Description: Guess My Tower – Stephanie and Matt **Location: Harding Elementary School** **Researcher**: Martino			**Transcriber(s): Sran, Manjit, Purity** **Verifier(s): Liberman, Melissa, Purity.** **Date:**	

Line #	Speaker	Time Stamp	Utterance	Code
1	MARTINO:	00:35:42	Okay, so what did you do for the second problem?	
2	M:		For the second problem….	
3	MARTINO:		You said you did that on the first, Matt?	
4	M:		Yes. I think we have missed one here *(referring to the towers drawn on piece of paper)*	
5	MARTINO:		Mmmh.	
6	M:		Yeah.	
7	MARTINO:		You are missing something?	
8	M:		Yeah, we are missing something. Stepha,	
9	S:		What? That's why *(inaudible)*	
10	M:	00:36:11	Yeah, we can do the all thing.	
11	S:		Yeah.	
12	MARTINO:	00:36:14	How many kinds of towers do you think they gonna be for four?	
13	M:		For four tall?	
14	MARTINO:		Yeah.	
15	M:		Huh, a lot *(laughter)*	
16	MARTINO:		Stephanie?	
17	S:	00:36:24	They could be more than three. Was. The last…I remember the way you could make sure how many they were. I don't know……	
18	MARTINO:		How was that?	
19	S:		It was, whatever number you go from last one, you multiply by two, and then you get the number, how many they will be for the next one. But, I got the number for this *(referring to the question prior to what they are working on) (inaudible)*	
20	MARTINO:	00:36:48	Why do you think that worked? You get to multiply by two, and the doubling	
21	S:		Yeah, that how it was	
22	MARTINO:		Why do you think that worked?	
23	S:		I don't know! *(laughter)*	
24	MARTINO:	00:37:00	Do you remember why? I think somebody explained it once when we were doing all that last year, but,	
25	S:		I don't know, maybe it's because you have to double whatever, okay, whatever you got for last one you have to double it for the next one.	
26	MARTINO:		Why do you think you have to double it? And why do you think that will give you all of them?	
27	S:	0:37:24	Because you can't find them by one, it going to give you the same answer	
28	MARTINO:		Okay.	

29	S:		And, I don't know, maybe, you know you cannot by one, because say the last answer was three, and you multiply by one, you only get three again.	
30	MARTINO:		Right.	
31	S:	00:37:46	Okay, if you multiply by two *(meaning multiplying three by two)*, you get six, and, I don't know, it works!	
32	MARTINO:		It works? And it always works?	
33	M:		So, Steph, …..	
34	MARTINO:		I will let you two work on this a little more and I will come back, and we work later.	
35	M:		I guess we have ten	
36	S:		Excuse me. We didn't figure out all the ways for that, did we? We only gave the way we can *(inaudible)*	
37	M:		We give one more, then that thing will work *(unknown: can you put your solution to the second problem on the blue paper here)*, yeah.	
38	S:		Okay, you want me to draw or you draw. Alright. Number two, answer four. *(writes on the blue paper "# 2 answer 4, 1 # yellow, 1 # red and started drawing towers)*	
30	M:		At least we have all the possibilities, these two, these two, these two, these two, *(Counting the towers he has already drawn)*, we have one, two, three, four, five, six, seven, eight, and nine.	
40	S:		Excuse me!	
41	M:		We have nine.	
42	S:		Alright, let me see yours because I don't know *(counts her towers)* one, two, three, four, five, six, I don't know what you are talking about. Alright, let me do that for you because I don't know, *(picks Matt worksheet)*, okay, I did this one *(she marks off a tower on Matt's sheet to show that she have already drawn the same tower in the blue sheet)* okay, I can look at your work later when I'm finished with this one *(referring to drawing towers on the blue sheet)*	
43	M:		I guess yes.	
44	S:	00:40:24	*(Draws a tower on the blue sheet, and marks it off on Matt's sheet)* why do we have this and this? *(referring to the duplication of YYYY tower)*	
45	M:		*(Matt cancels it off one of the towers, he is now left with eight towers)* now I was right, now the double thing is right. *(Counts them)* one, two, three, four, five, six, seven, eight. Yes! Now the double thing is right. *(audible)* I think we are just done.	
46	MARTINO:		Would mind coloring inside of these *(referring to the towers Stephanie is drawing on the blue sheet, solution for*	

			# 2) with red and yellow now?	
47	M:		Alright.	
48	MARTINO:		Those two colors are very hot, that one cannot fail to see them, I'm sure they are going to blend together. Okay. You think you got it?	
49	M:		Okay. *(starts coloring the towers drawn on the blue sheet)*	
50	MARTINO:	00:41:51	How many towers did you make here? *(referring to towers on the blue sheet)*	
51	S:		*(Counting)* eight.	
52	MARTINO:		Eight of them, eight different towers that are four tall? Is that all towers?	
53	S:		Yeah. That all. For answer number four. For the towers we make….	
54	MARTINO.		Ooh. You don't need to explain that to me.	
55	M:	00:42:13	Alright. Huh, if you have here *(pulls his work sheet)*, it's only one, then it has, *(uses the coloring pen to draw towers on a piece of paper)* that and that. Then it has three more there. *(colors yellow at the bottom, to show one yellow cube, followed by red, which is equivilents to three red cubes)*	
56	MARTINO:		Okay.	
57	S:		The question doesn't says, you have to have exactly two.	
58	MARTINO:		Okay. So, it says at least two cubes of yellow here? What is this again? (Referring to the tower Matt has drawn using the coloring pen, the RRRY tower) what is this tower? Tell me more about it.	
59	M:		That is exactly one, or they could have, exactly two, and that would be *(draws YRYR tower)* now this is the red, and these are the same *(referring to the number of red and yellow cubes in the tower)* and then, exactly two could be, (draws YRRY tower)	
60	S:		We only have four, like three different ways you could draw that	
61	MARTINO:		With exactly two yellows?	
62	M:		Then opposite of that *(referring to opposite of YRRY tower)*, opposite of that *(referring to the opposite of YRYR tower)* and opposite of that *(referring to the opposite of RRRY tower)* and that will give you six.	
63	MARTINO:	00:43:53	Can this one over *(referring to the RRRY tower)* here, again I don't understand, three red and one yellow? Does that fit our category? What's our category then? *(Reads on the worksheet)* at least two cubes are yellow. Is that what you are doing?	
64	M:		Yes, but, if we had exactly one, right now, if this…*(can I write it up here?)*	

65	MARTINO:		Sure.	
66	M:		No, no, no. we could not have this one *(cancels the RRRYtower)* because it has one *(referring to one yellow cube)* we could have this one *(referring to the YRYR tower)*	
67	MARTINO:		I see	
68	M:		And we could have this one *(referring to the YRRY tower)* because these are two cubes *(pointing at the yellow cube at the bottom and the top)*	
69	MARTINO:	00:44:36	I see. These, ….	
70	M:		And then you could also add on, three cubes and one red *(draws YYYR tower)*	
71	MARTINO:		Huh	
72	M:		You can have all four yellows *(draws a rectangle like shape using the yellow ink pen)*	
73	MARTINO:	00:44:51	That would work too when, okay. How would you know that you found all different ones that have either three yellows or two yellows or four yellows?	
74	S:		Because if you, the only way you could get any other yellow that was not a duplicate, you had to add on another yellow, another tower, you will have to make the four tower five.	
75	MARTINO:		I see	
76	S:	00:45:15	Or, you have to add another color or something like that.	
77	MARTINO:		Interesting. Okay. You think you got all? These are the ones fit number four? *(Matt finishes coloring towers in the blue sheet, but only colors the yellow cubes)*	
78	M:		Can I color the red too?	
79	MARTINO:		I guess I can now see. No need to work on red. I'm more interested in understanding now. I guess one of the things that worries me about this *(referring to the work on the blue sheet)* is, how do I know that I cannot go ahead and think on another one that got two yellows on it?	
80	S:	00:46:08	Alright, try, okay. This is one *(referring to the YYRR tower)* and this is its opposite, *(the tower next to it),* you cannot think of thosetwo anymore. We eliminate those.	
81	MARTINO:		Okay.	
82	S:		And this one *(referring to YYYY tower)*, there is nothing else that can fit that tower.	
83	M:		There is no else that can fit that one *(referring to the YYYY tower)*	
84	MARTINO:		Okay.	
85	S:	00:46:32	Then there is this *(referring to the YYYR tower)* and we have the opposite *(the tower RYYY next to it),* so there is nothing else you can try, nothing else that can be like…	
86	MARTINO:		Because these are three? *(Referring to the three yellow*	

			cubes in the tower YYYR)	
87	S:		Mmh.	
88	MARTINO:		Okay.	
89	S:		There is this *(referring to RYRY tower)* and there is the opposite *(referring to the YRYR tower next to it)*, there is nothing else you can… you know, and there is this *(referring to the YRRY tower)* and there is this *(referring to the opposite RYYR)* the opposite.	
90	MARTINO:	00:46:51	Are you sure that all?	
91	S:		Yes.	
92	MARTINO:		Are there any others?, okay, for the ones with three yellows, you made these two *(referring to the YYYR and RYYY towers)*, alright?	
93	S:		Yeah.	
94	MARTINO:		This is the only yellows these one have, is there another way to make three yellows and one red?	
95	S:		No, no. no other way. Not only if you add another color. Oh, if you add another color, you can, there is no another way you can *(inaudible)*	
96	MARTINO:		Are you sure?	
97	S:		Yeah.	
98	MARTINO:	00:47:30	You two seem very positive about this. You got how many? *(Counting),* two, four, six, nine? Alright. *(Counting)* One, two, three, four, five, six, seven, eight, nine. You came up with nine options for four tall? And we had, how many options did we had for three tall? *(Checking on papers)* four? That's interesting. And you are sure these one doesn't give you more than any of these other categories when you change it to four?	
99	S:		I wish I can get that one on my papers *(referring to the papers at home, with the previously done work)* because it doubles, because I know that it works. I did all the way to 11th. I'm positive that it works with everyone.	
100	MARTINO:		I know you guys are using it in order to get the right answer. I'm just wondering why it just works. You know what I'm talking about, Matt?	
101	M:		*(inaudible)*	
102	S:		What we did was, when….	
103	M:		*(inaudible)*	
104	S:		Excuse me! *(counter checking the towers on the work sheet and the towers on the blue sheet as she puts a star on the towers on the work sheet)* here is, one two, here is three, this goes with this, this one, okay, we can put a cross *(marks off the towers on the work sheet after counter checking)* okay, one, two, three, four and five, six, seven,	

			then.	
105	M:		Oh, we missed one, oh, yeah.	
106	S:	00:49:14	We lost one?	
107	M:		We lost one, we missed one.	
108	MARTINO:		Oh, you lost one?	
109	S:		When you crossed *that (referring to the tower Matt had crossed earlier, they thought it was a duplicate for YYYY tower)* the extra.	
110	M:		Oh, no. I crossed that, and we had eight.	
111	S:		*(Counting the towers on the work sheet)*one, two, three, four, five, six, seven, eight. I don't know. I don't know what happened.	
112	M:		I made up that one.	
113	MARTINO:		I will come back	
114	M:		I made, I made that one *(counting the towers once more)*	
115	S:		I see what happened, we didn't make, I see what I did, I see what happened, I made the opposite, this one *(referring to YRYR tower)*, it was really nine because when you look, this one has an opposite and here *(referring to the towers in the worksheet)* there is no opposite.	
116	M:		Yeah.	
117	S:	00:50:00	Alright. We are done. I will explain to you what we did, we had last year when we were in fourth grade, they used to give us the tower problem. Remember towers four high, how many can you make, towers five high, how many can you make, towers six high, oh, a couple of us figured a theory, because we used to see a pattern forming, if you multiply the last problem by two, you get the answer for the next problem, but you have to have all the answers, this didn't work out because we didn't have all the answers up here *(referring to the solution of the previous question)*	
118	M:		No we did.	
119	S:		No, I mean all the answers, all the answers we can get.	
120	M:		Oh.	
120	S:	00:50:49	We only have, yes we do, I don't know what happened. Because I'm positive that it works. I have papers at home that say that it works. Because I know you have to multiply by something. And it was two because I know it works.	
121	M:		Maybe you were adding.	
122	S:		I don't know *(laughter)*	
123	M:		Alright. We are done.	
124	MARTINO:		You are saying you are sure it works?	
125	S:		Yeah.	
126	MARTINO:		Interesting. I'm interested if we can go back and think	

			about that, you are saying you multiply by two, that what I heard you say?	
127	S:		Yeah.	
128	MARTINO:	00:51:27	If you kind built the towers and kind showed him how that works. I will be really interested of you going back to that because I will be interested because I saw a video of you working on it and you are known of it together, and I was very curious on how that works. Because it really interesting	
129	S:		I know.	
130	MARTINO:		But I wasn't there to talk to you about it then.	
131	M:		*(inaudible)*	
132	S:		That is what is startling me, because I'm absolutely sure, because we were, maybe is I worked all the way up to eleventh.	
133	M:		Maybe it works only, it probably an even numbers	
134	S:		But I worked all the way to eleven with it, and I had like one thousand one hundred, one thousand and twenty eight or something that. I know, I went all the way into thousands with it.	
135	MARTINO:	00:52:23	Why don't you start with some of the smallest tower *(gives then a plain blue paper)*	
127	S:		Can we use some blocks?	
128	MARTINO:		Yeah. You want some blocks? You work out Stephanie, I know it is interesting.	
129	S:		I know it works. I'm sure of it. Well, we will start with one and we will multiply it	
130	M:	0:52:47	Start with one. Okay.	
131	S:		Okay. Get yellows, too. You're going to need yellows. All possible ways…… *(Stephanie builds a tower of two cubes.)*	
132	M:		What are you going to do? Well, we	
133	S:		Okay. Build the same thing I build. *(Stephanie builds another tower)*	
134	M:		We'll build, we'll start what, with two? Two tower? *(Matt builds a red, yellow tower.)*	
135	S:		Two towers. We'll do two towers. Oh, you know why it doesn't work, Matt? It doesn't work because these are building four towers and these are building three towers! Yes! I knew it worked! It's not the same amount of towers.	
136	M:		Oh, it's not the same amount of blocks?	
137	S:	00:53:20	Uh oh. No. I'm wrong. Because that's how, way off on this. Forget I said anything. Okay. Turn this upside down *(Stephanie turns her red, yellow tower upside down to make a yellow, red tower.)*	
138	M:		Sorry about that.	

139	S:		Oh, well. Okay. All right. Se we have four, okay? Now we multiply that by two and we get eight. Okay, let's see if we get the next amount in eight.	
140	M:		Eight. Okay. So, what? Three?	
141	S:	00:53:42	Three. So really don't build again. Just add on. Well, actually, yeah, build again. That way we can show that we multiplied it out.	
142	M:		That. *(Matt finishes building a tower)*	
143	S:		Here, I'll do the solid. Because I know there was a way. I just don't know which way it was. Okay, we can do two yellows on top and a red on the bottom.	
144	M:		Okay.	
145	S:		Okay and I'll do two reds, one yellow.	
146	M:	00:54:22	I'm sorry I got that one, too.	
147	S:		No you didn't!	
148	M:		Yeah, I did.	
149	S:		Okay. I'll do the opposite. Okay, there it is.	
150	M:		So,	
151	S:		1, 2, 3, 4, 5, 6, 7, 8 I knew it worked!	
152	M:		All right, number four.	
153	S:		All right, now the next is sixteen.	
154	M:		I'll do the solids.	
155	S:		All right. Here, can you pass me some, a whole red and a yellow.	
156	MARTINO:	0:54:52	Can I just arrange these for you guys?	
157	S:		Yeah.	
158	MARTINO:		Okay, so these are twos	
159	M:		We start out with two and we go on….	
160	MARTINO:		And these are threes, right?	
161	S:		These are threes	
162	MARTINO:		I'll get those.	
163	S:		Okay. Right, now. Are you doing the solids?	
164	M:		All right. I got that, and that, and …….	
165	S:		Here, We'll fix them here.	
166	M:	00:55:17	I got that one already. How about ones? Did you do towers of one? Uh huh. What? Here, put them up here. That way.	
167	MARTINO:		How about ones? Did you do towers of one?	
168	S:		Uh huh. What? Here, put them up here. That way we can all see, I can see what we're doing.	
169	M:		Towers of one? Yeah.	
170	S:		Yeah, we did towers of one. Oh, no we didn't!	
171	MARTINO:		What are the possibilities for one?	
172	S:	00:55:33	One, two! 2, 2, 4, 8. Put them here that way I can see, we can all see what we're doing.	

173	M:		We got that and….	
174	S:		All right. Do yellow, red, yellow, red and red, yellow, red, yellow.	
175	M:		I got it. I got it.	
176	S:		Okay. Well I'll do the yellow, red one. Here, Where's the whole? Do we have the whole?	
177	M:		No. I'll do that next.	
178	S:		Here, I got the yellow one.	
179	M:		I got the red.	
180	MARTINO:	00:56:02	You do these so fast! How do you know when you have them all?	
181	M:		I don't know.	
182	S:		Well, we are trying to get up to sixteen. Because if you multiply this two, then it's four, and you get up to eight, and then eight times two is sixteen, so you pretty much figure.	
183	MARTINO:		That's very neat. I wonder why that works.	
184	S:		All right, um…. I don't know! It just works, sort of, here.	
185	MARTINO:		There must be a reason, don't you think?	
186	S:		Yeah. There has to be. I'll do it.	
187	M:		2, 4, 6, 8, 10.	
188	S:	00:56:43	Ten. We need six more. If it works. Put the pairs together. Okay. We have these two.	
189	M:		What about these two?	
190	S:		And those two. All right. So now we have our pairs.	
191	M:		No. this one and this one go together.	
192	S:		Oh, you want to do that. Okay.	
193	M:		Um, that's it! It! 2, 4, 6, 2, 4, 6, 8, 10.	
194	S:		That's it.	
195	M:		We need six more.	
196	S:	00:57:41	Unless it's adding. No, it can't be adding. I don't get that because it works.	
197	M:		Maybe it doesn't work for certain numbers?	
198	S:		No. it works!	
			SEE SRAN,2010 DISSERTATION FOR THE REST OF THE TRANSCRIPTS	