Description: Night Session – Pascal's Identity, Clip 2 of 7: Making sense of factorial notation and "why you multiply" Parent Tape: Night Session – Pascal's Identity Date: 1999-05-12 Location: David Brearley High School Researcher: Professor Carolyn Maher	Authors: Uptegrove, Elizabeth B. Verified: Poprik, Brad Date Transcribed: 2003 Page: 1 of 3

Line	Time	Name	Transcript	Coding and Explanation
1.	00:00	R1:	But I guess, so why are you multiplying?	
2.		Romina:	We don't like that question.	
3.		Jeff:	Ah.	
4.		R1:	You don't like that question.	
5.		Romina:	No. That, that one gets us all the time.	
6.		R1:	Why aren't you adding?	
7.		Jeff:	Uh, because you don't add. It's just, you don't do it. [Romina laughs]. There's no adding going on it any where anymore. That's like out of style. [Romina laughs.]	
8.		R1:	That's not the answer.	
9.		Jeff:	I know that doesn't, that doesn't work. Um, you do it because, uh-	
10.		Michael:	I can't help you on this one.	
11.		Jeff:	Yeah, I know.	
12.		Romina:	Yeah, we're-	
13.		Michael:	That's a good question.	
14.		R1:	OK, I'll leave you to tell me.	
15.		Michael:	Why do you multiply?	
16.		R1:	You'll figure that out.	
17.		Romina:	We never know this one.	
18.		Jeff:	Yeah it's like the //eternal question.	
19.		Ankur:	//Yeah it's cause, if, if you have three things, there's three things you put here, right?	
20.		Romina:	Mm hm.	
21.		Ankur:	There's red, white and blue. And then there's only-	
22.		Romina:	Uh, are we [Inaudible.].	
23.		Ankur:	-two things.	
24.		Michael:	//And if there's two more-	
25.		Ankur:	//Out of that two-	
26.		Romina:	//We're doing just two colors. We're doing two colors.	
27.		Jeff	Yeah, just do- No, we're- Yeah.	

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Line	Time	Name	Transcript	Coding and Explanation
28.		Michael:	//If you have like three things, right	
29.		Romina:	//To explain it, maybe you want to do three different colors?	
30.		Jeff:	No. Yeah, all right, maybe we can do that. All right, how you saying this?	
31.		Ankur:	There's red, white and blue, right?	
32.		Romina:	OK.	
33.		Ankur:	You take, if red goes over here, that means you only have, with red there could go either go white and blue.	
34.		Romina:	Mm hm.	
35.		Ankur:	Like it's each one of those three goes with two more. You know what I mean? There's three things-	
36.		Michael:	You could see how you got this.	
37.		Ankur:	-here and then there's two things here.	
38.		Michael:	You can say you have-	
39.		Jeff:	All right, yeah.	
40.		Ankur:	Each one of those, those three goes with //two other.	
41.		Jeff:	//Those three things go with-	
42.		Romina:	//Oh OK, like with our line thing.	
43.		Ankur:	//So it's three times two.	
44.		Jeff:	All right.	
45.		Romina:	Like our line thing.	
46.	01:19	Michael:	Or you could say like you have two more colors to add on. So you could do, you could make these into two different combinations.	
47.		Ankur:	Yeah.	
48.		Michael:	So that's two.	
49.		Jeff:	Yeah. That's- Yeah, that's why. All right.	
50.		Michael:	That's like times. That's why you multiply.	
51.		Ankur:	That's how you-	
52.		Michael:	That's just why. All right? Don't ask us anymore.	
53.		Jeff:	All right, so then, all right. Uh, //Researcher 1.	

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Line	Time	Name	Transcript	Coding and Explanation
54.		Romina:	//Researcher 1. [Romina laughs.]	
55.		Jeff:	All right, I think we're good with this.	
56.		R1:	I'll stay here. Explain it to me on the board.	
57.		Jeff:	All right, the reason- here, Ankur.	
58.		Ankur:	Just do it; you're right there. You're standing.	
59.		Romina:	You could just say it.	
60.		Jeff:	Um, just do it with three colors?	
61.		Ankur:	Yeah.	
62.		Jeff:	All right, say you have three colors, red, white and blue. Uh, here you do it.	
63.		Ankur:	Yeah, one of those colors goes in the first.	
64.		Jeff:	All right.	
65.		Ankur:	One of those colors goes in the first spot.	
66.		Jeff:	So, say you have your three spots. Say red goes in the first one, all right? Then you could do-	
67.		Ankur:	Either one of them-	
68.		Romina:	Draw the line to the white and the blue.	
69.	02:04	Ankur:	One, one color goes in the first spot, so there's two colors left. So there's three different colors that can go in the first spot and each of those colors can go with two other colors.	
70.		Jeff:	Two other ones. So this is either going to be a white and blue or a blue and a white. Right? And then- Or the white could to the first thing and this is going to be one of the two other colors or the blue's going to go here and it's going to be, the other two are going to be the combination either way of the other one. So that's why you multiply.	