

Description: Stephanie rebuilds Towers: one-cube, 2-cubes, 3-cubes and 4-cubes tall, selecting from two colors Parent Tape: Early Algebra Ideas About Binomial Expansion, Stephanie's Interview Six of Seven Date: 1996-03-27 Location: Union Catholic Researcher: Professor Carolyn Maher	Transcriber(s): Aboelnaga, Eman Verifier(s): DeLeon, Christina Date Transcribed: Spring 2009 Page: 1 of 5
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1	R2	What did you do next?
2	Stephanie	All right. – Next – we um – hm, what did we do next? - - - I think - - [<i>Stephanie looks through her paper.</i>] We – oh – we um- said if there were um – if it was ‘C’ and you still had four – um – four cubes, but you didn’t how many of them you were taking, what would it be? Um – like what could ‘r’ be?
3	R2	‘r’ is the lower number?
4	Stephanie	Yeah. – so ‘r’ would be like how many green you were selecting.
5	R2	Um hm.
6	Stephanie	But you didn’t know ‘cause it was a variable and then it was – it could either be um zero, one, two, three, or four. ‘Cause those were how many selections you could make. And then – do you remember what we did next? I think -
7	R2	Could ‘r’ be five?
8	Stephanie	No.
9	R2	Why?
10	Stephanie	‘Cause you’re selecting four.
11	R2	Okay
12	Stephanie	So ‘r’ couldn’t be anything more than four.
13	R2	Okay.
14	Stephanie	And um then – All right – We went back to um the beginning with the towers. And we went way back to when we were building towers like a long time ago. And we built – and started with like the first tower. And you could have towers of – either – towers one high

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15	R2	Um hm.
16	Stephanie	in two colors. So you could have
17	R2	Okay.
18	Stephanie	- Well, actually, I could just show you. You could either have blue or green. That's it.
19	R2	I'm convinced.
20	Stephanie	Now for towers two tall, you could have – from there you could have a two green or – [builds $\begin{bmatrix} B \\ G \end{bmatrix}$]
21	R2	Okay. Why did you choose these particular two? That you placed next to that green one?
22	Stephanie	Because the green was on the bottom here
23	R2	The bottom
24	Stephanie	So you keep building up from it. Like for the next one, there'll be either three green or green, blue, um, green.
25	R2	Okay. Continue.
26	Stephanie	And over there you can have that. [Builds $\begin{bmatrix} B \\ B \end{bmatrix}$ and $\begin{bmatrix} G \\ B \end{bmatrix}$] Those are the two you can get from that.
27	R2	Um hm.
28	Stephanie	You'll always get two, like, from each of them. And then for three it'll be like that

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		<p>[builds $\begin{bmatrix} G \\ G \\ G \end{bmatrix}$] or that [builds $\begin{bmatrix} G \\ B \\ G \end{bmatrix}$] or that [builds $\begin{bmatrix} B \\ B \\ B \end{bmatrix}$] or that [builds $\begin{bmatrix} B \\ G \\ B \end{bmatrix}$] or</p> <p>um [builds $\begin{bmatrix} G \\ B \\ B \end{bmatrix}$] I'm sorry. That or that. [Stephanie rearranges the towers she has built.] or that [builds $\begin{bmatrix} G \\ B \\ B \end{bmatrix}$, Stephanie then places a $\begin{bmatrix} B \\ G \\ G \end{bmatrix}$ beside the $\begin{bmatrix} G \\ G \\ G \end{bmatrix}$] Or</p> <p>that. [builds $\begin{bmatrix} B \\ B \\ G \end{bmatrix}$]</p>
29	R2	Okay. Can I just ask you about the last one you built?
30	Stephanie	Yeah.
31	R2	Okay. Um. If I'm not mistaken, you thought for a moment and then decided that something – that this one needed to be there.
32	Stephanie	Yeah.
33	R2	Okay. Um. If I'm not mistaken, you thought for a moment and then decided that something – that this one needed to be there.
34	Stephanie	Yeah.
35	R2	Is that right?
36	Stephanie	Yeah.
37	R2	Why did you decide that it needed to be there?

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38	Stephanie	Because, -well, what happened was – I started building and I forgot that each one had two.
39	R2	Um hm.
40	Stephanie	So I just built like one for each of ‘em and then I had to go back an rebuild it with the other one. And I wasn’t sure if I had already built one for this one, like two, but I noticed that there was none – see- for this – since this is green-blue.
41	R2	Yes.
42	Stephanie	Its choices can be green – you build on to it – it can either have a green on top of it
43	R2	Um hm.
44	Stephanie	or a blue on top of it.
45	R2	or a blue on top of it.
46	Stephanie	and there was no one
47	R2	I see.
48	Stephanie	with green-blue-blue. That’s why.
49	R2	Good.
50	Stephanie	Oops
51	R2	It looks to me like the others work the same way...
52	Stephanie	Yeah.
53	R2	Yeah.

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54	Stephanie	<p>You can – you can just keep building on. And then for four it was – [<i>Stephanie builds towers four high in the following order:</i></p> $ \begin{array}{cccccccccccccccc} \left[\begin{array}{c} G \\ G \\ G \\ G \end{array} \right] & \left[\begin{array}{c} B \\ G \\ G \\ G \end{array} \right] & \left[\begin{array}{c} G \\ B \\ G \\ G \end{array} \right] & \left[\begin{array}{c} B \\ B \\ G \\ G \end{array} \right] & \left[\begin{array}{c} B \\ G \\ B \\ G \end{array} \right] & \left[\begin{array}{c} G \\ G \\ B \\ G \end{array} \right] & \left[\begin{array}{c} B \\ B \\ B \\ G \end{array} \right] & \left[\begin{array}{c} G \\ B \\ B \\ G \end{array} \right] & \left[\begin{array}{c} B \\ B \\ B \\ G \end{array} \right] & \left[\begin{array}{c} G \\ B \\ B \\ G \end{array} \right] & \left[\begin{array}{c} G \\ G \\ B \\ B \end{array} \right] & \left[\begin{array}{c} B \\ G \\ B \\ B \end{array} \right] & \left[\begin{array}{c} B \\ G \\ B \\ B \end{array} \right] & \left[\begin{array}{c} G \\ G \\ G \\ B \end{array} \right] \\ \end{array} $ <p>There.</p> $ \left[\begin{array}{c} G \\ B \\ G \\ B \end{array} \right] \left[\begin{array}{c} B \\ B \\ G \\ B \end{array} \right]] $ <p>[<i>Stephanie counts the number of towers she has built.</i>] Okay.</p>
55	R2	I was counting, too.
56	Stephanie	That's all there are. – And that's it for four. But we did it on paper.