Coordinate System Activity

Instructor's Handout

1   Educational Objectives

- To help kids further understand grid/cartesian coordinate systems

- Provide a review of some algebra/general math topics

- Get kids moving out of their seats

2   Preparation

As the instructor, you will need some time to set this up. **You must print the clues double sided. Make sure the front and back coordinates correspond.** The clues will come in a packet of about 25 pages, and you will need to cut them out on the lines provided (a paper cutter would be perfect for this, but scissors will work just fine). Then, you must lay the clues out around the room in a grid coordinate fashion as labeled. Then once you are ready to start the activity, just give the kids their first clue (also labeled), and they will be off!

3   Activity Overview

1. First create the grid coordinate system with slips of paper that have the clues on them (they should be labeled.

2. with correct position). These can be set up on desks, on the floor around the room, or in a grid outside the classroom.

3. Depending on the number of children in the group, split them into groups of 3-5 (should not be more than 4 groups).

4. Distribute the initial clue cards to each group, at which point they will start solving the clues to direct them around the grid coordinate system (each initial clue will send them to different spots so that everyone is not running into each other at every station).

5. Each clue will have some sort of algebra or puzzle on it and will tell them where they will find their next clue.

6. The last clue will solve the "meta-puzzle" that was asked on the initial clue card, ending the activity.

4 Notes

- Try to keep groups as small as possible; the bigger the group, the greater chance one or two kids will dominate the clue solving and have the others bored/uninvolved in the activity.

- Encourage everyone to solve the clues, especially as a team.

- The further apart the clues are, the better (i.e. outside on a field would be optimal). This forces the children to actually think in terms of a coordinate system spatially where the next clue is so they do not waste time, and also they will get to move around a lot more.

- Kids may want to carry around their clues so that they can revisit/check their work if they get crossed up and/or need information from previous clues to solve their current clue.
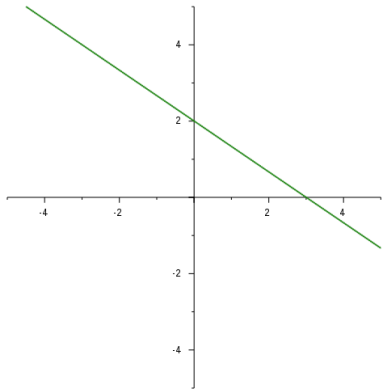
(0,0)	(0,1)
(1,0)	(-1,0)
(0,-1)	(0,2)

(0,1)-No clue here. Check your answers!	(0,0)-how to crack the code: 1=a, 2=b, 3=c...25=y,26=z.
(-1,0)-No clue here. Check your answers!	(1,0)-No clue here. Check your answers!
(0,2)-No clue here. Check your answers!	(0,-1)-No clue here. Check your answers!

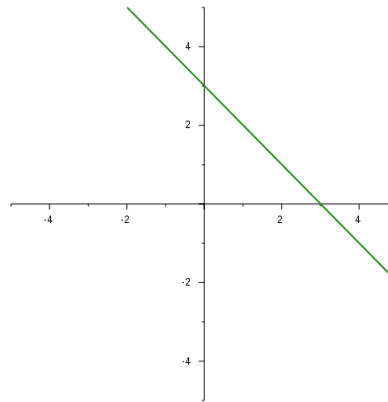| (2,0)	(-2,0)
(0,-2)	(0,3)
(3,0)	(-3,0)

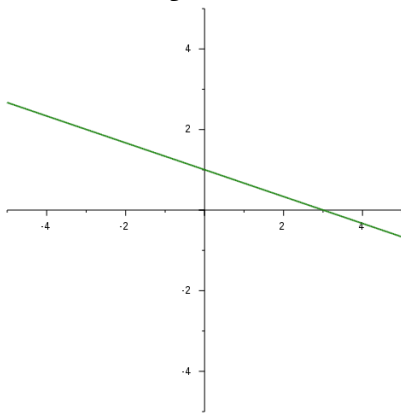|	
(-2,0)- (x intercept, y intercept) graph of $y = \dfrac{-2x}{3} + 2$ 	(2,0)- (x intercept, y intercept) graph of $y = -x + 3$
(0,3)-No clue here. Check your answers!	(0,-2)-No clue here. Check your answers!
(-3,0)-No clue here. Check your answers!	(3,0)-No clue here. Check your answers!

(0,-3)	(0,4)
(4,0)	(-4,0)
(0,-4)	(1,1)

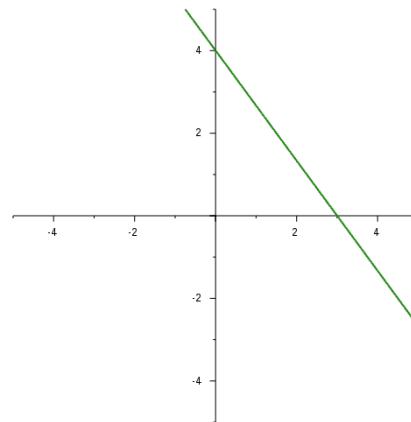|	
(0,4)-No clue here. Check your answers!	(0,-3)-No clue here. Check your answers!
(-4,0)- (x intercept, y intercept) graph of $y = \dfrac{-x}{3} + 1$ 	(4,0)- (x intercept, y intercept) graph of $y = \dfrac{-4x}{3} + 4$
(1,1)-No clue here. Check your answers!	(0,-4)-No clue here. Check your answers!

(1,-1)	(-1,1)
(-1,-1)	(1,2)
(-1,2)	(1,-2)

(-1,1)- $(4 - 6 \div 2$, current x coordinate+5)	(1,-1)- solve for x: $(\dfrac{-150}{375} = \dfrac{x}{10}$, y coordinate: if you multiply any number by x, you get x. what is x?)
(1,2)- solve for x: $(2x + 1 = -3,\ 3x + 8 = 17)$	(-1,-1)- $(\dfrac{9}{8} \div \dfrac{1}{3} + \dfrac{5}{8},\ \dfrac{1}{3} + \dfrac{1}{2} - \dfrac{17}{6})$
(1,-2)- solve for x: $(2x + 2 = 6,\ 3x + 8 = 17)$	(-1,2)-No clue here. Check your answers!

(-1,-2)	(2,1)
(-2,1)	(2,-1)
(-2,-1)	(2,2)

(2,1)-No clue here. Check your answers!	(-1,-2)-No clue here. Check your answers!
(2,-1)-No clue here. Check your answers!	(-2,1)-No clue here. Check your answers!
(2,2)-No clue here. Check your answers!	(-2,-1)- $(\frac{9}{8} \div \frac{1}{3} + \frac{5}{8} \ , \ \frac{1}{3} + \frac{1}{2} - \frac{11}{6})$

(-2,2)	(2,-2)
(-2,-2)	(3,1)
(-3,1)	(3,-1)

(2,-2)- solve for x: ($\dfrac{-150}{375} = \dfrac{x}{5}$, y cordinate: if you multiply any number by x, you get x. what is x?)	(-2,2)- ($4 - 6 \div 2$, current x coordinate+4)
(3,1)- In the third quadrant. The product of x and y coordinates (both integers) is 1.	(-2,-2)-No clue here. Check your answers!
(3,-1)-Great! Now go to the origin for you final clue!	(-3,1)-No clue here. Check your answers!

(-3,-1)	(3,2)
(-3,2)	(3,-2)
(-3,-2)	(3,3)

(3,2)- In the third quadrant. y coordinate>-2. The product of x and y coordinates (both integers) is 2.	(-3,-1)- $(\dfrac{9}{8} \div \dfrac{1}{3} - \dfrac{3}{8}, \dfrac{1}{3} + \dfrac{1}{2} - \dfrac{17}{6})$
(3,-2)-Great! Now go to the origin for you final clue!	(-3,2)- $(\dfrac{2+7}{3} - 1, \dfrac{2-7}{5} - 1)$
(3,3)-In the third quadrant. y coordinate>-2. The product of x and y coordinates is 3.	(-3,-2)- $(\dfrac{2+7}{3}, \dfrac{2-7}{5} - 2)$

(3,-3)	(-3,3)
(-3,-3)	(2,3)
(-2,3)	(2,-3)

(-3,3)- ($4 - 6 \div 2$, current x coordinate+1)	(3,-3)- solve for x: ($\frac{150}{375} = \frac{x}{5}$, y coordinate: if you multiply any number by x, you get x. what is x?)
(2,3)- If y=6, solve for x: (y+3x=0, 3x+2y=3)	(-3,-3)-No clue here. Check your answers!
(2,-3)-reflect over y=x line (switch current x and y coordinates)	(-2,3)- If y=6, solve for x: (y+3x=12 , 3x+2y=3)

(-2,-3)	(1,3)
(1,-3)	(-1,3)
(-1,-3)	(4,1)

(1,3)-No clue here. Check your answers!	(-2,-3)-reflect over y=x line (switch current x and y coordinates)
(-1,3)-No clue here. Check your answers!	(1,-3)-No clue here. Check your answers!
(4,1)-No clue here. Check your answers!	(-1,-3)-No clue here. Check your answers!

(-4,1)	(4,-1)
(-4,-1)	(4,2)
(-4,2)	(4,-2)

(4,-1)-Great! Now go to the origin for you final clue!	(-4,1)-No clue here. Check your answers!
(4,2)-No clue here. Check your answers!	(-4,-1)- $(\frac{9}{8} \div \frac{1}{3} - \frac{3}{8} , \frac{1}{3} + \frac{1}{2} - \frac{11}{6})$
(4,-2)-Great! Now go to the origin for you final clue!	(-4,2)-No clue here. Check your answers!

(-4,-2)	(4,3)
(-4,3)	(4,-3)
(-4,-3)	(4,4)

(4,3)- if y=6, solve for x: (y+3x=-6 , 3x+2y=3)	(-4,-2)-No clue here. Check your answers!
(4,-3)-reflect over y=x line (switch current x and y coordinates)	(-4,3)- if y=6, solve for x: (y+3x=18, 3x+2y=3)
(4,4)-No clue here. Check your answers!	(-4,-3)-reflect over y=x line (switch current x and y coordinates)

(-4,4)	(4,-4)
(-4,-4)	(3,4)
(-3,4)	(3,-4)

(4,-4)- solve for x: $(\frac{150}{375} = \frac{x}{10}$, y coordinate: if you multiply any number by x, you get x. what is x?)	(-4,4)- $(4-6 \div 2$, current x coordinate)
(3,4)-In the third quadrant. y coordinate>-2. The product of x and y coordinates is 4.	(-4,-4)-No clue here. Check your answers!
(3,-4)-No clue here. Check your answers!	(-3,4)- $(\frac{2+7}{3} - 2, \frac{2-7}{5})$

(-3,-4)-	(2,4)-
(-2,4)-	(2,-4)-
(-2,-4)-	(1,4)-

(2,4)-No clue here. Check your answers!	(-3,-4)- $(\dfrac{2+7}{3}+1, \dfrac{2-7}{5}-3)$
(2,-4)-No clue here. Check your answers!	(-2,4)-No clue here. Check your answers!
(1,4)- (2x+2=-6, 3x+8=17)	(-2,-4)-No clue here. Check your answers!

(1,-4)	(-1,4)
(-1,-4)	Initial Clue: Group 1
Initial Clue: Group 2	Initial Clue: Group 3

(-1,4)-No clue here. Check your answers!	(1,-4)- (2x+2=10, 3x+8=17)
Your antenna is not working and the space station is trying to send you directions on how to fix it, so NASA is sending directions to your alternate antenna which only transmits encrypted data and the message is appearing as nonsensical sequences of numbers! Follow these steps to reconnect with the space station and survive this disaster! 15-25-21 5-14-4-5 15-20 19-16-18-5-19 8-5-20 23-5-16-15-18 21-20-2-15-14-20 First Clue- The x and y coordinates add up to 0. The x coordinate is exactly 2 units smaller than the y coordinate.	(-1,-4)-No clue here. Check your answers!
Your antenna is not working and the space station is trying to send you directions on how to fix it, so NASA is sending directions to your alternate antenna which only transmits encrypted data and the message is appearing as nonsensical sequences of numbers! Follow these steps to reconnect with the space station and survive this disaster! 15-25-21 5-14-4-5 15-20 19-16-18-5-19 8-5-20 23-5-16-15-18 21-20-2-15-14-20 First Clue- The x and y coordinates add up to 0. The x coordinate is exactly 6 units smaller than the y coordinate.	Your antenna is not working and the space station is trying to send you directions on how to fix it, so NASA is sending directions to your alternate antenna which only transmits encrypted data and the message is appearing as nonsensical sequences of numbers! Follow these steps to reconnect with the space station and survive this disaster! 15-25-21 5-14-4-5 15-20 19-16-18-5-19 8-5-20 23-5-16-15-18 21-20-2-15-14-20 First Clue- The x and y coordinates add up to 0. The x coordinate is exactly 4 units smaller than the y coordinate.

Initial clue: Group 4	(0,0)
(0,0)	(0,0)

0,0)-how to crack the code: 1=a, 2=b, 3=c...25=y,26=z.	Your antenna is not working and the space station is trying to send you directions on how to fix it, so NASA is sending directions to your alternate antenna which only transmits encrypted data and the message is appearing as nonsensical sequences of numbers! Follow these steps to reconnect with the space station and survive this disaster! 15-25-21 5-14-4-5 15-20 19-16-18-5-19 8-5-20 23-5-16-15-18 21-20-2-15-14-20 First Clue- The x and y coordinates add up to 0. The x coordinate is exactly 8 units smaller than the y coordinate.
(0,0)-how to crack the code: 1=a, 2=b, 3=c...25=y,26=z.	(0,0)-how to crack the code: 1=a, 2=b, 3=c...25=y,26=z.