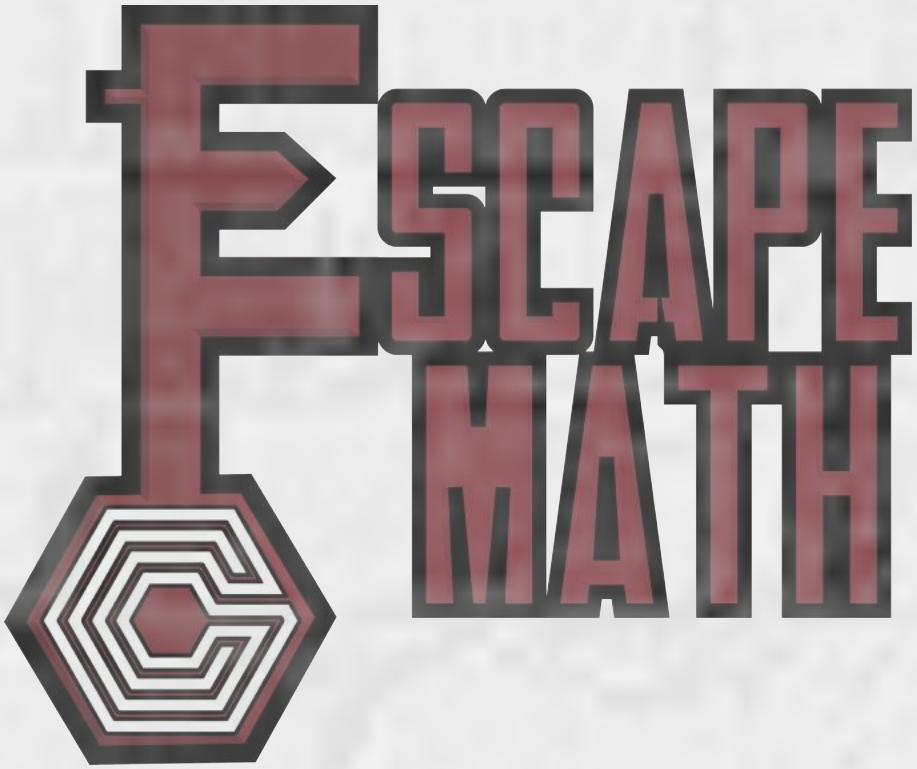
GRAPHING LINEAR FUNCTIONS



vocabulary/conceptual understanding/skill practice
small group activity

GRAPHING LINEAR FUNCTIONS

Ideal Unit: Operations & Variables	**Time Range:** 1 Period	**Supplies:** Envelopes, Pencil & Paper

Topics of Focus: Graphing lines, interpreting slope and rewriting into slope intercept.

Common Core Alignment:

8.F.A.3	Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.
8.F.B.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models.
F-IF.C.7a	Graph linear and quadratic functions and show intercepts, maxima, and minima.

Procedures:

A.) You will need to determine the number of student groups you plan to have. This will work best with student groups of 3-5. You will need to have one set of envelopes and set of all the clues for each student group. You will need 4 envelopes for each student group. There are seven pages of clues. These will need to be cut apart in advance and placed in the correct envelopes. It would be wise to have an extra copy of this for you as teacher (not cut up).

B.) To begin, give each student group "Envelope 1". Students are given some pieces of clues that they will need later. Like in an Escape Room, this isn't always obvious. Let them struggle! If a group is falling behind, you can always provide a hint. After they have figured out how their clue fits together and solve the problems correctly. They will discover a "code". This is like a lock. Once they give you the correct code, you can give them their next envelop. If they are incorrect, you can make them wait 2 minutes before they can reapproach you. Can students escape the topic before time runs out? We'll find out.

As an option, you can use the Escape Math app for interactive locks! See the next page for links and the Class Code!

Options.) Should you want to have alternate endings, although the docs are not editable, you can use teacher magic tricks to change numbers to make different codes. I wouldn't recommend this until you've done the activity a few times. You may also find it works well to laminate the cutout and number them on the back with the envelope they are supposed to go in.

FOR INTERACTIVE LOCKS

CLASS CODE: 6-1-3-6

HTML

WANT A SPOOKY COUNTDOWN TIMER?

ESCAPE COUNTDOWN

CLICK THE BUTTONS TO GO THERE!

THE STORY

As an option, you can read this to your class to prepare them for the activity.

You've been taken in the middle of an ordinary day and are now locked in a math class. This isn't your fault – this is what the law tells us needs to happen. Unfortunately you are not allowed to leave until you have an understanding of graphing linear functions and demonstrate the skills. You have _____ minutes to do so. If you know a bit about monster fiction that can help.

There are four sets of envelopes with clues. You must determine the correct code to receive the next envelope. If you cannot Escape Math in the time allowed, you will be stuck in here forever.

ESCAPE MATH

VOCABULARY

Cut into 10 pieces **ENVELOPE 1**

Answer: as displayed

a. Linear Function	4. A function whose graph is a straight line.
b. Slope	1. The change in y divided by the change in x. The constant of variation.
c. Rate of Change	5. The same as the slope, but often used in real world problems where the variables represent units.
d. Standard Form	2. $Ax + By = C$ where A, B and C are real numbers.
e. Slope-Intercept Form	3. $y = mx + b$ where m is the slope of the line and b is the point of intersection with the y-axis.

Cut out and place in **ENVELOPE 1**

1 VOCABULARY

Match the word with the definition. Substitute the numbers from the definition in for the correct letter. Simplify the expressions to get the three digit code.

a + b	c	d + e

Cut and place into

ENVELOPE 2

IMAGE & CLUE

Piece together the two parts to the image. How many letters are in the name of this monster? Divide this number by 2.

?

Answer: Zombie, 6 letters
Divided by 2 -- 3

This info (?) is needed for the CONCEPT puzzle.

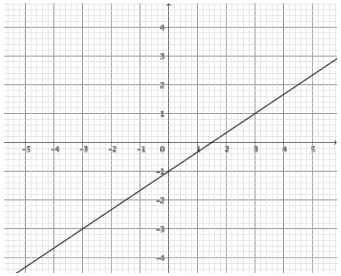
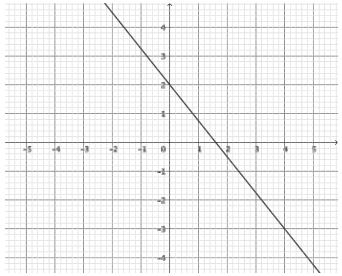
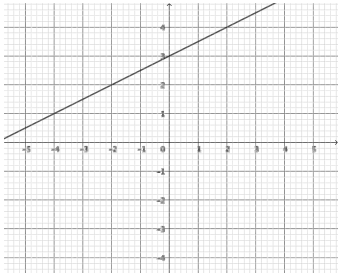
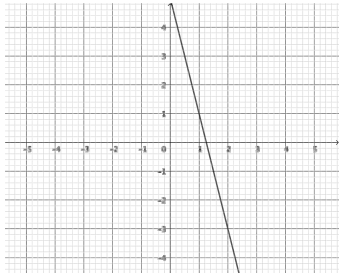
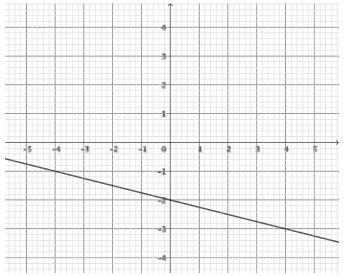
Cut and place into **ENVELOPE 2**

Cut and place into **ENVELOPE 1**

Cut into 6 pieces and put in **ENVELOPE 2**

2 CONCEPTUAL UNDERSTANDING

Place the corresponding information beneath the correct graph to reveal the next code.

$2x-3y=3$	$y=-\frac{5}{4}x+2$	$m=\frac{1}{2}$ $(-4,1)$	$12x+3y=15$	$m=-\frac{1}{4}$ $(24,-8)$
?	1	8	1	8

(When Mary Shelley published Frankenstein)

Cut into 10 pieces and put in
ENVELOPE 3

SKILL PRACTICE

$y = x - 2$	Perpendicular to $y = 4x + 5$ through $(12,0)$
Perpendicular to $y = 2$ through $(4,9)$	Through $\left(1,1\frac{1}{5}\right)$ and $(10,3)$
$y = -5$	$5x + 4y = -28$
Parallel to $y = \frac{1}{3}x + 8$ through $(3,-4)$	$x + 8y = -16$
Parallel to $y = -2x + 4$ through $(10,-19)$	Through $(-6,-18)$ and $\left(\frac{1}{2},1\frac{1}{2}\right)$

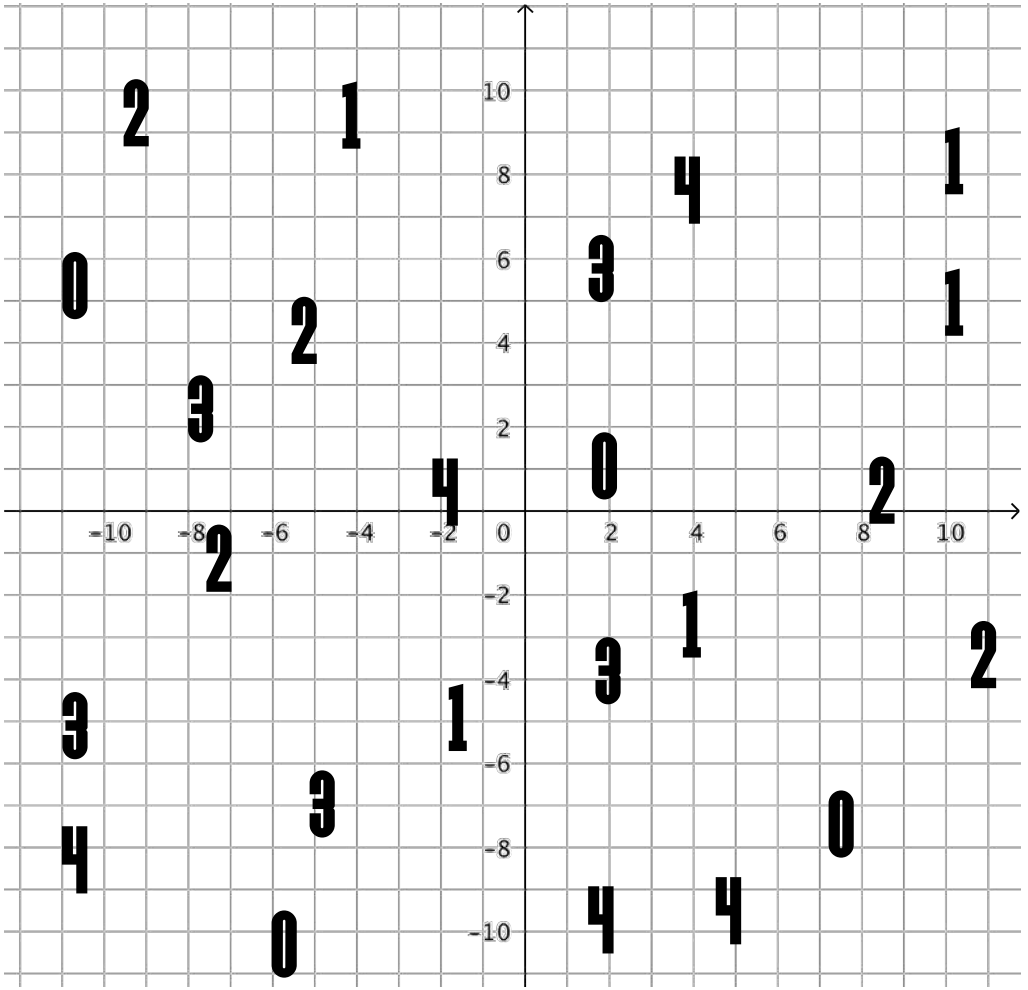
Cut and place in
ENVELOPE 3

③ SKILL PRACTICE

When the 10 lines are graphed, they will cross out numbers.

Four will be left; one in each quadrant. The code is these numbers from Quadrant I to Quadrant IV.

Time is of the essence. A new day is about to begin...



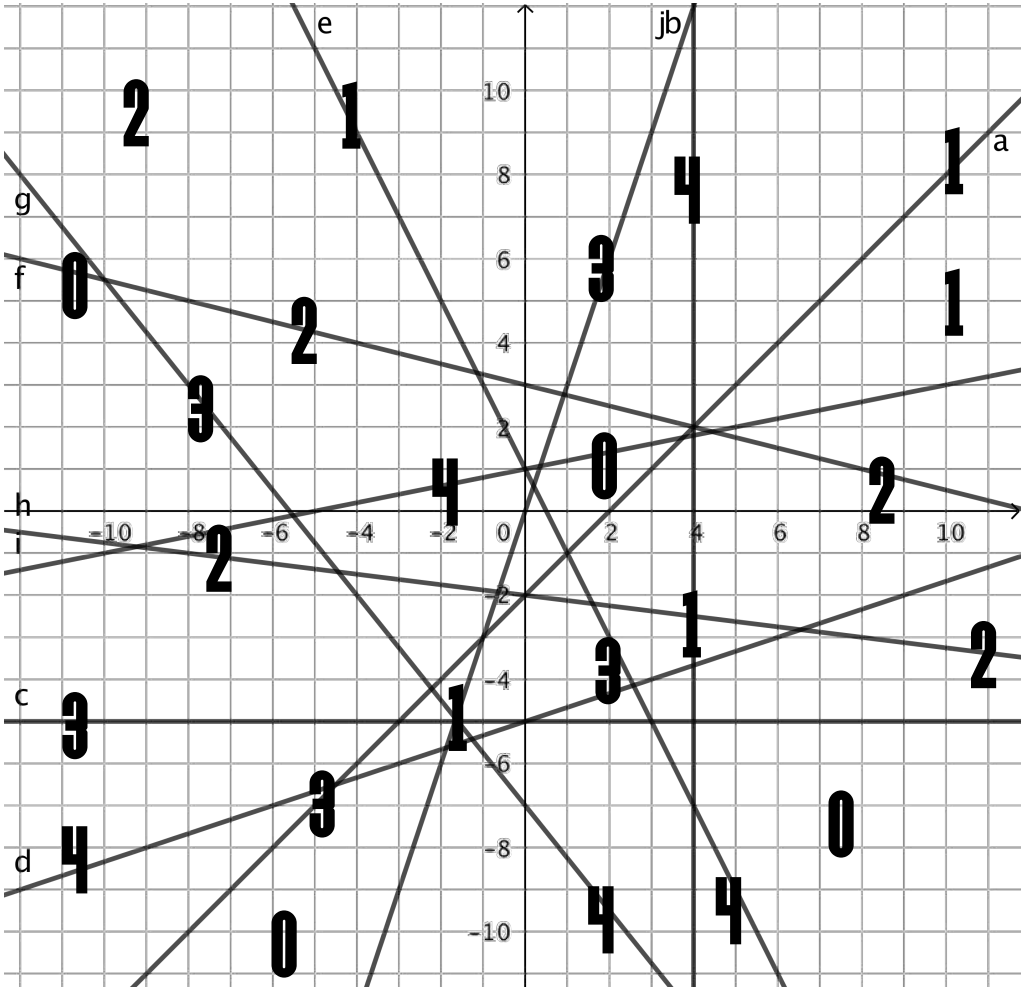
1-2-0-0
Code 1200 (Midnight)

ESCAPE MATH

SKILL PRACTICE CLUE

NOT FOR STUDENTS

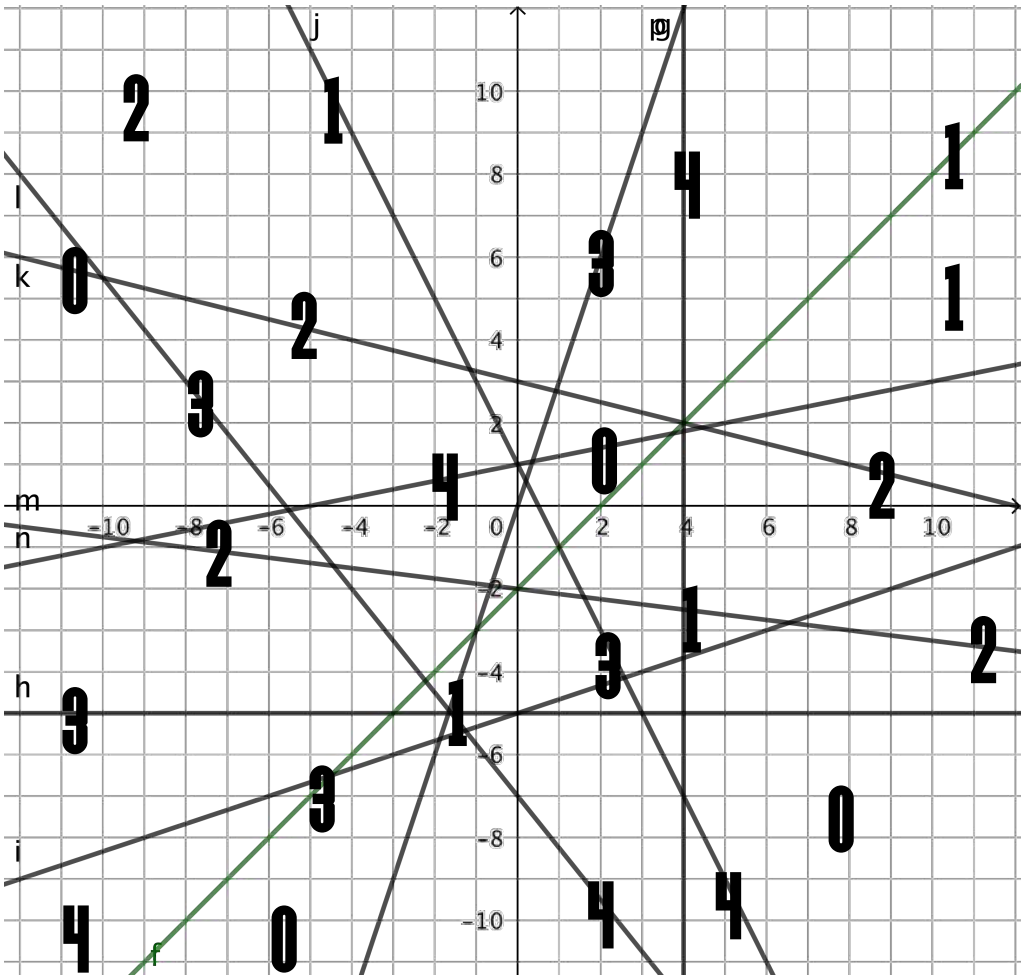
- a : $y = x - 2$
- b: $x = 4$
- c: $y = -5$
- d: $y = 0.33x - 5$
- e: $y = -2x + 1$
- f: $y = -0.25x + 3$
- g: $y = -1.25x - 7$
- h: $y = -0.13x - 2$
- i: $y = 0.2x + 1$
- j: $y = 3x$



Code (Midnight)

SKILL PRACTICE KEY

NOT FOR STUDENTS



Cut and place in **ENVELOPE 4**

4 FINAL CHALLENGE

If you can piece together the final problem, work with the slopes -- you may, just may, escape in time. The final code has a special significance to monster fiction. You might learn a bit of history if you can

ESCAPE MATH.

FINAL CHALLENGE

Cut into 4 pieces and place in four different envelopes

ENVELOPE 1

Find the slopes of these lines and put them in order from least to greatest.

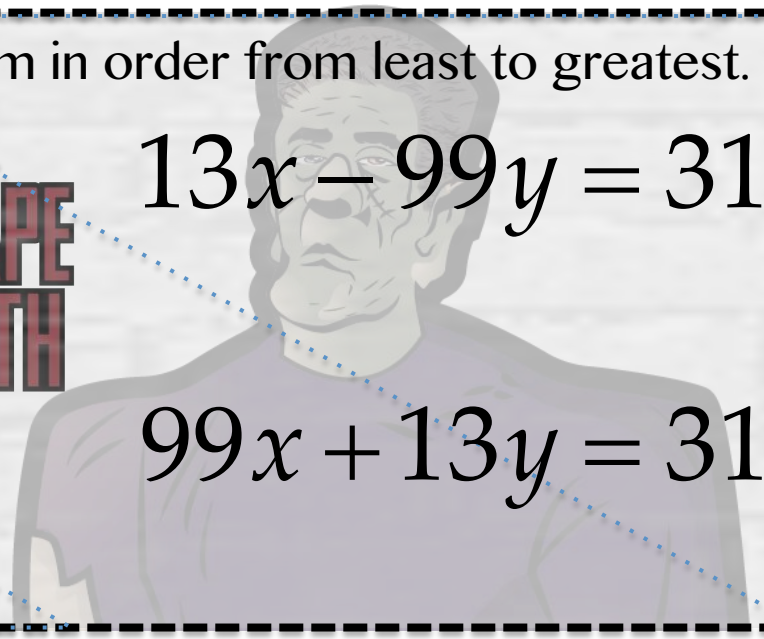
$$13x - 31y = 99$$

$$31x + 99y = 13$$

ENVELOPE 4

$$13x - 99y = 31$$

$$99x + 13y = 31$$



ENVELOPE 3

ENVELOPE 2

FINAL CHALLENGE CLUE

Cut into 8 pieces and place in **ENVELOPE 4**

$-\frac{99}{13}$	**1**	$-\frac{13}{31}$	**3**
$-\frac{31}{99}$	**0**	$-\frac{99}{31}$	**0**
$\frac{13}{99}$	**3**	$\frac{31}{13}$	**2**
$\frac{13}{31}$	**1**	$\frac{99}{13}$	**2**

I HAVE