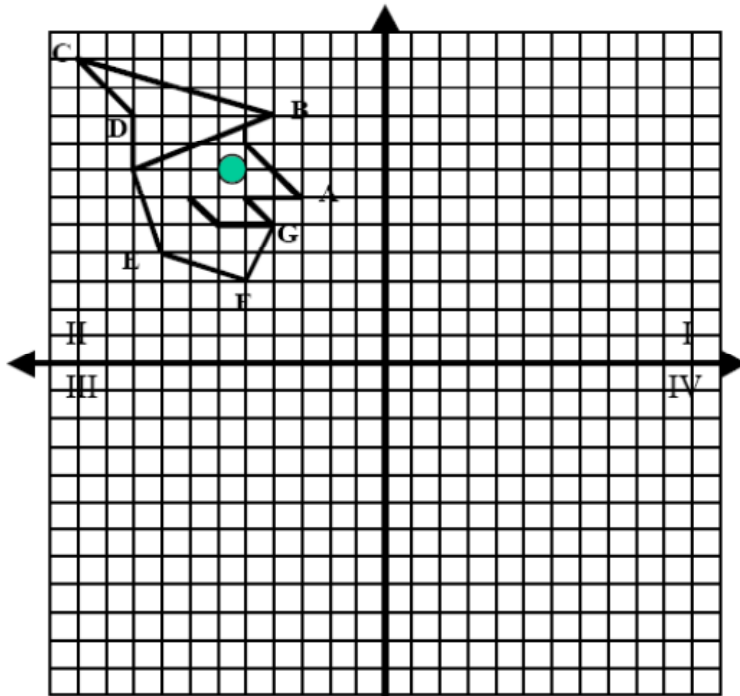


4. Draw Sammy at 2nd base and give the coordinates of his five other body parts.
Toe (17, 18)



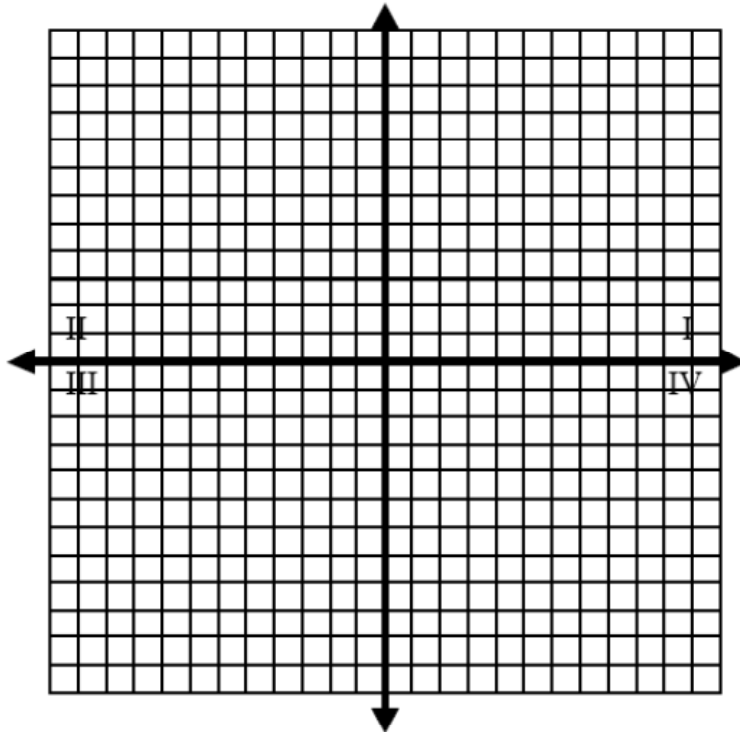
4. Draw Sammy at 2nd base but this time Reflect him to face 3rd base.
Toe (17, 18)

Draw it Again, Sam



Slide Sam into quadrant IV. Then flip Sam upside down into quadrant III. List the coordinates.

	<u>II</u>	<u>IV</u>	<u>III</u>
A	(-3,6)	(9, -6)	(-3, -6)
B	_____	_____	_____
C	_____	_____	_____
D	_____	_____	_____
E	_____	_____	_____
F	_____	_____	_____
G	_____	_____	_____



Now draw your own design in quadrant II. Slide it into quadrant IV. Then flip it upside down into quadrant III. List the coordinates.

	<u>I</u>	<u>IV</u>	<u>III</u>
A	_____	_____	_____
B	_____	_____	_____
C	_____	_____	_____
D	_____	_____	_____
E	_____	_____	_____
F	_____	_____	_____
G	_____	_____	_____

Coordinate Plane

Enrichment Investigation #3

Common Core State Standard(s):

6.G.3

Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

6.NS.6b

Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

- b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
- c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

6.NS.8

Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

Standard(s) for Mathematical Practice:

MP.1 Make sense of problems and persevere in solving them

MP.2 Reason abstractly and quantitatively

MP.6 Attend to precision

MP.8 Look for and express regularity in repeated reasoning

Materials Needed:

- Itinerary Worksheet
- Transparency with a rectangular (cm) graph grid
- Transparency pens
- Notebook paper
- Calculator
- Web Site: [Interactive Map: Downtown Washington DC](#)

Instructions:

1. Open the [Interactive Map: Downtown Washington DC](#). Zoom in as needed. Use your mouse to position the White House near the top and center of the viewing area. Adjust the map so the Jefferson Memorial is showing at the bottom of your screen, the Lincoln Memorial on the left, and part of the U.S. Capitol on the right.
2. Draw the x - and y -axes at the center of the transparent grid and place the transparency over the map on the computer screen. Position the transparency so the origin of the axes is at the bottom on the Washington Monument and the positive y -axis intersects along one side of the monument.
3. Locate the five selected tour sites from the itinerary worksheet and place them on the transparency. Plot a point for each (at the nearest intersection of a vertical and horizontal gridline), and label the coordinates of the point.
4. Calculate the distance between each site on the tour record your answers on the Itinerary worksheet.
5. Complete the Itinerary Worksheet

Sources:

- Adapted from SAS Curriculum Pathways QL#282 "Distance Formula in Washington DC". <http://www.sascurriculumpathways.com/portal/Launch?id=282&bhcp=1>

Itinerary Worksheet

Name:

- Once you set up a coordinate system on your transparency, write the coordinates of each site you will visit.

Sightseeing Stops	Coordinates
1. American Scandal Walking Tour	
2. White House	
3. National Building Museum	
4. National Museum of the American Indian	
5. National Museum of African Art	

1. Find the distance between each stop on the tour.
 - a. Distance between Stop 1 and Stop 2.
 - b. Distance between Stop 2 and Stop 3.
 - c. Distance between Stop 3 and Stop 4.
 - d. Distance between Stop 4 and Stop 5.
2. What is the total distance you will travel during your day of sightseeing?

Coordinate Plane	
Enrichment Investigation #4	
<p>Common Core State Standard(s): 6.G.3 Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.</p> <p>6.NS.6b Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.</p> <p style="padding-left: 40px;">b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.</p> <p style="padding-left: 40px;">c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.</p> <p>6.NS.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.</p>	<p>Standard(s) for Mathematical Practice: MP.1 Make sense of problems and persevere in solving them MP.2 Reason abstractly and quantitatively MP.6 Attend to precision MP.8 Look for and express regularity in repeated reasoning</p>

Materials Needed:

- Coordinate Battle Activity Sheet

Instructions:

1. Note: It is a good idea to familiarize all students with the rules of the game by playing one game with the whole class trying to guess where you have placed your ships.
2. Students play this game in pairs. They will use the worksheet to help keep track during the game. Students should not allow their partner to see their worksheet during the game or their ships' locations will be compromised.
3. Students take turns guessing coordinates that might be the locations of their opponent's ships. (For example, a player might ask, *Do you have a ship at x coordinate 4, y coordinate -2?* If the opponent does have a ship at that location, he or she must respond in the affirmative. The student who asked the question notes on his or her graph that the opponent does have a ship there.) If they choose a coordinate where their opponent has placed one of his/her ships, they get to guess another coordinate. As they play the game, each player should record all his/her right and wrong coordinate guesses on the blank coordinate graph. When the player has guessed all the coordinates of a ship, his or her opponent must "give up the ship that has been sunk" by telling the opponent of his/her success.) Gradually, students narrow down the exact locations of all of the opponent's ships.
4. The winner of the game is the first person who guesses the locations of (sinks) each of his/her opponent's ships.

Sources:

- Adapted from "Sink the Sir – Battleship Style Game":
<https://sites.google.com/site/teachforever/home> and "Play Battleship on Graph Paper:
http://www.educationworld.com/a_tsl/archives/06-1/lesson001.shtml

NAME: _____
 DATE: _____

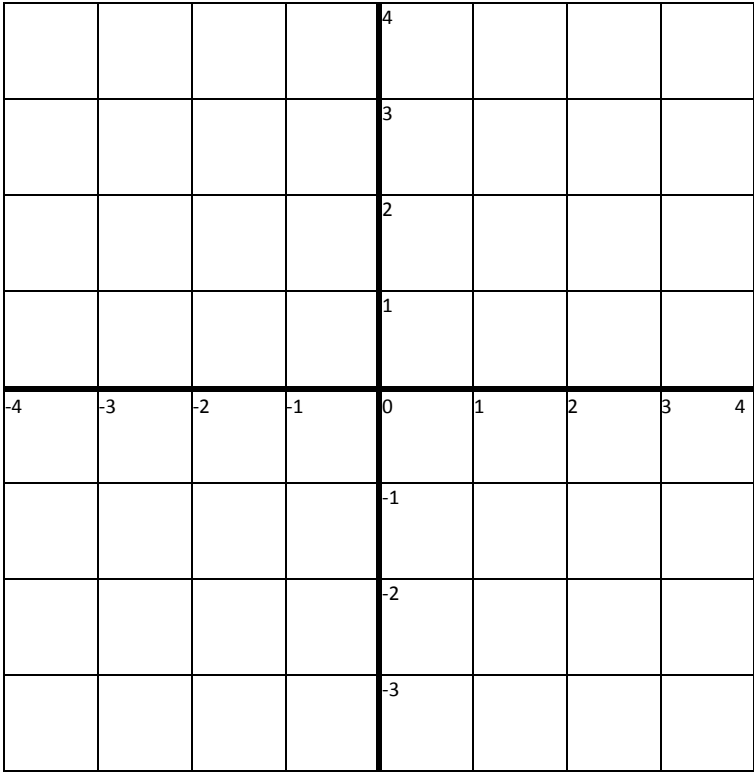
6th Grade

Coordinate Battle!

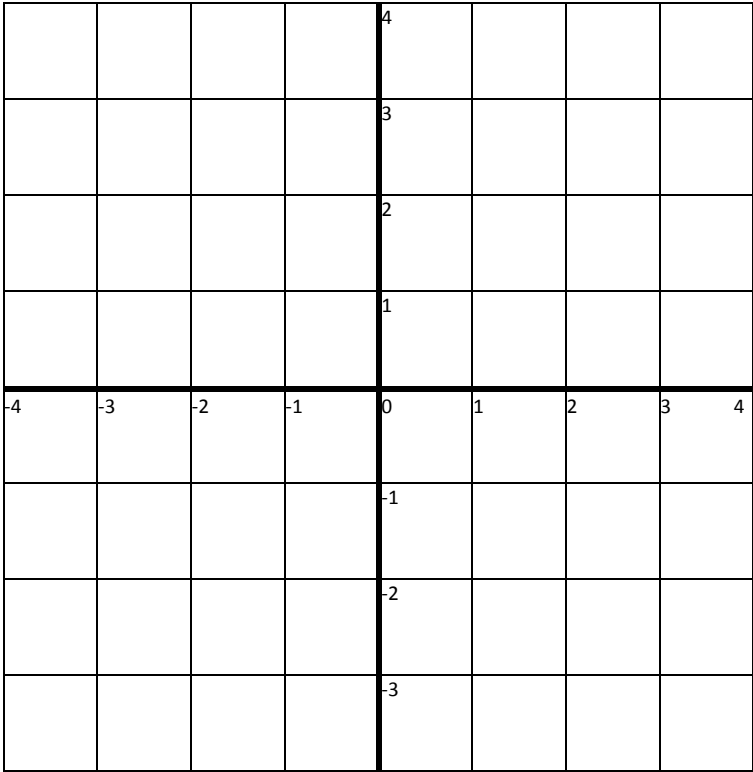
Sink your partner's fleet before he sinks yours!

Fired at Me

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MY GRID (put your ships here)



Partner's Grid (keep track of when you hit them here)

Fired at Partner

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DIRECTIONS

Place 5 ships on your grid (LEFT):

- ✓ 1 aircraft carrier - 5 points long
- ✓ 1 battleship - 4 points
- ✓ 1 submarine - 3 points
- ✓ 1 destroyer - 3 points
- ✓ 1 PT boat - 2 points

Label the coordinate planes:

- ✓ x-axis
- ✓ y-axis
- ✓ origin
- ✓ Quadrants I, II, III, IV

Keep track of all attacks:

- ✓ Mark **X** for hits
- ✓ Mark ● for misses
- ✓ Write all coordinate points in the tables