**Similar Triangles and Slope Lesson Plan**

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| **Overview** |
| **Prerequisite Skills:**   * Plotting ordered pairs on a coordinate grid. * Calculating the slope of a line as change in y or y2 - y1   change in x x2 - x1 |
| **Learning Goals:**   * Students will be able to:   + Compare triangles from common slopes of a line to determine similarity.   + Justify their reasoning for how sets of similar triangles have an equivalent slope. |
| **Common Core Standards:**   * [CCSS.MATH.CONTENT.8.EE.B.5](http://www.corestandards.org/Math/Content/8/EE/B/6/) 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*. |
| **Materials:**   * PhET *Graphing Lines* simulation:   + <https://phet.colorado.edu/sims/html/graphing-lines/latest/graphing-lines_en.html?screens=1> * Similar Triangles and Slope activity sheet, 1 per student * Rules or straight-edge tool |
| **Estimated Time:** Approximately 60 minutes |
| **Possible Misconceptions:**   * Students may mistakenly switch x and y values when placing ordered pairs on coordinate grid. * Teacher may need to explain the difference between similarity and congruency after triangles have been introduced. |

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| **Lesson Flow** | | |
| **Timing** | **Student Task(s)** | **Teacher Task(s)** |
| 7 mins | Complete warm-up/bell-ringer activity in notebook.  “Ms. Garcia drives a total of 6 miles to and from work each day. Complete the following table for each missing amount.”   |  |  | | --- | --- | | **Day** | **Miles** | | 1 | 6 | | 2 |  | | 3 |  | | 4 |  | |  | 30 | | 6 |  | |  | 42 | | 8 |  | | Attendance, facilitate warm-up discussion. |
| 10 mins | Open play with simulation. Write down observations and questions in table for item #1. | Direct students to appropriate simulation option. Ask exploratory questions to further student inquiry. |
| 8 mins | Share observations with table group, then whole class (think-pair-share).  Students run projected simulation on personal device or teacher device while describing observations. | Facilitate discussion between table groups and whole class. Record observations and questions on whiteboard or teacher screen.  Help troubleshoot student tech use if needed. |
| 10 mins | Complete item #3 and #4 individually.  #3: Students complete table for ordered pairs of pink and green dots, horizontal change, and vertical change while maintaining a slope of 1. | Assist students as needed. Possible student difficulties include:  •locating points on coordinate grid  •saving lines  •identifying horizontal and vertical change  •keeping an equivalent slope to the original line |
| 10 mins | Working with a partner, students complete items #5 and #6.  #5: Partners create two right triangles that have an equivalent slope using the simulation and copy them onto their activity sheet.  Pink and green dots can be placed anywhere on coordinate grid. | Circulate while student pairs are working.  Students may need reminders or re-teaching in order to create similar right triangles that form the same slope.  This chunk of the activity would also be a good opportunity for one pair of students to share their results with another pair of students (Pairs Compare strategy).  **Extension Topic:** connect slope to constant rate of change and proportionality. |
| 8 mins | Working with a new partner, students complete items #7 and #8.  #7: Partners create two right triangles that **do not** have an equivalent slope and copy them onto their activity sheet. | Circulate while student pairs are working.  Students may need guidance bridging the concepts of similar and non-similar right triangles.  For the purposes of this activity, non-similar triangles will have different slopes than each other.  As student understanding develops, it can be explored how similar right triangles with different slopes can be created by rotating or reflecting the triangle’s vertices but keeping the same values for the triangle’s legs. |
| 7 mins | Students complete exit ticket individually using simulation. | Try not to answer student questions during exit ticket time. This will give the most accurate view of student understanding of the learning goals and inform future instruction on concepts involving linear equations. |