

Name:

Exercise on Explanations

The script below shows an explanation of slope. Use the margins to make your comments about what you think was done well and what needs more work.

This scenario took place in a high school Algebra class, populated mostly by 9th graders. After going over homework on how to graph linear relationships by plotting values from a table on a system of Cartesian coordinates, Mr. Flugelhorn begins his day's lesson on slope.

		Comments
1.	<u>Flugelhorn</u> : Okay. Now, I want you to turn in your homework and open your notebooks.	
2.	These are notes on Section 1.2 and it is about slope.	
3.	So write 1.2 on your notes.	
4.	And think where in everyday life you think of slope. Any ideas?	
5.	(A few students raise hands.) Yes, Mike.	
6.	<u>Mike</u> : Well, my brother works in construction and he uses a big wood triangle for the slope of a roof.	
7.	<u>Flugelhorn</u> : That's correct. Slope is used for roofs.	
8.	You need the roof to have some slope especially in a snowy area like here.	
9.	So that is one place where we have slopes. Yes, Lara?	
10.	<u>Lara</u> : Also mountains have slope, the higher the mountain the more dangerous the slope	
11.	<u>Joey</u> (interrupting): Well not always	
12.	<u>Flugelhorn</u> : Joey, you need to wait.	
13.	And Lara is right... Mountains have slope too. (Pauses)	
14.	So you guys seem to know something about slope.	
15.	Who can tell me what is slope? Yes, Tammy.	
16.	<u>Tammy</u> : It is when it goes upward as it goes sideways.	

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17.	<u>Flugelhorn</u> : That is very nice, indeed very close.	
18.	Just that instead of upward and sideways we call them rise and run.	
19.	Slope is the rise over the run.	
20.	So, write in your notes [writes on board "Slope = $\frac{\text{Rise}}{\text{Run}}$ "]	
21.	Remember what that line means? Yes, Jane?	
22.	<u>Jane</u> : You divide them.	
23.	<u>Flugelhorn</u> : That's correct, Jane. You divide the rise by the run. But what's the rise and what the run?	
24.	They go in order, so let's start with the rise.	
25.	Remember first you rise in the morning.	
26.	Then you run, you run around the block like I do, or you run to breakfast, or you run to the shower, or you run to catch the bus.	
27.	At any rate you rise first, then you run, okay?	
28.	Now write in your notes that Rise is how much the line increases going upwards. (Pauses while students write in their notes, Flugelhorn looks at the homework for the night)	
29.	Now as to Run...	
30.	Run is how much the line increases sideways.	
31.	So it is pretty much what Tammy said earlier, just in more fancy math lingo. (Pauses)	
32.	So, when you have a line, you pick two points and look at their coordinates.	
33.	Say their coordinates are (writes on the board)	
34.	(a, b) and (c, d)	
35.	And you look at how much the line moves sideways, that is when it goes from a to c. And how much is that? Yes, Ron	
36.	<u>Ron</u> : It's c	
37.	<u>Flugelhorn</u> : It's c minus a, you see? That's the run.	
38.	(Ron nods and Flugelhorn writes $c-a$ on the board).	
39.	Now, you look at how much the line moves upwards, that is when it goes from b to d.	
40.	Which numbers should I subtract now? Yes, Maddy?	

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41.	<u>Maddy</u> : b and d	
42.	<u>Flugelhorn</u> : Yes, Maddy, d minus b. That's the rise.	
43.	(Flugelhorn turns the expression on the board into $m = \frac{d-b}{c-a}$).	
44.	And that is the slope.	
45.	And so... slope means rise over run and this is how you find it.	
46.	To find the slope you just find the run, find the rise, then divide the rise by the run, and that's your slope.	
47.	A very simple concept.	
48.	Now, there is a little trick with the sign.	
49.	So I want you to pay attention to this because it's one of the main reasons why students get their answers wrong.	
50.	If d happens to be bigger than b, no problem, but if d is smaller than b, that means the rise will be negative and then the slope will be negative.	
51.	So the moral of the story is, slope is just rise over run and pay attention to the sign—if d is smaller, put a minus in front of it.	
52.	There is a way to make it even easier.	
53.	If you are given the choice of which points to use to calculate the slope and if you can pick (a,b) to be at the origin, go right to it. Your calculation will be almost done for you.	
54.	It will just be d divided by c. Okay?	
55.	Now for homework you will get a bunch of lines and you need to pick the coordinates and get their slopes.	
56.	Sometimes just to make it harder for you guys, they will give you the points and you need to use those points to get the slope. Or they may even give you a table and so what you have to do is plot the points and draw the line through them.	
57.	Make sure you do that and that you make your line solid, or otherwise I will take points off.	
58.	Then get the slope.	
59.	Now remember the key idea is very simple—rise first then run, rise over run.	

60.	And watch your signs.	
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