

<b>Description: Clip 2 of 7: Explaining the meaning of area of a square with concrete materials</b> <b>Parent Tape: Early Algebra Ideas About Binomial Expansion, Stephanie's Interview Three of Seven</b> <b>Date: 1996-02-07</b> <b>Location: Harding Elementary School</b> <b>Researcher: Professor Carolyn Maher</b>	<b>Transcriber(s): Aboelnaga, Eman</b> <b>Verifier(s): Yedman, Madeline</b> <b>Date Transcribed: Fall 2010</b> <b>Page: 1 of 5</b>
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0:00	1	R1	Um hm. Right. I think so. Neat! Um. Okay. Um. Just to – that’s actually very nice, Stephanie. That’s a very lovely write up. Um. How about – you have a younger sister? Susie?
	2	Stephanie	Yes.
	3	R1	Is that her name?
	4	Stephanie	Um hm.
	5	R1	Okay. I talked to her briefly.
	6	Stephanie	<i>[whispers]</i> Oh God.
	7	R1	And um. She’s very friendly. <i>[Stephanie chuckles.]</i> Now um Susie’s in what grade?
	8	Stephanie	Sixth.
	9	R1	Sixth grade. Okay, that’s good. Um. Now suppose Susie wanted to understand what you were doing. But she’s not studying algebra, right?
	10	Stephanie	Yeah.
	11	R1	Okay. We have some things here. Okay. <i>[R1 removes several items from the bag beside her. These include squared materials and a bag of odd shaped plastic pieces.]</i> We have these things –these things. Right?
	12	Stephanie	Um hm.
	13	R1	Um. We have some things in the bag here. And we have some of these things, which, by the way, I have never used before. Um. So when I tell you, I really haven’t – <i>[Stephanie chuckles.]</i>
	14	R1	Um. Dr. Alston threw some of these things in – thinking maybe you want to use any of these.
	15	Stephanie	Okay.
	16	R1	Now. Can you kinda maybe think for a minute and see how you could use some of these things to explain to Susie what you were doing here?
	17	Stephanie	Oh. Um.
	18	R1	That might be – that might be appropriate for her in the sixth grade.
	19	Stephanie	Do you want me to explain <i>a</i> squared or do you want me to explain like <i>a</i> plus <i>b</i> quantity squared?
	20	R1	Well, you know Susie.

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	21	Stephanie	Yeah.
	22	R1	(inaudible)
	23	Stephanie	We'd have to start out with 'unit' and 'square unit'.
	24	R1	Okay. You start out where you think Susie is and kind of try to think what you might do.
	25	Stephanie	Like what's this? Ten by ten? [ <i>Stephanie picks up a 'flat' and counts the intervals on one side.</i> ] Yeah. It's ten by ten. And like [ <i>Stephanie takes more of the squared materials from the bag.</i> ] if she knew it was – she knows how to get um - I'm sure she knows how to get area. And it would be – you know
	26	R1	Why don't you pretend she doesn't. Don't take anything for granted. 'Cause she just might know a formula.
	27	Stephanie	Um hm.
	28	R1	But she might not know what it means. You know? So suppose you even – you wanted her to really understand what she's doing.
	29	Stephanie	So I'd have to explain what area was
	30	R1	So you might even want to come back and try to introduce the whole idea of area to her.
	31	Stephanie	Okay. Well, area is like um the amount of space inside like a sp...an object. Um. So and to find the area of a square it's like length times width or if – especially when you're dealing with a square 'cause like the sides are all equal it's like one side squared. So if this is ten, it would be ten squared.
	32	R1	So, I'm going to be Susie.
	33	Stephanie	Or ten times ten.
	34	R1	Can I role play?
	35	Stephanie	Yeah.
	36	R1	What do you mean ten? Where did you get ten?
	37	Stephanie	Oh. Well, there's ten – you see, it's ten units long. This is like one unit.
	38	R1	Can you show me what's a unit?
	39	Stephanie	See this [ <i>Stephanie puts a cube over the 'square' in the top left corner of the 'flat'.</i> ]
	40	R1	This square is one unit?

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	41	Stephanie	Yeah. Like this square, [ <i>a cube</i> ] this is like a littler piece like that's how big that is.
	42	R1	And you're calling this a unit?
	43	Stephanie	Yes.
	44	R1	Okay.
	45	Stephanie	Oh. One square unit.
	46	R1	Oh. This is one square unit. But I don't know what a unit is.
	47	Stephanie	This is a unit. You see this like side right here. [ <i>Stephanie points out the length of one unit on the side of the 'flat'.</i> ]
	48	R1	Can you show me here too? [ <i>R1 holds up a cube.</i> ]
	49	Stephanie	Like this. [ <i>Stephanie shows R1 the length of the edge on the cube.</i> ]
	50	R1	Oh. Okay.
	51	Stephanie	Or like that. Or any – that's a unit
	52	R1	Okay.
	53	Stephanie	And so this – If you were going to get the area of this [ <i>the cube</i> ] it would be one unit by one unit
	54	R1	Um hm.
	55	Stephanie	and so it would be one square unit.
	56	R1	Okay.
	57	Stephanie	So to get the area of this [ <i>the flat</i> ] – there are ten units – ten square units going this way and ten – like length and width
	58	R1	Um hm.
	59	Stephanie	And so it would be ten times ten
	60	R1	Um hm.
	61	Stephanie	and you'd get a hundred.
	62	R1	Um hm. And how can I be sure there's a hundred?
	63	Stephanie	Well, you could count them if you wanted to.
	64	R1	I don't want to do that, okay.
	65	Stephanie	But...
	66	R1	I believe you.
	67	Stephanie	Yeah. And so – and another way you could get like um a hundred like if you're multiplying any number by itself you can also say like ten squared or nine squared or eight squared or you know eleven squared.

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	68	R1	Um hm.
	69	Stephanie	And it just means that number multiplied once by itself. So ten times ten.
	70	R1	Okay. But now you were doing algebra. $a$ 's and $b$ 's. and I'm a very curious little sister. And I really want to sorta know what you're doing with $a$ 's and $b$ 's.
	71	Stephanie	Um hm.
	72	R1	What does this have to do with $a$ 's and $b$ 's?
	73	Stephanie	Well.
	74	R1	Can you make me something that looks like ...
	75	Stephanie	$a$ is any length.
	76	R1	Okay.
	77	Stephanie	So $a$ stands for any number.
	78	R1	Um hm.
	79	Stephanie	And we're gonna – like if this side was $a$ units long
	80	R1	Um hm
	81	Stephanie	Like you didn't – I'm trying to think if there's anything in there that's not marked – [ <i>Stephanie looks through the materials on the table for an example.</i> ] Well - like
	82	R1	I don't know what these are.
	83	Stephanie	Yeah.
	84	R1	You might want to take a look. I've never seen them.
	85	Stephanie	I think I – we used them last year to build like weird shapes. Oh, here's [ <i>Stephanie pulls a blue square of the bag of shapes.</i> ] like if this was a square.
	86	R1	Square?
	87	Stephanie	Oh, well this is kinda – [ <i>Stephanie puts aside the blue shape and picks up the flat.</i> ] We'll just use this. It's easier.
	88	R1	Well, no. I'm just curious.
	89	Stephanie	Well like if this was a square?
	90	R1	So, what am I supposed to imagine, that this is a straight line?
	91	Stephanie	Yeah, that those are all straight lines.
	92	R1	Um hm.
	93	Stephanie	But this isn't marked, so you don't know how many units long it is.

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	94	R1	Um hm.
	95	Stephanie	And you don't know how many units wide it is.
	96	R1	Um hm.
	97	Stephanie	And then that would – uh – $a$ length long, $a$ length long, $a$ length – 'cause you don't know - $a$ can stand for any number. And... [Stephanie indicates that each side of the blue shape is ' $a$ ' length long.]
	98	R1	Why can't you do the same thing here? Why can't I pretend...
	99	Stephanie	'Cause it's marked.
	100	R1	I don't know.
	101	Stephanie	It's marked so it's harder you know.
	102	R1	Um hm.
	103	Stephanie	Like it would, but it would be easier to imagine if you
	104	R1	I see.
	105	Stephanie	had something that wasn't marked.
	106	R1	I see.
	107	Stephanie	So like if this wasn't marked it would be $a$ length by $a$ length and to find the area
	108	R1	Um hm.
	109	Stephanie	of an object that's like $a$ length long it would be $a$ length squared or $a$ length times $a$ length.
	110	R1	Um hm.
	111	Stephanie	And you'd get area.
	112	R1	Um hm.
	113	Stephanie	And so that's where $a$ comes into it.
	114	R1	Um hm. Okay.
	115	R1	What always confuses me about these blocks is that it also has a height. [R1 and Stephanie chuckle.] You know. And this kinda [R1 indicates the blue square Stephanie had selected earlier.] does, too, but it sorta doesn't look like it does.
	116	Stephanie	Yeah.
	117	R1	You know. Um. Okay. Interesting. So, um, you said, you'd make this $a$ , but what about the $a$ plus $b$ ? How would you handle that?