

Slope Screen

Explore the parameters of the slope formula and how modifying the graph affects the equation or modifying the equation affects the graph.

HIDE the slope formula

DRAG either point to change the slope of the line

USE the point tool to get the integer coordinates of any point

MODIFY the coordinates from within the formula

SAVE a line to compare multiple lines simultaneously

Slope-Intercept Screen

Explore the parameters of the slope-intercept form of a line.

Simplified equation of line

DRAG the blue point to change the slope of the line

DRAG the pink point along the y-axis to change the y-intercept of the line

MANIPULATE the slope and/or y-intercept from the equation

SHOW reference lines of $y=x$ or $y=-x$

Point-Slope Screen

Explore the parameters of the point-slope form of a line.

DRAG the purple point and see the point within the equation of the line change

DRAG the blue point to change the slope

MANIPULATE the purple point and/or the slope from the equation

The interface includes a 'Graphing Lines' title bar, a home button, and a PhET logo. A sidebar on the right shows options for 'Slope', 'y = x', 'y = -x', and a grid.

Game Screen

Challenges are random within each level, but increase in difficulty.

Levels 1-2: Set the point, set the y-intercept, or set the slope, by manipulating either the equation or the graph.

Levels 3-4: Make the equation or graph the line.

Levels 5-6: Make the equation, graph the line, or put points on the line.

Levels 1-2:

Your Equation:
 $(y - 0) = \frac{1}{3}(x - 0)$

Your Equation:
 $y = \frac{2}{3}x + 0$

Your Equation:
 $y = \frac{1}{1}x - 3$

Choose Your Level

Level 1

★★★★★

Level 2

★★★★★

Level 3

★★★★★

Level 4

★★★★★

Level 5

★★★★★

Level 6

★★★★★

Levels 3-4:

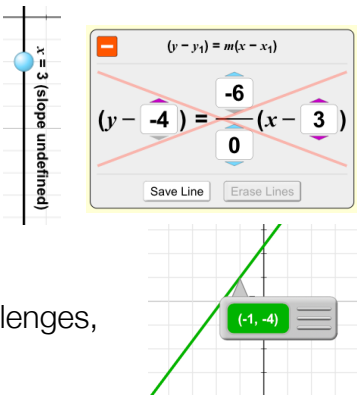
Your Equation:
 $(y - 0) = \frac{1}{1}(x - 0)$

Levels 5-6:

The interface includes a 'Graphing Lines' title bar, a home button, and a PhET logo. A sidebar on the right shows options for 'Slope', 'y = x', 'y = -x', and a grid.

Complex Controls

- If two points are stacked vertically on any screen, the slope will be displayed as undefined and a red x will appear over the equation.



Insights into Student Use

- Students may have difficulty with the game, particularly Set the Equation challenges, if they do not use the point tools.

Customization Options

Query parameters allow for customization of the simulation, and can be added by appending a '?' to the sim URL, and separating each query parameter with a '&'. The general URL pattern is:

`...html?queryParameter1&queryParameter2&queryParameter3`

For example, in Graphing Lines, if you only want to include the 1st and 2nd screens (`screens=1, 2`), with the 2nd screen open by default (`initialScreen=2`) use:

https://phet.colorado.edu/sims/html/graphing-lines/latest/graphing-lines_all.html?screens=1,2&initialScreen=2

To run this in Spanish (`locale=es`), the URL would become:

https://phet.colorado.edu/sims/html/graphing-lines/latest/graphing-lines_all.html?locale=es&screens=1,2&initialScreen=2

⚙ Indicates this customization can be accessed from the Preferences menu within the simulation.

Query Parameter and Description	Example Links
<code>gameLevels</code> - specifies which levels appear in the game screen.	<code>gameLevels=1, 2</code>
<code>screens</code> - specifies which screens are included in the sim and their order. Each screen should be separated by a comma. For more information, visit the Help Center .	<code>screens=1</code> <code>screens=2, 1</code>
<code>initialScreen</code> - opens the sim directly to the specified screen, bypassing the home screen.	<code>initialScreen=1</code> <code>initialScreen=3</code>
⚙ <code>locale</code> - specify the language of the simulation using ISO 639-1 codes. Available locales can be found on the simulation page on the Translations tab . Note: this only works if the simulation URL ends in “_all.html”.	<code>locale=es</code> (Spanish) <code>locale=fr</code> (French)

Query Parameter and Description	Example Links
 <code>regionAndCulture</code> - Select the portrayal of people, places, or objects in the sim. Images are not intended to represent the entire diversity of a region or culture. Possible values: <code>africa</code> , <code>africaModest</code> , <code>asia</code> , <code>latinAmerica</code> , <code>oceania</code> , <code>random</code> , <code>usa</code>	<code>latinAmerica</code>
<code>allowLinks</code> - when <code>false</code> , disables links that take students to an external URL. Default is <code>true</code> .	<code>allowLinks=false</code>

See all published activities for Graphing Lines [here](#).

For more tips on using PhET sims with your students, see [Tips for Using PhET](#).