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| Description: Clip 4 of 10, Investigating the "Doubling Pattern" for Unifix Towers of Increasing Heights Parent Tape: Early Algebra Ideas About Binomial Expansion, Stephanie's Interview Five of Seven Date: 1996-03-13 Location: Harding Elementary School Researcher: Professor Carolyn Maher | Transcriber(s): Aboelnaga, Eman Verifier(s): Yedman, Madeline Date Transcribed: Fall 2010 Page: 1 of 5 |
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| 0:00 | 1 | R1 | Okay, so we've looked at selecting, right? |
| | 2 | Stephanie | Mm-hmm. |
| | 3 | R1 | Well we're going to do a little algebra here. We have four and we're selecting r and r could go- be zero, one, two, three or four. Isn't that right? |
| | 4 | Stephanie | Yeah. |
| | 5 | R1 | When r is zero, we have this, and you told me that's one. Right? |
| | 6 | Stephanie | Ok. |
| | 7 | R1 | When r is one, you told me that was . . . [<i>writing</i>] |
| | 8 | Stephanie | Um, with one red, four. |
| | 9 | R1 | And this was . . . [<i>writing</i>] |
| | 10 | Stephanie | Six. |
| | 11 | R1 | And this was . . . [<i>writing</i>] |
| | 12 | Stephanie | Four. |
| | 13 | R1 | And this was . . . one, two, three. [<i>writing</i>] |
| | 14 | Stephanie | Four out of four, you'd have one. |
| | 15 | R1 | One. Right? |
| | 16 | Stephanie | Yeah. |
| | 17 | R1 | So, if I wanted to know the total number- |
| | 18 | Stephanie | Mm-hmm. |
| | 19 | R1 | -where you could have no reds, exactly one, exactly two, exactly three, exactly four. What does it turn out to be? |
| | 20 | Stephanie | Sixteen. |
| | 21 | R1 | Does that surprise you? |
| | 22 | Stephanie | Not really. I-I mean, I wasn't thinking about it like that- |
| | 23 | R1 | I know. |
| | 24 | Stephanie | -but I mean, no. |
| | 25 | R1 | Isn't that interesting? |
| | 26 | Stephanie | Yeah, it's the same thing. |
| | 27 | R1 | What do you mean? |
| | 28 | Stephanie | Like with just the towers- |
| | 29 | R1 | Mm-hmm. |

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| | 30 | Stephanie | -except that I just did it different. |
| | 31 | R1 | How did you do it differently with the towers? |
| | 32 | Stephanie | Well, with the towers, I just didn't have this, to, like, say "All right, now I'm going to try it with three." I just, like, did all these different things until we couldn't do them any more. |
| | 33 | R1 | Mm-hmm. |
| | 34 | Stephanie | So, it was like, more just like guessing. You know? |
| | 35 | R1 | Well, but I noticed in the towers later on you did something different. Um, something I just looked at recently. Um, you didn't start, y-you- in order to figure out how many you can build, let's say, four high- |
| | 36 | Stephanie | Mm-hmm. |
| | 37 | R1 | -you started building one high. Like, you said this is one high. You said it could be a red or a yellow- |
| | 38 | Stephanie | Mm-hmm. |
| | 39 | R1 | -you did some family thing. |
| | 40 | Stephanie | Yeah, and we had them, I think, when we first showed it we had them all lined up. Like, and their opposites. We did, like, one red, all red, all yellow. And stuff like that. |
| | 41 | R1 | Do you remember how you built up the family? This was for one high, right? |
| | 42 | Stephanie | Oh, okay. |
| | 43 | R1 | Then, when you went for two high, right- |
| | 44 | Stephanie | Mm-hmm. |
| | 45 | R1 | -you built on top of. You all were talking about a way of doing that. Um, you said that, something like, I remember you starting something like, someone asked you how many can you build one high when they could be red or yellow. |
| | 46 | Stephanie | Mm-hmm. And, there could be two. |
| | 47 | R1 | There could be red. |
| | 48 | R1/Steph | Or yellow. |
| | 49 | R1 | And then you built those. |
| | 50 | Stephanie | Yes. |
| | 51 | R1 | And you see them standing in front of the camera. Beautiful |

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| | | | shots of red or yellow. |
| | 52 | Stephanie | Yeah. |
| | 53 | R1 | And then, you talked about, "Ok, now I want to move from one to two high." |
| | 54 | Stephanie | Mm-hmm. |
| | 55 | R1 | So you said, "Ok, if I start with the red, what could I do to make two high?" |
| | 56 | Stephanie | Well, I could have um, red-red. |
| | 57 | R1 | You did something like this, right? [<i>draws a tree diagram showing how the towers build by adding a red and yellow to each previous tower.</i>] |
| | 58 | Stephanie | Yeah. Or I could have yellow-yellow. Oh if you want to use the red, you can have red-yellow. |
| | 59 | R1 | If you start with red on the bottom? |
| | 60 | Stephanie | Well, yellow-red. |
| | 61 | R1 | Is that right? |
| | 62 | Stephanie | Yeah. |
| | 63 | R1 | Millan did something like this. Do you remember that? |
| | 64 | Stephanie | Mm-hmm. |
| | 65 | R1 | So you got two, the family grew. |
| | 66 | Stephanie | Yeah. |
| | 67 | R1 | You did something like that. Do you remember that? |
| | 68 | Stephanie | Yes. |
| | 69 | R1 | And then you used the same argument here. |
| | 70 | Stephanie | That'd be yellow-yellow and red-yellow. |
| | 71 | R1 | And you could put, ok, you could put yellow on the top or you could put red on the top of that yellow. |
| | 72 | Stephanie | Mm-hmm. |
| | 73 | R1 | And so, two high you ended up—for one high you ended up with a total of two, and for two high, you ended up with a total of- |
| | 74 | Stephanie | Four. |
| | 75 | R1 | And then you predicted for three high, there'd be how many? |
| | 76 | Stephanie | Um, Eight. |

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| | 77 | R1 | And then you predicted for four high, there'd be |
| | 78 | Stephanie | Sixteen. |
| | 79 | R1 | Sixteen, and? |
| | 80 | Stephanie | Thirty-two. |
| | 81 | R1 | And so, yeah, but how did you get the eight from these four? |
| | 82 | Stephanie | Um, well, you could do red-red-red or you could do red-yellow-red or red-red-yellow. |
| | 83 | R1 | I'm having trouble following you if you're making a family. |
| | 84 | Stephanie | Oh ok, if you're doing- ok. You could do it. And I have to have two red on the bottom? |
| | 85 | R1 | Well, I don't know, you tell me, I don't... |
| | 86 | Stephanie | Well, here, I have to have-I can have [<i>writing</i>] red-red-red or I can have red-red-yellow or I can have . . . |
| | 87 | R1 | That goes from that one? |
| | 88 | Stephanie | Yeah, that goes from the red-red. Or I can have, [<i>writing</i>] like, red-yellow-red. Or I can have – whoops – red-yellow-yellow. You can't see that. Or I can have, um, yellow-yellow-yellow. Or I can have yellow-yellow-red. Or I can have, um, yellow-red-yellow. Or I can have yellow-red-red. Yeah. |
| | 89 | R1 | So where did the eight come from, from the four? |
| | 90 | Stephanie | From the four? Well, like, red-red-red or yellow-red-red. |
| | 91 | R1 | How did that happen that you got two from that one? Did you always get two from the one? |
| | 92 | Stephanie | Um... |
| | 93 | R1 | As you build up from one, you got two here, didn't you? |
| | 94 | Stephanie | Mm-hmm. |
| | 95 | R1 | From this one, you got two here, right? |
| | 96 | Stephanie | Yeah, probably. Yeah. |
| | 97 | R1 | Why? |
| | 98 | Stephanie | 'Cause, I guess, there's always going to be two combinations with whatever you have on the bottom- |
| | 99 | R1 | Mm-hmm. |
| | 100 | Stephanie | -like, 'cause if you're building it from here, it's got to have three |

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| | | | reds on the bottom, and there's only two other things 'cause you only have two colors. So you can only do two other things with that. You can either put a red on top or a yellow. |
| | 101 | R1 | So, so that means four high, you would get? |
| | 102 | Stephanie | You would get sixteen. |
| 6:51 | 103 | R1 | You would get sixteen, so, in this, I'm not gonna ask you to do that, you just told me what it would look like and I can follow what you're saying. So you do get sixteen four-high. |