Algebra/Geometry Institute Summer 2002

Lesson Planning Guide

Faculty Name: Paula J. Lewis
School: Horn Lake Middle School
Grade Level: 8th grade

1 Teaching objective(s)

II.E. Apply the principles of graphing in the coordinate system.

8a. Identify the x- and y-axis, the origin, and the quadrants of a coordinate plane.

8b. Plot ordered pairs.

8c. Label the x and y coordinates for a given point.

The student will be able to identify the x- and y-axis, the origin, and the quadrants of the coordinate plane.
The student will be able to plot ordered pairs on the coordinate plane.
The student will be able to label the x and y coordinates for a given point.

2 Instructional Activities

1. The teacher will present a warm up activity by having the students reflect and write how the coordinate system and longitude and latitude are similar.
2. After the students have had time to reflect and write their responses, begin the discussion about longitude and latitude. How and where it's used and how it relates to identifying locations all over the world. The coordinate system is very similar to longitude and latitude because it too identifies locations. Both have perpendicular intersecting axes that consist of positive and negative numbers.
3. The teacher will present on the overhead a horizontal number line with positive and negative numbers with zero being the origin. Before identifying this to be the x-axis, rotate the number line vertically, and place an overlay of a horizontal number line. Show that the coordinate plane is formed by two number lines that intersect at their zero points.
4. The teacher will emphasize that this intersection point is called the origin, the horizontal number line is identified as the x-axis, and the vertical number line is the y-axis. These two axes separate the coordinate plane into four sections called quadrants.
5. The teacher will discuss each quadrant and the numbers that will be located in each area by introducing ordered pairs.
6. The teacher will emphasize that the first number in an ordered pair is called the x-coordinate. The second number is the y-coordinate. The coordinates are your directions to find a point.
7. The student will be given a graph with a list of ordered pairs. Under the direction of the teacher, the students will plot these points and create a design of a heart. "Graphiti Book Two, Design 3A".

8. To further check the comprehension of the students, the teacher will present the game, "Connect the Points". Each student is given an index card labeled with a letter and an ordered pair. Example: A (7,7), B (6,3), C (6,2), etc… To present this activity the students are taken out of the classroom to an area where a large coordinate plane has been placed. The student that has the index card labeled with an "A" begins the game first. They must begin at the origin (0,0), then identify their first integer in the pair and move that number of spaces on the x-axis (either to the right or left, depending if the integer is positive or negative). Example for index card "A": 7 spaces to the right on the x-axis. Next, identify the second integer in the pair and move that number of spaces on the y-axis (either up or down, depending if the integer is positive or negative). Example for index card "A": 7 spaces up on the y-axis. They will now have located their ordered pair on the coordinate plane. The student will be given the beginning piece of string to tape and place it on the located point. The index card will be placed by the coordinate point. The game continues on in the same manner with the next letter in the alphabet until all points have been located and the design has been identified. The design is of a butterfly.
9. The teacher will observe the correct directions the students display upon locating their point.
10. Once the students return to class, they will be given a handout in which they will write step-by-step directions using ordered pairs that will get the mouse through the maze to the cheese.
11. In closing, ask the students, "How might you use the coordinate system or longitude and latitude in real-life situations? (Of course, in planning trips and searching for cities you would use a map and locate the intersecting point. But also computer artist create many of the images you see in movies and video games using the coordinates and replacing those specific points with color. These locations are called pixels.)

3 Materials and Resources

References:

Collins, William, et al, Glencoe Mathematics "Applications and Connections" Course 3. Glencoe McGraw-Hill. 2001. p. 92-95.

Chapin, Suzanne H., et al, Prentice Hall Middle Grades Math "Tools for Success" Course 3. Prentice Hall. 2001. p. 168-171.

Lamb, Mazie, 8th grade Mathematics teacher, "Connect the Points." 2001. (original idea)

Activity Resources Company, Inc., "Graphiti Book Two", Heart Design - 3A, Box 4875, Hayward, CA 94545.

Materials:

Transparencies, transparency markers, “Heart” design graph worksheet, index cards with labeled ordered pairs, shower curtain coordinate plane, string, masking tape, and “Mouse and Cheese Maze” worksheet.

4 Assessment

The teacher will observe the student’s progress while working the “Heart” design graph worksheet. And during the “Connect the Point” game. The “Mouse Maze” worksheet will be graded for accuracy giving a point for each correct coordinate. There is a possible 12 out of 12 score for this worksheet.

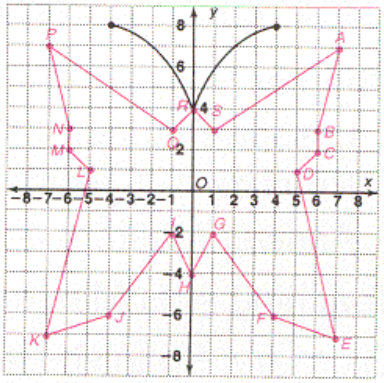
5 Enrichment (Optional)

To add to the discussion of the computer artist, the student can be asked to use graph paper to design their first name and then add color or other designs to each block. These will be displayed around the classroom and in the hallways.

Connect the Points

Place each of the following ordered pair on an index card, which will be passed out to each student. The game begins with the student who has the index card labeled "A". Each student will begin at the origin, then walk along the x- and y-axis until they have located their point. The game continues until the last ordered has been plotted. To further extend this graph, the intenna s of the butterfly may also be included on index cards.

$A(7, 7)$	$J(-4, -6)$
$B(6, 3)$	$K(-7, -7)$
$C(6, 2)$	$L(-5, 1)$
$D(5, 1)$	$M(-6, 2)$
$E(7, -7)$	$N(-6, 3)$
$F(4, -6)$	$P(-7, 7)$
$G(1, -2)$	$Q(-1, 3)$
$H(0, -4)$	$R(0, 4)$
$I(-1, -2)$	$S(1, 3)$

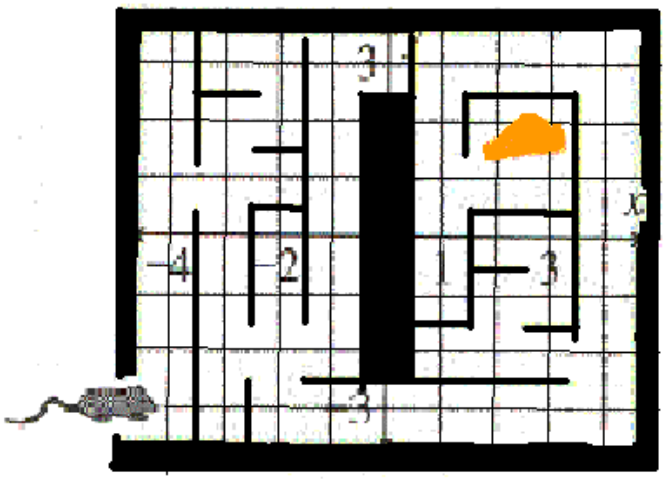


Graph each ordered pair on the coordinate plane. Label each point with its letter. Then connect the points in order from *A* to *S*. Connect point *S* with point *A* to complete a picture.

Name _____ Date _____

Mouse and Maze

Write step-by-step directions that will get the mouse through the maze to the cheese.



Start at (-5, -3)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____