

# STAINED GLASS GRAPHING

GRAPHING IN SLOPE- INTERCEPT FORM

By Jessica Wilkerson

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## Objective:

Students will practice graphing lines in slope-intercept form. Examples include lines with positive, negative, zero, and undefined slopes. When completed, the correctly graphed lines will create a “stained glass window” which can be colored for a fun art-math crossover project.

## Materials:

Students will each need the following materials:

- A blank graph
- A copy of the “Stained Glass Blueprints”
- Ruler
- Pencil
- Colored pencils, crayons, or markers

## Time:

Most students can finish graphing and coloring in a **60-minute class period**.

## Teacher Notes:

- I encourage students to show me their work before they begin coloring.
- The design is symmetrical; this makes it easy for you to check.
- The most common mistake I see is in how students deal with negative slope. Many will take an equation like  $y = -\frac{3}{2}x + 1$  and draw their slope negative in both directions. If students seem to be missing a line, this may be the problem!
- There are some great opportunities for students to analyze what will make the design symmetrical and discuss the effects of changing the sign of the slope or y-intercept.
- Students who finish quickly might enjoy creating their own design. An additional sheet with instructions for creating their own design is included.

**8.EE6:** Use similar triangles to explain why the slope  $m$  is the same between any two distinct points on a non-vertical line in the coordinate plane; **derive the equation  $y = mx$  for a line through the origin and the equation  $y = mx + b$  for a line intercepting the vertical axis at  $b$ .**

**8.F3:** 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.F4:** 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, and **in terms of its graph** or a table of values.

# STAINED GLASS BLUEPRINTS

NAME: \_\_\_\_\_

DATE: \_\_\_\_\_ PERIOD: \_\_\_\_\_

- 1) Graph each line on your paper using pencil. Make sure that your lines are straight by using a ruler. Extend the lines to the edge of your paper. You may trim the edges later to make it neat.
- 2) When you have finished graphing all the lines, color your design to create a stained glass window.
- 3) You may wish to go over certain parts of the design with a dark pen, crayon, or marker to emphasize different portions.

1)  $y = -\frac{3}{2}x + 12$

7)  $y = \frac{4}{5}x - 4$

2)  $y = \frac{3}{2}x + 12$

8)  $y = -\frac{4}{5}x - 4$

3)  $y = -\frac{3}{2}x - 12$

9)  $y = 12$

4)  $y = \frac{3}{2}x - 12$

10)  $y = -12$

5)  $y = \frac{4}{5}x + 4$

11)  $x = -10$

6)  $y = -\frac{4}{5}x + 4$

12)  $x = 10$

After you have graphed all the lines, plot these points. Connect them in the order that they are plotted. For example, graph (-2,0). Then graph (0,4) and connect it back to (-2,0). When you reach a STOP, you have completed a shape. Pick up the pencil and start the next column without connecting it to the previous one.

(-2, 0)	(0, 10)	(-1, 0)	(0, -4)	(0, 4)
(0, 4)	(5, 0)	(0, 3)	(1, -6)	(1, 6)
(2, 0)	(0, -10)	(1, 0)	(0, -10)	(0, 10)
(0, -4)	(-5, 0)	(0, -3)	(-1, -6)	(-1, 6)
(-2, 0)	(0, 10)	(-1, 0)	(0, -4)	(0, 4)
STOP	STOP	STOP	STOP	STOP

# DESIGN YOUR OWN STAINED GLASS

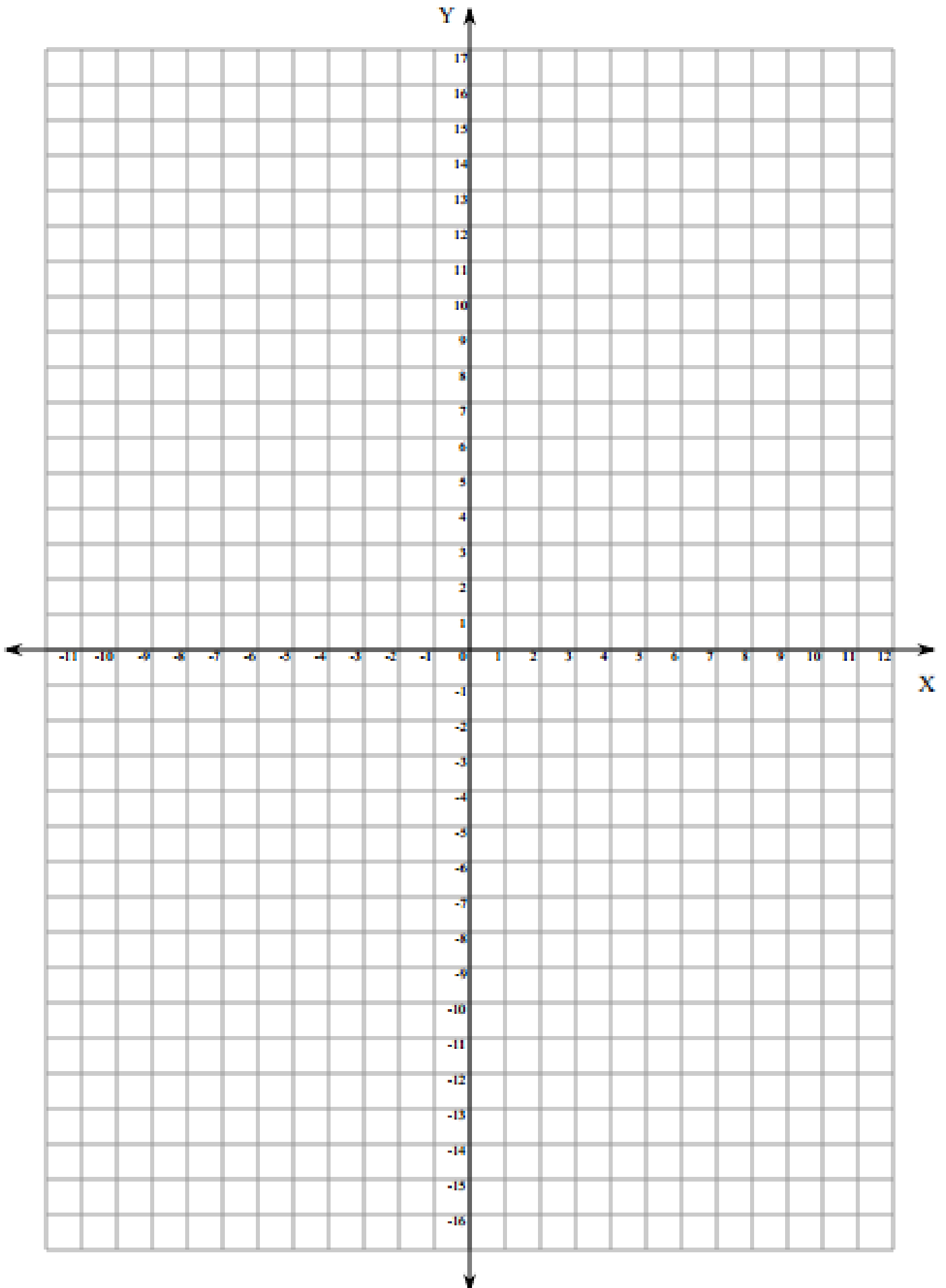
1. Create your own stained glass design, using at least 10 equations.
2. Create a list of the equations you used.
3. Graph and color your design.

## SOME POINTERS:

- ✓ Changing signs will reflect your design, for instance...
  - Changing  $y = \frac{1}{2}x + 3$  to  $y = -\frac{1}{2}x + 3$  will reflect the line across the y-axis.  
(Opposite sign for the slope)
  - Changing  $y = \frac{1}{2}x + 3$  to  $y = -\frac{1}{2}x - 3$  will reflect the line across the x-axis.  
(Opposite signs for the slope and the y-intercept)
- ✓ You can create shapes as in the original activity by making a list of ordered pairs to connect.

## STAINED GLASS WINDOW EQUATIONS

- 1) \_\_\_\_\_
- 2) \_\_\_\_\_
- 3) \_\_\_\_\_
- 4) \_\_\_\_\_
- 5) \_\_\_\_\_
- 6) \_\_\_\_\_
- 7) \_\_\_\_\_
- 8) \_\_\_\_\_
- 9) \_\_\_\_\_
- 10) \_\_\_\_\_





# Examples

