STAINED GLASS GRAPHING

By Jessica Wilkerson

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

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

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

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

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

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

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

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

9) $y = 12$

10) $y = -12$

11) $x = -10$

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