DAY 6: Slope Triangles

Materials

Copies: 6.1 Slope Triangles Outside
6.2 Slope Triangles Inside
Ticket Out the Door Day 6

Supplies: Coordinate grids outside (-10 to 10)- 1 per group
Rope- about 15 feet- 1 per group

Objective

Students will learn to calculate slope by walking the vertical change and then the horizontal change and by drawing and counting slope on triangles drawn between two points of that line on paper.

Student Talk Strategy

Think-Group-Share for 6.1 predictions
Three-Way Interview for 6.2

Academic Language Use

Origin- The center of the coordinate plane, represented by the point (0,0). This will be understood by the students as the "starting point" before graphing a point.
Coordinate Plane- The *xy*-coordinate plane has two coordinate axes, the *x*- and *y*-axis. They are perpendicular to each other. A point in the *xy*-plane is represented by two numbers, (*x*, *y*), where *x* and *y* are the coordinates of the *x*- and y-axes.
x-axis- The horizontal axis in the coordinate plane.
y-axis- The vertical axis in the coordinate plane.
Slope- The rate of change. In this unit, students will understand slope, initially, as the amount a pattern grows each time and then later by the change in *y* compared to the change in *x*.

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Activity Notes

10 minutes: Explaining how to do Slope Triangles Outside and Modeling
Draw a coordinate grid on the board. Put students into groups of 4 and pass out activity sheet 6.1. Give the students 1 minute to read the directions. Do problem 1 with them inside by asking a student to be the "director" and read to you the coordinates of point A. Using a marker, begin at the origin, go up 1 and then over 4 to the right. Mark the point. Then have the director read you the coordinates of point B. Begin at the origin again, go up 3 and then over 6 to the right. Draw a line to connect the two points. Ask the students to use think-group-share to predict if the slope is negative or positive. Then explain that you will be the slope runner and begin at point A and move your marker up 2 and to the right 2 (drawing the slope triangle as you do this). Call out what you are doing; i.e. up 2, right 2. Record this as the slope: $\frac{2}{2}=\frac{1}{1}$. Have the class

form 2 lines and walk out to the coordinate grids with you (they need to bring 6.1 and a writing utensil). Bring the class to one of the grids and, while all students are seated around the grid, have 1 group come up to model problem #1. (You will need to give them a piece of rope). Once all students understand, pass out the rope to each group and have them begin.

15 minutes: Students complete Slope Triangles Outside
Give the groups about 12 minutes to complete the remaining 7 problems. Instruct them to rotate roles each time and make sure they stop to think and then share with the group whether they predict the slope will be negative or positive before the slope runner begins. Circulate while they are working to ensure they are staying on task, graphing the points correctly and then walking the slope correctly. When a group thinks they are done, have them bring you their answers to 6.1 and check them. If they are correct and time remains, give them a challenge problem: find 2 points for which the slope of the line connecting them would be -1/4. Once time is up, bring all groups back inside (even if they have not finished all problems).

30 minutes: Slope Triangles Inside
Pass out activity sheet 6.2. Walk through the two examples on page 1 with the students. Then give the students 5 minutes to complete #'s 1-6. At the end of the 5 minutes, have them compare answers with an elbow partner. Put up an answer key and help students with any missed problems. Then give the students 2 minutes to work on problems 7 and 8. Have them do a 3-way interview at then end of the 2 minutes, where they interview their partner as to what they wrote and why and then you select a few students to share what their partner said. Guide a discussion about what a slope of zero means (that the line is completely flat; i.e., there is NO slope (or 0 slope). For the vertical line, while the mathematics lead to understanding that the slope is undefined as you cannot divide by zero, it may be more beneficial to the students to relate it to real life by noting that no one could go down a hill that was completely vertical. Point out to the students that problems 9 & 10 have different scales, so, when counting the slope, they need to look at what they are counting on each axis. Give them 3 minutes to complete these two problems. Find two students who have finished more quickly to draw out their work on the board and then explain. Finally, direct the students' attention to #11. Model #11 with them and then give the students 5 minutes to finish the final three problems. Select volunteers to show their work.

5 minutes: Ticket out the Door
Pass out the Ticket out the Door and have the students raise their hands when finished (so that you can check it and then dismiss them).