Description: Clip 3: Why Does it Work? **Parent Tape: Pizza Problems with Four and Five Toppings** **Date: 1999-03-01** **Location: David Brearley High School** **Researcher(s): Professor Carolyn Maher**	**Transcriber(s): Marcelle Farhat, Elijah Brookes, Gary Wenger, Anat Even-Zahav** **Verifier(s): William McGowan** **Date Transcribed: Fall 2010** **Page:** 1 **of** 3

Line	Time	Speaker	Transcript	Code
1				
2		Dr. Maher	So tell me what these numbers mean?	
3		Stephanie	One plain pizza, oh…five pizzas with one topping,10 pizzas with two toppings, 10 pizzas with three toppings, five pizzas with four toppings and one pizza with all five.	
4		Dr. Maher	O.K. Now my question. This is my question. O.K? How did you get this triangle so fast?	
5		Stephanie	Cause, we remembered, Oh we didn't like all of a sudden…	
6		Dr. Maher	How did you get from one row to the next? From the 3rd row to the forth? From the forth to the…	
7		Stephanie	One plus three, you leave the one, and the one plus three is four and the three plus three is six and the one plus three is four and then the 1 and 1.	
8		Dr. Maher	 Now, this is my question. You told me what that meant with pizza and toppings, right? When you have four topping to choose from. And you told me what this meant when you have five toppings to choose from. Can you show me thinking about pizza toppings, Why, for instance, the four plus the six is the ten? You told me what that meant in pizzas, right? Could you tell me what's that means in pizzas? That four? (Pointing to their Pascal's triangle) you know what kind of pizzas they are? And you know what kinds of pizza these are? And you know the kind of pizza these are?	
9		Stephanie and Shelly	Uh-hmm	
10		Dr. Maher	I'd like you to explore why that works with the pizzas? And we're gonna leave you alone. Do you understand my question?	
11		Stephanie and Shelly	Uh-hmm	
12		Dr. Maher	O.K (she is leaving the table).	
13		Shelly	I think to explain it you might have to do another tree diagram . Another …	
14		Stephanie	Well go ahead Shell...	

15		Shelly	O.K. ….(they start to draw the diagram, Stephanie draws the triangle and signing arrows from the 4 and the six to the ten, in the next row).	
16		Stephanie	(Counting) O.K , do you know what?	
17		Shelly	No. But I have the tree diagram done. (They both laugh).	
18		Stephanie	O.K. I got excited, I was like, yes, I know what they are doing… Um, Well what if we start it, what if we do from like up here. Because it is gonna go all the way down. And it's gonna be lot easier to do it with one topping than with eight.	
19		Robert	What's the top number? Is that zero toppings? Or one topping?	
20		Stephanie	That's one plain pie, that's zero. I guess that's zero toppings? For you. Well that's zero toppings, that's a plain pizza. The next row , we have a plain pizza, and then we have two pizzas with one topping, right?	
21		Shelly	Yeah.	
22		Stephanie	And then we have one pizza with both toppings.	
23		Shelly	Yeah, O.K.	
24		Stephanie	Right?	
25		Robert	So, this is no toppings, one topping, is that how it goes?	
26		Shelly	Yeah	
27		Robert	But then...	
28		Stephanie	Right, right, I know what you're …yeah.	
29		Robert	Then I don't think it works.	
30		Stephanie	No, it works! We just don't know why - it works! (both laughing). Um-yes, cause this is a plain pizza, if we had plain…	
31		Amy	Plain is zero toppings….(inaudible)	
32		Shelly	So, you see you count ach…if you count plain as a topping, or if you don't count plain as a topping, it's two different things.	
33		Stephanie	So does that make… yeah	
34		Shelly	If we have to count it as a topping… we could do it this way.	
35		Stephanie	But it doesn't really matter. Because even if we counted plain as a topping, here it will still be repeating itself…if we only had…if this row stands for one topping…this is wrong, right? (asking Robert)	
36		Robert	Yeah	
37		Stephanie	That's what you were thinking? (to Robert)	
38		Robert	Yes	

39		Shelly	That stinks	
40		Stephanie	That's what you were thinking. But, like past that it works. Right? (laughing). I think. It worked.	
41		Amy	Ignore the top of it	
42		Stephanie	The bottom half works.	
43		Shelly	Ignore the top… the rest of it works.	
44		Stephanie	No. But if this stands for two toppings then this works. But, does this work for three toppings, because this works for four.	
45		Shelly	Yeah	
46		Stephanie	And this works for five.	
47		Shelly	Yeah, so that's, this is one topping.	
48		Stephanie	This is five – four – three - two, and this is…	
49		Shelly	No, because if that's one topping, then you have one with a topping and one that is plain.	
50		Stephanie	Let's just ignore this. Ignore the top…Let's work from three to four.	
51		Shelly	O.K	
52		Stephanie	I guess we're just going to have to -	
53		Shelly	Build another diagram!	
54		Stephanie	Another one!	
55		Shelly	Fun!	