Stained Glass

Window
Stained Glass Window

Circle three linear equations in each box and write them over the t-tables below. Complete each table with at least three ordered pairs (with coordinates of 10 or less) that are solutions to the linear equation. Then graph these twelve linear equations on the coordinate plane provided. Write the equation neatly on each line that you graph. When you are done graphing the equations use markers to color each section and create your stained glass window.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
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<tbody>
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<table>
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<tr>
<th>y = x + 5</th>
<th>y = 2x - 7</th>
<th>y = 4x + 8</th>
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<tbody>
<tr>
<td>y = 2x + 18</td>
<td>y = ¼ x - 6</td>
<td>y = -½ x - 3</td>
<td>y = -2x</td>
</tr>
<tr>
<td>y = ½ x - 3</td>
<td>y = -x + 12</td>
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On the coordinate plane below, graph the linear equations that you circled on the Linear Equations Worksheet. Use the three ordered pair solutions that you listed for each equation to graph it. Write the equation neatly on each line that you graph. When you are finished graphing the equations, use markers to color each section to create your stained glass window.
Stained Glass Window

Sample Linear Equation Worksheet

Circle three linear equations in each box and write them over the t-tables below. Complete each table with at least three ordered pairs (with coordinates of 10 or less) that are solutions to the linear equation. Then graph these twelve linear equations on the coordinate plane provided. Write the equation neatly on each line that you graph. When you are done graphing the equations use markers to color each section and create your stained glass window. (Underlined equations are used for sample project.)

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(This answer key goes with the sample Linear Equations Worksheet provided.)
All 24 linear equations included in this project are graphed on this page. You may choose to have students graph all 24 equations, in which case you can make a transparency of this sheet and use it as an overlay to evaluate the work.

(All 24 lines are included on this answer key.)
Stained Glass Window

**Lesson Description:** Stained Glass Window is a project that requires students to graph Linear Equations in order to create a colorful (yet mathematical) display window. Each student selects and graphs at least twelve linear equations from the equation bank to create their own unique window. This visual/kinesthetic project will help students to clearly identify the equations of horizontal and vertical lines and to easily distinguish between positive and negative slope. Key vocabulary will also be developed.

**Math Content:** Linear Equations, Graphing Linear Equations, Finding Solutions for Linear Equations, Slope, Y-Intercept, Coordinate Plane, Ordered Pairs, and Coordinates

**Time Required:** 1-2 Class Periods

**Stained Glass Window includes:**
* 1 Stained Glass Window Linear Equations student worksheet
* 1 Stained Glass Window Project student worksheet
* 1 Stained Glass Window Project Linear Equations student worksheet sample
* 1 Stained Glass Window Project Sample that goes with student worksheet sample
* 1 Stained Glass Window Project Answer Key with all 24 equations graphed
* 2 Stained Glass Window Teacher Tips pages
* 1 Stained Glass Window Cover Sheet

8 pages in all!

**Materials Needed:** Rulers, Colored Markers

**Suggested Grade Level:** 5th - 8th

**Teacher Testimonial:**
Stained Glass Window is a project that provides needed practice for students in the area of Graphing Linear Equations. Students are able to be creative in selecting the equations that they want to graph and then choose colors in order to create their own unique Stained Glass Window. Then, they have the opportunity to put their window together with others in the class to create large Stained Glass Windows in the classroom.

**Teacher Tips:**
* The Stained Glass Window Project can be administered by the teacher in a number of ways:
  1) Hand out the Linear Equations Worksheet and allow the students to choose the twelve linear equations that they will graph according to the worksheet directions. This will allow each student to have their own unique Stained Glass Window Project.
  2) Prior to handing out the Linear Equations Worksheet, circle the twelve equations identified on the Sample Linear Equations Worksheet. By doing this, every student will end up with the exact same Stained Glass Window Project and you will already have a completed answer key (see the Sample Stained Glass Window Project). You can make a transparency of the Sample Stained Glass Window Project and place it over the student projects to quickly evaluate them.
Teacher Tips (continued):

3) If you have multiple classes you may want to circle a different group of twelve equations to graph for each class. Then you can quickly create an answer key for each class.

I personally prefer to go with option #1 and let each student create their own unique Stained Glass Window Project. It depends upon how you decide to evaluate the projects and whether or not you want a whole class to have the same final product.

* It is also possible to have your students graph all 24 linear equations, but of course that would double the time involved in finding solutions and graphing the equations. You would need to give each student another Linear Equations Student Worksheet. An Answer Key showing the graphs of all 24 lines has been included and could be placed on a transparency in order to facilitate quick evaluation of the projects.

* Each of the four boxes in the equation bank contains a group of similar linear equations. Discuss with student the equations for vertical lines, horizontal lines, positive slope, and negative slope. Teach students to recognize the equations that go with each graph type.

* Make sure that students draw each line to the outer edge of the graph.

* The teacher may want to evaluate the labeled lines that have been graphed prior to the color being added. After the windows are colored, it may be harder to see the equations.

* To display the completed Stained Glass Window have the students write their names on the back of their windows, carefully cut them out, and then mount them to your classroom windows. The light coming through the projects will create a great window decoration. If you run out of window space you can always use bulletin boards. Try to center the display and use border paper around the windows if necessary.

* Students that are familiar with the slope-intercept form of linear equations could also use the slope and y-intercept to graph (or to check) their lines. However, a few of the equations include a y-intercept that is not on this graph since the graphs only go up to ten.

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Enjoy your lesson!!
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