# 10.3TRANSCRIPT - GROUP WORK ON 2/6/92

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| 1. | 00:00:30 People 4:17 work | **R2** | It has like a chimney on top. Do you see th you can build, under those conditions?...⸬SE *directions to the entire class. The followir work for Milin and Michael*. |
| 2. | 00:00.37 People | **Michael:** | What'd you do, what'd you do with the tov *(counts towers while the researcher is still* |
| 3. | 00:01:19 00:05:06 work | **Milin:** | We did this last year. *(the researcher is sti* |
| 4. | | **Michael:** | Really? *(the researcher is still giving direc* **They start working on the problem whil** |
| 5. | 00:01:34 people | **Michael:** | Uh huh. Alright you gotta go like this. You gotta build them like ... |
| 6. | | **Milin:** | I know, I know |
| 7. | | **Michael:** | With no, with no under...*(Michael builds a and 1yellow on the top)* you can't, they car be different I mean, they gotta be the same |
| 8. | 00:01:58 0:05:44 | **Milin:** | Here *(Milin built one tower with three yell cube on the top )* |
| 9. | | **Michael:** | Put one more *(Milin adds another yellow c* |
| 10. | | **Milin:** | Okay, Mike, lets do it like this |

| 11. | 00:02:05 | **Michael:** | Y eah |
|---|---|---|---|
| 12. | | **Milin:** | You do this and that |
| 13. | | **Michael:** | Make the opposite of that. Let me see if I |
| 14. | | **Milin:** | Na, no, no, gimme these two |

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**Line Time Name Transcript** *Manjit K. Sran*

| 15. | | **Michael:** | Ou |
|---|---|---|---|
| 16. | 00:02:16 | **Milin:** | These ... these two go like this. Look, look |
| 17. | | **Michael:** | Here you made the opposite of it. Oops |
| 18. | 00:02:35 | **Milin:** | Oh yeah I forgot. |
| 19. | 00:06:24 work | **Michael:** | Got this one *(Michael makes and adds a to yellow/red/yellow/red/yellow)* |
| 20. | | **Milin:** | You'll have to put this here, right? Mike? ( yellows on the top with three reds on the b |
| 21. | | **Michael:** | Yeah ... Wait a minute. What'd you do? Th *(Michael picks up the tower with three red bottom)* |
| 22. | 00:02:48 00:06:34 work | **Milin:** | See *(Milin picks up the 3 reds on bottom a* |
| 23. | | **Michael:** | Which ones of these are opposites, this? *(N bottom and 2 yellows on the top tower)* fir |

| | | | |
|---|---|---|---|
| 24. | | **Milin:** | This |
| 25. | 00:03:02 | **Michael:** | Yeah. Uh ... I just got an idea |
| 26. | | **Milin:** | There is going to be these two *(he continu* |
| 27. | | **Michael:** | There's this and this. Make the one like th with red. What'd you do? *(Groans)* where |
| 28. | 00:07:08 work | **Milin:** | This goes with this |
| 29. | | **Michael:** | Alright |
| 30. | | **Milin:** | We only have this many. |
| 31. | | **Michael:** | It's easy |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| 32. | | **Milin:** | Yeah yeah but Mike what if we could mak blocks |
| 33. | | **Michael:** | It can't be the same so ... |
| 34. | | **Milin:** | Uh, where's, where's this ... or something |
| 35. | 00:03:48 | **Michael:** | Where's the one like that? Right there. Al one |
| 36. | | **Milin:** | Did we do this, Mike? |
| 37. | | **Michael:** | No. make the opposite of that |
| 38. | 00:04:15 | **Milin:** | Make the opposite with this. See two yello on this side and one red. I'll do it. |

| Line | Time | Name | Transcript |
|---|---|---|---|
| **39.** | | **Michael:** | (*Michael flips the towers around*) Lot easie |
| **40.** | | **Milin:** | This? |
| **41.** | 00:04:43 | **Michael:** | Oh, we got that already.(*Michael snatches* already. |
| **42.** | | **Milin:** | I know, but I'm going to ... |
| **43.** | 00:04:48 | **Michael:** | This is wrong. We've got twenty already... *at what Milin is making*) We did it. ...that? one you put down... |
| **44.** | | **Milin:** | (*Milin Points to the tower he had done*) di |
| **45.** | | **Michael:** | No |
| **46.** | 00:05:16 | **Milin:** | Two reds and ... |
| **47.** | | **Michael:** | Here, I'll do this. I'll do that one. Take an |
| **48.** | | **Milin** | I already got this. No, Mike don't do that ' already got ... |
| **49.** | | **Michael:** | Ha ha (*Michael makes the tower before M* |

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**Line Time Name Transcript *Manjit K. Sran***

| Line | Time | Name | Transcript |
|---|---|---|---|
| **50.** | 00:05:38 | **Milin:** | Mike we can't do it like this can we? |
| **51.** | | **Michael:** | If we didn't do it, yeah, no, turn it. Go to t |
| **52.** | | **Milin:** | Yeah we could |

| 53. | 00:05:57 | Michael: | Yeah. I got this one. I got it Mil. How man<br>13...oh, wait a minute. 2, 4, 6, 8 ... 16. Thi<br>altogether, how many do we have? |
|---|---|---|---|
| 54. | | Milin: | *(shrugs his shoulders)* sixteen |
| 55. | | Michael: | What's sixteen times two? What's sixteen |
| 56. | | Milin: | Huh? |
| 57. | | Michael: | What's sixteen times two? |
| 58. | | Milin: | No see 2, 4, 6, 8 ... 16. |
| 59. | 00:06:41 | Michael: | Yeah what's sixteen plus sixteen? |
| 60. | | Milin: | You can't do that 'cause I counted by 2's |
| 61. | | Michael: | 1, 2, 3, 4 ... |
| 62. | 00:10:40 work | Milin: | Sixteen. Right! |
| 63. | | Michael: | Never mind. |
| 64. | | Milin: | See? 2,4,6,8,10,12,14,16. |
| 65. | | Michael: | Never mind |
| 66. | 00:10:52 | Milin: | I just counted by two's |
| 67. | | Michael: | Yeah, but I still get that. Did we do this on<br><br>*(Michael is holding a tower with four yello<br>bottom)* |
| 68. | 00:11:00 work | Milin: | I just had this one *(Milin adds Michael's to* |
| 69. | | Michael: | No you didn't do that. |

**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| **70.** | 00:07:19 | **Milin:** | Y eah |
| **71.** | | **Michael:** | You did |
| **72.** | | **Milin:** | I did. The other way. See right here. |
| **73.** | | **Michael:** | But you didn't have an opposite to it so . Y right... |
| **74.** | | **Milin:** | See, this goes like this, so this stays on the bottom and this stays on the bottom. |
| **75.** | | **Michael:** | we got another pair |
| **76.** | | **Milin:** | So that one would be the same as this |
| **77.** | | **Michael:** | No it wouldn't |
| **78.** | | **Milin:** | And this one would go like this (*Milin flip.* |
| **79.** | | **Michael:** | Y eah |
| **80.** | | **Milin:** | No, different like this then it would be the *back the way it was)* |
| **81.** | | **Michael:** | Yeah, well it's a different match. So put it (*Michael makes the new tower and put it i* Gotcha. Eighteen. I did it Mil. |
| **82.** | | **Milin:** | I know, I know, you did? What about for t |
| **83.** | | **Michael:** | I did that |

| | | | |
|---|---|---|---|
| 84. | | Milin: | How? Okay. This goes with what? |
| 85. | | Michael: | This, Mil. Look, these ... |
| 86. | | Milin: | Oh yeah. 8:27 |
| 87. | | Michael: | Go together. These go together. |
| 88. | | Milin: | Okay, okay. |

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**Line Time Name Transcript *Manjit K. Sran***

| | | | |
|---|---|---|---|
| 89. | | Michael: | These go together. |
| 90. | | Milin: | No, no, no, no, these two could be the sam |
| 91. | | Michael: | These go together look. These go together together |
| 92. | | Milin: | Yeah, you're right |
| 93. | | Michael: | These go together. These go together. Two maybe not |
| 94. | | Milin: | Did we do this? |
| 95. | | Michael: | Let's see |
| 96. | | Milin: | No |
| 97. | | Michael: | I don't think so |
| 98. | | Milin: | We couldn't have. I got this one. I got this |

| | | | |
|---|---|---|---|
| | | | (*Michael tries a tower to see if it is the opp*... *opposite tower*) |
| 99. | | **Michael:** | Y eah |
| 100. | | **Milin:** | All of these reds turned yellow. |
| 101. | | **Michael:** | Yeah, yeah, yeah, yeah. Did we do this? 9. |
| 102. | | **Milin:** | I think ... could ... here ... uh oh. |
| 103. | | **Michael:** | Ah! |
| 104. | | **Milin:** | Switch them to yellows. (*Milin starts build*... that 10.06 |
| 105. | | **Michael:** | (*Michael Moves the new pair*) |
| 106. | | **Milin:** | Did I do this one? |
| 107. | | **Michael:** | Yeah. Its fine ... 20 altogether. |
| 108. | | **Milin:** | So far twenty. So anybody that said fifteen |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| 109. | | **Michael:** | Yeah. Twenty? What? |
| 110. | | **Milin:** | So anybody that said fifteen must be wron... |
| 111. | | **Michael:** | I don't know |
| 112. | | **Milin:** | But didn't you say if you go like um this (... knocked the other tower off the table) |

| 113. | | Michael: | But you can't do this.*(Milin switches the t... fallen tower next to it)* They didn't say you... |
| 114. | | Milin: | But we might have. |
| 115. | | Michael: | No, we didn't. *(Michael starts rearrangin... Here It'll give us more room. In case we h... something... |
| 116. | | Milin: | This |
| 117. | | Michael: | Yeah alright |
| 118. | | Milin: | Do we have three on the bottom and one o... |
| 119. | 00:15:15 work | Michael: | That's only four. |
| 120. | | Milin: | No, but do we have the opposite of this? U... |
| 121. | | Michael: | Here put it ...<span style="color:red">11:44</span> |
| 122. | | Milin: | Nah |
| 123. | | Michael: | Put another red on top. |
| 124. | | Milin: | Do we have This. No. *( as Mike compares... |
| 125. | | Michael: | Something ain't right. We didn't make a m... |

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**Line Time Name Transcript *Manjit K. Sran***

| 126. | | Milin: | Three on the top ... |
| 127. | | Michael: | That's a match. Put that together before. D... for something. |

| 128. | | **Milin:** | Why? |
|------|--|------------|------|
| 129. | | **Michael:** | 'cause it doesn't make any sense. *(Milin a... collection)* |
| 130. | | **Milin:** | 2,4, 6, 8, 12...12 |
| 131. | | **Michael:** | Oh I guess so |
| 132. | | **Milin:** | We haven't missed a match |
| 133. | | **Michael:** | Are we sure everything matched |
| 134. | | **Milin:** | That we're, we're losing ... do we do three |
| 135. | | **Michael:** | I think I did that. Yeah we did that. |
| 136. | | **Milin:** | Where? |
| 137. | | **Michael:** | Oh, two on the bottom and two on the top' |
| 138. | | **Milin:** | This? |
| 139. | | **Michael:** | Yeah, we did it. |
| 140. | | **Milin:** | No, we didn't. |
| 141. | | **Michael:** | Right here *(Michaels checks the tower Mil...* |
| 142. | | **Milin:** | How? *(Milin puts the tower back)* |
| 143. | | **Michael:** | No, we didn't make a match for it. See. I k... something. This goes together. This goes t... |
| 144. | | **Milin:** | These go together |
| 145. | | **Michael:** | This goes together. See we did it. No we d... |

| 146. | | **Milin:** | We didn't |
|---|---|---|---|

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**Line Time Name Transcript** *Manjit K. Sran*

| 147. | | **Michael:** | Alright |
|---|---|---|---|
| 148. | | **Milin:** | But this has to, no, yeah but then these two have to ... ah! |
| 149. | | **Michael:** | Oh yeah we did it. |
| 150. | | **Milin:** | Where? |
| 151. | | **Michael:** | Right here. |
| 152. | | **Milin:** | No |
| 153. | | **Michael:** | Y eah |
| 154. | | **Milin:** | No, there *(takes tower apart)* did we do th |
| 155. | | **Michael:** | Um that me |
| 156. | | **Milin:** | I don't think so |
| 157. | | **Michael:** | Uh huh |
| 158. | | **Milin:** | Not three yellows in the middle not three These two go together. 14.10 |
| 159. | | **Michael:** | We could make a lot more if we had one |
| 160. | | **Milin:** | Blue. Yellow. If we had green I could put |

| | | | |
|---|---|---|---|
| 161. | | Michael: | Wait, I think I just got one. I think I just g[ ]<br>make two |
| 162. | | Milin: | One on the bottom? *(Michael compares to* |
| 163. | | Michael: | Yeah. I think I got one |
| 164. | | Milin: | One on the bottom? |
| 165. | | Michael: | We didn't do it. We didn't do it Mil. |
| 166. | | Milin: | I think twenty-eight uh huh *(R1 arrives to* |
| 167. | | R1 | How are you working at it? *(Mike counts)* |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| 168. | | Michael: | We got twenty-eight |
| 169. | | Milin: | Because, see every time we make it like th[ ]<br><br>15.25 |
| 170. | | R1 | Y eah |
| 171. | | Milin: | Then we change the color, like this. |
| 172. | | R1 | Oh, so they come like that. 15.33 |
| 173. | | Milin: | So we get doubles of this and this and all t |
| 174. | | R1 | Uh huh. So that's what you have done all a |
| 175. | | Milin: | Uh huh. |
| 176. | | R1 | Do you think there are more? |

| 177. | | Michael: | May be |
|---|---|---|---|
| 178. | 00:19:29 work | Milin: | Y eah |
| 179. | | R1 | How are you gonna be able to tell... |
| 180. | | Michael: | I don't know. Put them together and see if |
| 181. | | Milin: | When we lose all these use up the cubes |
| 182. | | R1 | Uh, we have plenty more. But you have 28 |
| 183. | | Michael: | Y eah |
| 184. | 00:16:02 People | R1 | Well, I'll come back and see if you have a |
| 185. | | Milin: | Do we have ... |
| 186. | | Michael: | Hey. We did ...let me see |
| 187. | | Milin: | This |
| 188. | | Michael: | Yellow, red yellow, yellow |
| 189. | | Milin: | Yes. Double. Lets see if this has a double. |

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**Line Time Name Transcript** *Manjit K. Sran*

| 190. | | Michael: | We just did this one |
|---|---|---|---|
| 191. | | Milin: | No, this doesn't, until now. This ... ok two |
| 192. | | Michael: | We did it |
| 193. | | Milin: | Phew |

| | | | |
|---|---|---|---|
| **194.** | | **R3:** | Hi there. |
| **195.** | 00:21:17 work | **Milin:** | So far we only got twenty-eight |
| **196.** | | **R3:** | Twenty-eight |
| **197.** | | **Michael:** | That's pretty ... |
| **198.** | | **R3:** | What did you say Michael? I'm sorry I did |
| **199.** | | **Michael:** | No I said that's ... he said we only had twe |
| **200.** | | **R3:** | Okay, do you think there are any more? 17 |
| **201.** | | **Milin:** | Maybe. |
| **202.** | | **Michael:** | Ooo ... |
| **203.** | | **Milin:** | Y eah |
| **204.** | | **R3:** | Michael. |
| **205.** | | **Michael:** | Maybe |
| **206.** | | **R3:** | Yes and maybe. Okay. You probably want Are you sure that they're all different towe |
| **207.** | | **Michael:** | Yeah. |
| **208.** | | **Milin:** | Yes. |
| **209.** | | **R3:** | How do you know that? |
| **210.** | 00:21:41 work | **Milin:** | Because everything we get, we make it lik |
| **211.** | | **R3:** | Uh hum. |

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| Line | Time | Name | Transcript |
|------|------|------|-----------|
| **212.** | | **Milin:** | Right now I am going to check, see its not |
| **213.** | | **Michael:** | We made that one. |
| **214.** | | **Milin:** | Where? *(Michael points to the tower)* |
| **215.** | | **R3:** | Ah, so you check by moving it along here? |
| **216.** | | **Milin:** | Yeah. |
| **217.** | | **Michael:** | Yeah. |
| **218.** | | **R3:** | Okay. |
| **219.** | 00:18:13 people | **Milin:** | Did we make it this way? |
| **220.** | | **R3:** | Also is there anything else that helps you t |
| **221.** | | **Milin:** | Um, we just keep on checking to see if ... t do it every way like we get that um ... we a these and five of the reds so we are not go *about his solid towers)* |
| **222.** | | **R3:** | Okay. I have a question. There is somethin Michael doing this. Michael maybe you co that your towers, there seems to be someth about these two? |
| **223.** | | **Michael:** | We make ... |
| **224.** | | **Milin:** | See this goes like this and this turns to yel from ... |

| 225. | | Michael: | They are like opposites. |
|---|---|---|---|
| 226. | | Milin: | Yellow to red ... |
| 227. | | R3: | Like opposites what do you mean by oppo |
| 228. | | Milin: | Like um when have this we change the co |

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**Line Time Name Transcript** *Manjit K. Sran*

| 229. | | R3: | You agree with that Michael? |
|---|---|---|---|
| 230. | | Michael: | Yeah like here. |
| 231. | | R3: | Show me. |
| 232. | | Michael: | We changed, we changed from, we made t yellow to red, these from red to yellow. Fr yellow. |
| 233. | 00:23:13 work | R3: | Okay and that's interesting. Did you do th |
| 234. | | Milin: | Yes |
| 235. | | Michael: | Yeah. That's how we got all these. |
| 236. | | R3: | That's how you got all of them. Okay. I an these. Okay. Call me when you think you' |
| 237. | | Michael: | We did that one. I just did... tried that. |
| 238. | | Milin: | Its right there. Maybe just go like this |
| 239. | | Michael: | I gotta feeling ... did that |

| 240. | | Milin: | Is there a perfect match? |
|---|---|---|---|
| 241. | | Michael: | We did that |
| 242. | | Milin: | Here's an exact perfect match. Yep. Perfec a perfect match on this? Yep, yep. We hav What about ... make three reds. |
| 243. | | Michael: | We did that. 3 reds and 2 yellows |
| 244. | | Milin: | Nah! That is too much. |
| 245. | | Michael: | I know |
| 246. | | Milin: | We didn't try this. |
| 247. | | Michael: | Gotcha. |
| 248. | | Milin: | Come on. We have its opposite! |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| 249. | | Michael: | We do? |
| 250. | | Milin: | No, I made this opposite make this its opp have this an, an opposite instead. *(Milin p* |
| 251. | | Michael: | No, I you turn it upside down. Go ahead. 1 |
| 252. | | Milin: | But, see? Now we have to make an opposi |
| 253. | | Michael: | My eyes went weird. Whoa, whoa, whoa, made? |
| 254. | | Milin: | This. |

| 255. | | **Michael:** | What are you talking about? |
|------|--|--------------|------------------------------|
| 256. | | **Milin:** | See, I see look this is a perfect match. Nov for this. |
| 257. | | **Michael:** | This is nuts. This is nuts. This is nuts. We' |
| 258. | | **Milin:** | We have this so ... |
| 259. | | **Michael:** | No, we got it. Its right here. |
| 260. | | **Milin:** | But do we have it here? There's probably |
| 261. | | **Michael:** | Yeah there is gotta be *(counts towers)* 30. |
| 262. | | **Milin:** | Thirty? There's gotta be another pair. I'm TV Mike. |
| 263. | | **Michael:** | Mil, I doubt it. |
| 264. | | **Milin:** | Mikey, look over there. Hands are on TV. |
| 265. | | **Michael:** | Mumbles |
| 266. | | **Milin:** | Do we have this? Mike, Mike, mike, mike |

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**Line Time Name Transcript** *Manjit K. Sran*

| 267. | | **Michael:** | We do. I made it remember. |
|------|--|--------------|-----------------------------|
| 268. | | **Milin:** | Where? Yellow/red/yellow/red/red |
| 269. | | **Michael:** | Maybe not |
| 270. | | **Milin:** | Yeah thirty-two. Thirty-two, I think we're |

| 271. | | Michael: | Hmm. |
|---|---|---|---|
| 272. | | Milin: | Just see. I think I got ... I'm on to one, yea these. |
| 273. | | Michael: | Okay, I got it already, Mil maybe we ough |
| 274. | | Milin: | No, there's |
| 275. | | Michael: | Thirty things in the way. No, don't move t (Milin and Michael are rearranging the se |
| 276. | | Milin: | How many do we have altogether? |
| 277. | | Michael: | Thirty-two |
| 278. | | Milin: | I just want to make sure because I think so |
| 279. | | Michael: | Oh, no thirty-four. We just made one. |
| 280. | | Milin: | Oh, yeah, yeah thirty-four. I think I am co |
| 281. | 00:25:49 00:29:34 | Michael: | No, there's got to be one more. There's go |
| 282. | | Milin: | See if you do this right? Then this, right? of that. see? This on the other way. They d |
| 283. | | Michael: | Hey, I think you have got that. |
| 284. | | Milin: | So that means we have to come up with si |
| 285. | | Michael: | No, I don't think so. |

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**Line Time Name Transcript *Manjit K. Sran***

| 286. | | R1 | About done? |
|---|---|---|---|
| 287. | | Milin: | We have about thirty-four now. |
| 288. | | R1 | About? Exactly or about? |
| 289. | | Milin: | Exactly, exactly. |
| 290. | | R1 | Show me. |
| 291. | | Michael: | I don't think so |
| 292. | | Milin: | All that plus 2 more. |
| 293. | | Michael: | Thirty-six |
| 294. | | R1 | You have thirty-six? |
| 295. | | Milin: | Thirty-six |
| 296. | | R1 | Now how are we going to decide if you ha |
| 297. | | Milin: | Because see we still keep on going like thi |
| 298. | | R1 | Yeah. |
| 299. | | Milin: | It's a duplicate of this so we can't use this. |
| 300. | | R1 | Oh, I understand that but what about the o be sure that there aren't any duplicates the |
| 301. | | Milin: | Because we always keep on going like this duplicates, in our way... Mike, this can't be |
| 302. | | R1 | Yeah because that's a copy of one |
| 303. | | Michael: | Yeah, I know. I just want to check somethi |

| 304. | | R1 | You already have? |
|------|---|------|-------------------|
| 305. | | Michael: | Think there's one more left? |

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**Line Time Name Transcript** *Manjit K. Sran*

| 306. | | Milin: | If there is there's... |
|------|---|--------|------------------------|
| 307. | | R1 | You know I am just busy looking and I thi[...] over towards the bottom down there. See i[...] check that out. |
| 308. | | Milin: | No |
| 309. | | R1 | Another one besides ... |
| 310. | | Milin: | This? This. Yeah, this is a dupli... |
| 311. | | R1 | What do you think? |
| 312. | | Milin: | It's a duplicate |
| 313. | | R1 | Why'd you take two? |
| 314. | | Michael: | 'cause they're, we made them like we mac[...] |
| 315. | | Milin: | These two, one of this and this is out ... the[...] |
| 316. | | Michael: | Took the bottom? |
| 317. | | R1 | How many do you have now? |
| 318. | | Milin: | Thirty-four, thirty-four, we had thirty-six a[...] just trying to figure out if we have any mo[...] alright. |

| | | | |
|---|---|---|---|
| **319.** | | **R1** | Count them for me, I can't do it. |
| **320.** | | **Michael:** | 2, 4, 6, 8, 10...32 |
| **321.** | | **R1** | Thirty-two |
| **322.** | | **Milin:** | How did we lose four? |
| **323.** | | **R1** | Maybe there's some that you took out? |
| **324.** | | **Milin:** | Let's see if this one is a duplicate. |
| **325.** | | **Michael:** | Remember the one we were about to make came? I counted that in. that's |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| | | | how we got the four left. The four out, I ju |
| **326.** | | **Milin:** | Nah, this, this doesn't have any exact dupl |
| **327.** | | **R1** | Any ideas about how you can tell if you're |
| **328.** | | **Milin:** | Um, if we keep on doing these and we kee |
| **329.** | | **R1** | That's a one way. |
| **330.** | | **Milin:** | Then we'll probably be done. |
| **331.** | | **R1** | Really, why? What makes you think you'r |
| **332.** | | **Milin:** | 'cause we only, see, we keep on, we just fo |
| **333.** | | **Michael:** | And its getting harder and harder as we go |
| **334.** | | **R1** | I bet it is. Gets harder and harder |

| 335. | | **Michael:** | To keep finding them. |
|---|---|---|---|
| 336. | | **Milin:** | So when it gets too hard and we can't mak<br>about four minutes without making some r<br>Because every like one minute we made o |
| 337. | | **R1** | Do you think there is any way ever to kno<br>or not. |
| 338. | | **Milin:** | Uh huh |
| 339. | | **Michael:** | No I don't think so. |
| 340. | | **R1** | You don't think there is any way to know :<br>looking and kept looking you really might |
| 341. | | **Milin:** | If you had ... |
| 342. | | **Michael:** | Maybe |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| 343. | | **Milin:** | But that's only if you are really not done. |
| 344. | | **R1** | Only if you are really not done. So you're<br>is a done... you really think there really is<br>more. |
| 345. | | **Michael:** | Y eah |
| 346. | | **Milin:** | Because see ... |
| 347. | | **R1** | Why? |

| | | | |
|---|---|---|---|
| 348. | | Milin: | Um. We could make a duplicate of this see but we, we change the colors so then that keep on doing it |
| 349. | | R1 | You mean different colors. |
| 350. | | Michael: | Y eah |
| 351. | | R1 | But we can't do that 'cause we just counte |
| 352. | | Milin: | See if we have this, right? We change all t to reds ... |
| 353. | | R1 | Hmm, but you've already done that, haver it? I wonder I wish I could come up with a |
| 354. | 00:31:56 | Milin: | Maybe there's an answer sheet? I think we does Michael. So that's more than ten min |
| 355. | | R1 | Has it really been a long time? |
| 356. | | Milin: | Cannot have one |
| 357. | | R1 | I keep wondering if there's some way you |
| 358. | | Milin: | Uh, there is one way. If you take hundred |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| 359. | | R1 | Its just a matter of ... do you know what y think you are done? Let me go find out. |
| 360. | | Milin: | We have gotta be done. |
| 361. | | Michael: | mm. |

| | | | |
|---|---|---|---|
| **362.** | | **Milin:** | Kids think they are done, right? Only up to |
| **363.** | | **Michael:** | And we got thirty-four, thirty-four |
| **364.** | | **Milin:** | Ifshefindsonemoreforuswegotalotmoretod today. |
| **365.** | | **Michael:** | We still got tomorrow I think. |
| **366.** | | **Milin:** | Yeah, but tomorrow, this is gonna be all w |
| **367.** | | **Michael:** | No, not really |
| **368.** | | **Milin:** | Could be. |
| **369.** | | **Michael:** | Not if she puts them in a bag. |
| **370.** | | **Milin:** | With our names on it. I'll go get and ... ok |
| **371.** | | **R3:** | Okay you have thirty-four |
| **372.** | | **Michael:** | Thirty-two wasn't it? |
| **373.** | | **R3:** | I don't know |
| **374.** | | **Milin:** | No, thirty-two |
| **375.** | | **R3:** | I am trusting in the two of you. So can you |
| **376.** | | **Michael:** | Mike counts |
| **377.** | | **Milin:** | How much do you get so far? |
| **378.** | | **Michael:** | Thirty-two |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| | | | |

| 379. | | R3: | Thirty-two. Alright. How did you find all |
| 380. | | Milin: | You made duplicates. But you have to cha |
| 381. | | R3: | Okay, explain to me what duplicates are? |
| 382. | | Milin: | Like, see |
| 383. | | R3: | Where you change the color. |
| 384. | | Milin: | See, you have this right? |
| 385. | | R3: | Hmm. |
| 386. | | Milin: | These two look the same but see this chan this changes to yellow, and this changes to |
| 387. | | R3: | Okay, Michael you show me a pair of dup |
| 388. | | Michael: | This, this yellow compares to red, red com yellow and these yellows compare to the t |
| 389. | | Milin: | And all these compare to each other |
| 390. | | R3: | Alright. Why do you think you found then |
| 391. | | Milin: | Because it took us one minute to find anot minutes left? |
| 392. | | R3: | Its taking a long time to find it. Have you |
| 393. | | Milin: | Nah uh |
| 394. | | R3: | No? |
| 395. | | Milin: | We just lost some |
| 396. | | R3: | What do you mean you just lost some? |

| 397. | | Milin: | Because we made a duplicate of two |

**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| 398. | | Michael: | We made like these two the same and thes |
| 399. | | R3: | I see, so you, you had a pair there that was |
| 400. | | Milin: | Y eah |
| 401. | | Michael: | Y eah |
| 402. | | R3: | Okay. And you feel pretty convinced abou |
| 403. | | Michael: | Uh hum |
| 404. | | Milin: | Y eah |
| 405. | | R3: | Alright okay, just sit tight, then. I think we minute. Alright. |
| 406. | | Milin: | I thought we were supposed to leave five |
| 407. | | R3: | No, this is, we're having an extended math for a little while , okay you'll be here for a |
| 408. | | Milin: | Oh! |
| 409. | | Michael: | Uh huh |
| 410. | | R3: | You see, now make sure that you've thoug others.<br><br>Okay? |

| | | | |
|---|---|---|---|
| **411.** | | **Milin:** | Could this be? |
| **412.** | | **Michael:** | Oh, great they're out of here. |
| **413.** | | **Milin:** | How come? |
| **414.** | | **Michael:** | Check it out dude |
| **415.** | | **Milin:** | Let me see |
| **416.** | | **Michael:** | That's what I was actually checking for. W anymore we only have thirty |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| **417.** | | **Milin:** | There's gotta be more. (*Someone says thir* lose some right now I'm telling ya. I wish Really then I would get like fifty. There's thirty-two. |
| **418.** | | **Michael:** | Well we had thirty-six and then we lost fou |
| **419.** | | **Milin:** | Check if we have this. Yellow, yellow, yel |
| **420.** | | **R3:** | We're ------to now talk about ... |
| **421.** | | **Michael** | This looks familiar |
| **422.** | | **Milin** | Sighs |
| **423.** | | **Milin** | We have got to get one more |
| **424.** | | **Michael** | There's gotta be- |
| **425.** | | **Milin** | I think this was there |

| 426. | | **Milin** | Check if we have any of these two |
|---|---|---|---|
| 427. | | **Milin** | Guess not. Now how many do we have? |

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## *10.4TRANSCRIPT - SHARING SESSION ON 2/6/92*

200

**Line Time Name Transcript** *Manjit K. Sran*

| 1. | | **Jeff:** | We Have... |
|---|---|---|---|
| 2. | 00:00:00 | **R2:** | Okay. But hold on a minute Jeff:, I am go many did you find? |
| 3. | | **Jeff:** | We are not sure |
| 4. | | **Michelle:** | Well so far we found thirty two. |
| 5. | | **R2:** | Okay Michelle says thirty two, but the wa made some extras you are telling me to e: |
| 6. | | **Michelle:** | Yeah we found some extras. |
| 7. | | **Jeff:** | We need some more colors though we do |
| 8. | 00:00:24 | **R2:** | Oh! We can get you some more colors if y how many did you make? |
| 9. | | **Stephanie:** | We made thirty four but we are still check two duplicates |
| 10. | | **R2:** | Oh! Did anybody else here get thirty four thirty four. What about this group over he |

| 11. | | **Michael:** | Thirty two. |
| 12. | | **Milin:** | Thirty two. |
| 13. | | **R2:** | You have thirty two. Did any other group groups here in the front that got thirty two Sebastian? |
| 14. | | **Sebastian** | Thirty five. |
| 15. | | **R2:** | You have thirty five. Okay, do you think i number? |
| 16. | | **Students:** | No. |
| 17. | | **R2:** | They have an odd number thirty five. |
| 18. | | **Michael 2:** | You can't because when you have a numb |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | have the opposite if you have one of this because it is the opposite...If you have ter one that's opposite so it makes twenty. |
| --- | --- | --- | --- |
| 19. | | **R2:** | So what you are telling us, Sebastian and thirty four or thirty six? Do you believe tl saying? Does that make any sense? |
| 20. | | **Students:** | Uh huh! |
| 21. | | **R2:** | What do the rest of you think? Do you thi think Jennifer? |

| 22. | 00:01:28 | Jennifer: | It makes sense, but he could have what ev<br>depends if he put it opposite or not oppos |
|---|---|---|---|
| 23. | | R2: | So he might not have used an opposite wa<br>What do you think about that? |
| 24. | | Student: | I think originally he has thirty six but if y<br>to not doubles like umm...but different co<br>red, red or it could go yellow, red, yellow<br>make it go to thirty four could be the sam |
| 25. | | R2: | But could it be thirty five? |
| 26. | | Michael 2: | It could be, but then you would need anot |
| 27. | | R2: | I see. What do you think back there? |
| 28. | | Milin: | Um, we got thirty six before, but then we<br>got thirty two and we keep on duplicating<br>can't get an odd number unless you don't |
| 29. | | R2: | You know what I am interested in? I am i<br>you who think you have found all possibi<br>guess some of you think there are only th<br>there are more than thirty two. Maybe, wl<br>who think there are more |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | than thirty uh who think there are only thi<br>the patterns of the people who found mor<br>duplicates. What do you think about that? |
|---|---|---|---|

| 30. | 00:03:00 | Dina: | When Robert said that he had thirty five, 'em of these in a same color like this like *then takes a ten tall tower of all brown)* w could split them into five like two fives a odd number so maybe he could have he c so we could split this into fives. |
|---|---|---|---|
| 31. | | R2: | Why don't we take a look to see what Seb claims he has thirty five. Some of you he take a look and see what was built by Rol think? Do you see any duplicates there? N there are thirty five gee, I don't know. Di of you think you have really good method to come and peek? Anyone here find a du |
| 32. | | Milin: | There's thirty four! *(there are really thirt* |
| 33. | | R2: | There are thirty four? |
| 34. | | Student: | Yeah. *(Student counts the towers made by* thirty five. *( miscounted)* |
| 35. | | R2: | You have thirty five. Those of you who fo they have three that ought to be duplicate able to find them. Want to study this for a you a few minutes to study it. |
| 36. | | Student: | I found two |
| 37. | | Ankur: | We found a duplicate! |
| 38. | | R2: | Oh! You found a duplicate. Show me the both of those away. You are gonna keep c Good! Do you agree? Do you agree Robe |

**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| | | | that's a duplicate? Okay. |
| 39. | | Michael: | I think there is another one. |
| 40. | | Ankur: | Found one. Here is another duplicate |
| 41. | | R2: | Okay! You boys agree there's another du |
| 42. | 00:05:13 | Milin: | Y es! |
| 43. | | R2: | Okay. Now how many do you have? |
| 44. | | Student: | Thirty two |
| 45. | | Ankur: | Thirty two oh yeah thirty three |
| 46. | | Milin: | There's got to be thirty two |
| 47. | | Student: | There is no more duplicates. |
| 48. | | Student: | Has to be, there has to be. |
| 49. | | Michael: | Let me see that one. |
| 50. | | R2: | Okay. Ones that are out why we don't put mixed up. Is that another duplicate? |
| 51. | | Michael: | Yeah. |
| 52. | | R2: | Okay, we found another. Now let's see wl then? What did you think Alex? |
| 53. | | Michael 2: | One two three...thirty. I missed some. |

| 54. | 00:06:10 | R2: | What about the ones that Mrs. Barnes has |
|-----|----------|-----|----------------------------------------------|
| 55. | | Ankur: | Those are duplicates. |
| 56. | | Milin: | Those are duplicates. |
| 57. | | Michael 2: | Two, four, six, eight, ten...eighteen was it one. |
| 58. | | R2: | So. Is it possible to have thirty one? |

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**Line Time Name Transcript** *Manjit K. Sran*

| 59. | | Students: | No |
|-----|----------|-----|----------------------------------------------|
| 60. | | R2: | Okay. Got to find that other one then or e |
| 61. | | Student: | There is two of the same one. |
| 62. | | Teacher: | Okay, hand me one. |
| 63. | | Ankur: | Okay, so they have thirty two. |
| 64. | | R2: | How many? |
| 65. | | Ankur: | Thirty two. |
| 66. | 00:06:50 | R2: | Okay, you absolutely convinced? What d<br>Are they convinced? |
| 67. | | Students: | 14, 16, 18, 20, 22...30, 31(counting the to |
| 68. | | Student: | There is one more duplicate |
| 69. | | Teacher: | Got to figure out which one it is. |

| | | | |
|---|---|---|---|
| **70.** | | **Milin:** | It's either that or we took more out than t... |
| **71.** | | **Teacher:** | Well maybe somebody is not counting rig... |
| **72.** | | **Students:** | Sebastian said he found a duplicate |
| **73.** | | **Teacher:** | There is one on the floor there. |
| **74.** | | **Student :** | This is confusing. |
| **75.** | | **Teacher:** | Somebody is not counting them right. |
| **76.** | | **Student:** | Wait wait wait |
| **77.** | | **Teacher:** | Let's have one person count them instead... once. Let Michael count them. Michael, s... |
| **78.** | | **Michael 2:** | Which ones? These? (he points to a group... |
| **79.** | | **Teacher:** | Count them all. Bobby says these are the... |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| | | | out |
| **80.** | | **Ankur:** | Those are the duplicates. |
| **81.** | | **Teacher:** | Put them up. One person should count the... |
| **82.** | | **Student:** | There should be thirty two |
| **83.** | | **Teacher:** | Yes. There is three out and you started wi... |
| **84.** | | **Michael 2:** | Two, four, six, eight, ten, twelve, fourteen... two, twenty four, twenty six, twenty eight... |

| | | | |
|---|---|---|---|
| **85.** | 00:08:26 | **R2:** | Now let me ask you a question here, how out if you think there is an extra one or y |
| **86.** | | **Ankur:** | One missing |
| **87.** | | **R2:** | How could you...You have a strategy for How could you do that? |
| **88.** | | **Milin:** | You could take one to thirty six. |
| **89.** | | **Student:** | - and then which ever one doesn't have a |
| **90.** | | **R2:** | Is that a good strategy? Why don't you w prize for finding that one if there is one? |
| **91.** | 00:08:58 | **Milin:** | Its either that or you could check with ou *the room)* |
| **92.** | | **Michael 2:** | I found a match a match Yes I did this is |
| **93.** | | **Teacher:** | Leave them here till you find matches *(sh* |
| **94.** | | **Students:** | This is a match. These are matches. |
| **95.** | | **Milin:** | This has got to get a match |
| **96.** | | **Student:** | Wait. |
| **97.** | | **Student:** | Found another match |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| **98.** | | **Student:** | These are two the same take one. |
| **99.** | | **Teacher:** | Okay, choose one person alright here. |

| 100. | | Student: | Now we have thirty |
|---|---|---|---|
| 101. | | Teacher: | Okay, Bobby |
| 102. | | Student: | Now we have thirty |
| 103. | | Teacher: | No, we put the others back in. |
| 104. | | Student: | We should have all duplicates. |
| 105. | | Ankur: | Did you put the duplicates back in? |
| 106. | | Teacher: | Because we didn't know which ones are t |
| 107. | | Ankur: | There's more duplicates |
| 108. | | Michael 2: | Found another one |
| 109. | | Teacher: | Michael what do you mean by duplicates' |
| 110. | | Milin: | We say matches ( he is holding up a towe because this changes these two could be r |
| 111. | | Michael: | I just called it a match. |
| 112. | | Teacher: | What do you mean by duplicates? |
| 113. | | Michael 2: | I didn't say duplicate he did *(point to the* |
| 114. | | Teacher: | What are you saying? Find a match? Wha |
| 115. | | Michael 2: | They go together see? |
| 116. | 00:10:34 | Milin: | See, right here all these turn yellow *( he i and two yellows)* and these two turn red |
| 117. | | Michael 2: | Its' a match |

**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| **118.** | | **Student:** | Hey! Here's a match |
| **119.** | | **Michael 2:** | No, that's not a match. |
| **120.** | | **Milin:** | This could be a match. |
| **121.** | | **Matt:** | No its not (he is holding the inverted pair |
| **122.** | | **Milin:** | If you put it the other way yeah. |
| **123.** | | **Student:** | I found a match. |
| **124.** | | **Student:** | I found a match. |
| **125.** | | **Ankur:** | Let me see those two. This is a match. Mi |
| **126.** | | **Student:** | Aren't these the same? |
| **127.** | | **R2:** | Where are you putting your matches? Are other? Are you putting them along side e record of them here? |
| **128.** | | **Teacher:** | Let's let Sebastian and Bobby find it. Let |
| **129.** | | **R2:** | You boys need to move back |
| **130.** | | **Teacher:** | Bobby and, Joey you need to move aroun question what did you mean by the oppos show us? Because you have yours in pairs about your pairs. Joe you want to come a Joe come here there is plenty of room. Ok explain |

| 131. | | Michael 2: | See when it is the opposite see we call it a |
|------|--|------------|----------------------------------------------|
| 132. | | Teacher: | Okay, can you explain a little bit more ab |

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**Line Time Name Transcript** *Manjit K. Sran*

| 133. | 00:12:43 | Michael 2: | You do it. (Michael asks his partner to ex |
|------|----------|------------|---------------------------------------------|
| 134. | | Student: | Well, These are a pair because these two and this is yellow and this is red, red yell colors in the left tower to the colors in the |
| 135. | 00:12:58 | Milin: | I know what they mean. See this yellow t these reds turn into yellow in this one |
| 136. | | R2: | Oh good! Okay, I see what you mean. I se |
| 137. | | Ankur: | You switch them |
| 138. | | R2: | What are you switching? |
| 139. | | Milin: | This color changes into this ( he points to |
| 140. | | Students: | You switch the colors around |
| 141. | | R2: | You are switching the colors. Oh I see yo yellow and yellow to the red that's what |
| 142. | | Teacher: | Michael what, how did you use that as a s |
| 143. | | Michael 2: | See, what I- |
| 144. | | Teacher: | What made to come up with that? |

| 145. | | Michael 2: | See when I found it I found another one I I said to Paul that We should make al thes ten we get twelve.. |
|------|--|------------|------------------------------------------------------------------------------------------------------------|
| 146. | 00:13:48 | Milin: | They got doubles |
| 147. | | Teacher: | May be they have them mixed up a little. |
| 148. | | Paul: | We still have doubles |
| 149. | | Teacher: | Don't have a double. |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|------|--|------------|------------------------------------------------------------------------------------------------------------|
| 150. | | Michael 2: | Let me see. |
| 151. | | R2: | Ah huh! |
| 152. | | Milin: | Doubles. Doubles (Michael is looking at and this are doubles you can't take those and the fourth towers. |
| 153. | | R2: | Which is the top and which is the bottom top of the tower? Can you show me what |
| 154. | | Student: | Shows the chimney side of a tower |
| 155. | | R2: | On the ones you think are doubles can yo see them? So they look the same to me I s that? Maybe we should hear from somebo |
| 156. | | Michael 2: | Yeah we had some of these left. I thought forgot to break them apart. |

| 157. |  | Teacher: | Let's go over to Ankur. Hey Ankur I wan[...] going and getting yours. |
|------|--|----------|--------------------------------------------------------------------------|
| 158. |  | Ankur: | We ... |
| 159. |  | R2: | Hold on a minute Ankur, hold on a minut[...] |
| 160. |  | Teacher: | I want you to step back a little so we can [...] how you did yours. |
| 161. |  | Ankur: | I made one all red (he points to an all red [...] put one yellow and then I took another ye[...] yellow and left the bottom the same. I di[...] |
| 162. |  | R2: | Oh! That's very neat. Okay, I see how yo[...] neat. What about the others? |
| 163. |  | Ankur: | We just made anyone that way. |
| 164. |  | R2: | Oh! |

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**Line Time Name Transcript** *Manjit K. Sran*

| 165. |  | Teacher: | What made you stop following it? |
|------|--|----------|----------------------------------|
| 166. |  | Ankur: | We couldn't find any other ones. |
| 167. |  | Teacher: | Then after you stopped here and you coul[...] decide to go this way. |
| 168. |  | Ankur: | We did that from the bottom up |
| 169. |  | R2: | Let me ask you a question. In these I see [...] three reds, four reds right? ( she starts fro[...] |

| 170. | | **Ankur:** | Uh huh! |
|---|---|---|---|
| 171. | | **R2:** | I guess may be, five reds and here you ha yellows, four yellows, five yellows. Alrig very easily. You want to put this over her the five red tower and moves it next to th have trouble seeing that can you help me towers) |
| 172. | | **Ankur:** | We didn't do anything here. |
| 173. | | **R2:** | You want to think about that how you can very neat. Okay, think about how you can hear from somebody else? |
| 174. | | **Student:** | Not yet. Not yet. |
| 175. | | **R2:** | Not yet? |
| 176. | | **Stephen:** | Over here. Over here |
| 177. | 00:17:04 | **R2:** | Okay, give you a minute to get set up. |
| 178. | | **Teacher:** | Joe I want you to sit over there cause you Are you ready yet Stephen? |
| 179. | 00:17:37 | **Stephen:** | Almost. |
| 180. | | **Teacher:** | Okay, Stephen how did you go about solv |

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**Line Time Name Transcript *Manjit K. Sran***

| 181. | | **Stephen:** | Uh! |
|---|---|---|---|

| 182. |          | Focundo: | It just came out. |
|------|----------|----------|-------------------|
| 183. |          | T eacher: | What do you mean it just came out? |
| 184. |          | Focundo: | I just thought of them. |
| 185. |          | Teacher: | Okay, what did you start with? Do you re |
| 186. |          | Stephen: | Yeah, we started with ( his partner picked |
| 187. |          | Teacher: | And after you decided to do it that way w |
| 188. | 00:18:36 | Stephen: | This one (picks up four yellows and one r |
| 189. |          | Teacher: | What made you do it that way? |
| 190. |          | Stephen: | Because it is the opposite see red yellow, pair) |
| 191. |          | Teacher: | And where did you go from there? |
| 192. |          | Stephen: | Then we did, |
| 193. |          | Focundo: | These two. (gives the two solid towers to |
| 194. |          | Stephen: | These two. |
| 195. |          | Teacher: | Okay, why those two? Look at them. Put me. |
| 196. |          | Stephen: | They are all plain. All you had to do was put them together and you see you got a r |
| 197. |          | Teacher: | Where did you go next? Did you have an next one or were you just going to guess? |
| 198. |          | Stephen: | (he finds the inverted pairs of the first tov |

**Line Time Name Transcript** *Manjit K. Sran*

| Line | Time | Name | Transcript |
|---|---|---|---|
| **199.** | | **Teacher:** | What is different about those two? |
| **200.** | | **Stephen:** | Because this one is down here is yellow a red-yellow, red-red, red-red, red-red, and |
| **201.** | | **Teacher:** | Now when I saw you working at the begi getting groups of them together and Focu And then I noticed that you were each get that your set had to be the same. |
| **202.** | | **Focundo:** | Same. |
| **203.** | | **Teacher:** | Not the same but you had to come up wit straighten it out hen because Stephen was working by yourself so I said it had to be |
| **204.** | | **Stephen:** | Well, Focundo made them and we had the with the others to see if there if there was |
| **205.** | | **Teacher:** | Did you have any doubles? |
| **206.** | | **Stephen:** | Yeah, like five |
| **207.** | | **Teacher:** | Did you fight over who was going to keep |
| **208.** | | **Stephen:** | No. |
| **209.** | | **R2:** | Where is he? |
| **210.** | | **Matt** | I am not sure. |
| **211.** | | **R2:** | Okay, We are going to move on to someo |

| 212. | 00:21:37 | **Jeff:** | We got a whole bunch. Twelve, fourteen.. |
|------|----------|-----------|------------------------------------------|
| 213. |          | **Michelle:** | There is a duplicate of this ( she removes |
| 214. |          | **Jeff:** | Okay. |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|------|------|-----------|------------------------------------------|
| 215. | | **R2:** | So you think there are other duplicates he |
| 216. | | **Jeff:** | I don't. I will put them all in a straight lin |
| 217. | | **Michelle:** | I am a mover. (she removes a duplicate)I |
| 218. | | **R2:** | You think there are still thirty two. I think need to work on this some more. Now, Je differently. Tell me a little bit about how |
| 219. | | **Jeff:** | First we made them all in patterns and no duplicates. |
| 220. | | **R2:** | Can you show me? Can you tell me abou |
| 221. | | **Jeff:** | You see we just went up like that like tha |
| 222. | | **R2:** | Okay, here you went up with these two re |
| 223. | | **Jeff:** | I am not sure because they all got mixed |
| 224. | | **R2:** | You want to work on that a little more? |
| 225. | | **Jeff:** | Yeah. |
| 226. | | **R2:** | Give you a little bit more time. Well you what Stephanie and Dana are did |

| 227. | | **Dana:** | Twenty eight |
|---|---|---|---|
| 228. | | **Stephanie:** | Twenty eight |
| 229. | | **R2:** | Oh! You lost some |
| 230. | | **Stephanie:** | We are checking. We have a lot left. |
| 231. | | **R2:** | Now you are back to twenty eight |
| 232. | | **Stephanie:** | Y eah |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| **233.** | | **R2:** | Are you finished or are you still working you convinced of now? |
| **234.** | | **Stephanie:** | We are convinced that you always have t( |
| **235.** | | **R2:** | Well that's interesting. |
| **236.** | 00:23:38 | **Stephanie:** | Well you do. You don't know the answer. into your head and say I can figure this ou always have to think this isn't like the pr( five shirts and four pairs of pants where y figure it out. For this one you have to go going and say I have twenty eight but the |
| **237.** | | **R2:** | You don't think there is any way you eve there can't possibly be any more. |
| **238.** | 00:24:15 | **Stephanie:** | No, because you could buy like, the bigge yellows all over this room and people cou know that one person could have forty fo |

| | | | |
|---|---|---|---|
| | | | having, would be having fifty eight and s... you don't know until you are finished unt... sure. |
| **239.** | | **R2:** | How do you become absolutely positive? |
| **240.** | | **Stephanie:** | That's |
| **241.** | | **R2:** | You haven't gotten there yet. You are abs... tell me a little bit how you have them arr... |
| **242.** | | **Stephanie:** | In groups. |
| **243.** | | **R2:** | So you have them in groups |
| **244.** | | **Stephanie:** | This is a group, This is another group. |
| **245.** | | **R2:** | How did you choose your groups? Dana t... |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| | | | how did you choose your groups? |
| **246.** | | **Dana:** | Well when we looked, we made one we j... like, say I Made this one (holding a tower... yellow, yellow) Stephanie would take the... yellow how I have the red in the middle a... two yellows. |
| **247.** | 00:25:16 | **R2:** | Okay I see. Okay so keep working and se... to know when you think you know. Okay... here yet did we hear from Mike and Milin... |
| **248.** | | **Milin:** | We just got to fix this stuff real quick |

| 249. | | R2: | Okay. You ready to talk to us I think, righ |
|---|---|---|---|
| 250. | | Michael: | Y eah |
| 251. | | R2: | Okay. |
| 252. | | Michael: | We don't have that? |
| 253. | | R2: | Very interesting. By the way how many d |
| 254. | | Milin: | Now we think we got thirty four. We just |
| 255. | | R2: | Okay. Now you think thirty four. |
| 256. | | Milin: | Now we got this, this is a double. |
| 257. | | Michael: | Aye! |
| 258. | | Milin: | This can't be a double |
| 259. | | R2: | Do you want a little bit more time to thinl |
| 260. | | Michael: | Y eah |
| 261. | | Milin: | Wow! take this away I mean. Okay we go a couple of his towers that were paired in |
| 262. | | R2: | You want to explain to me? |

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**Line Time Name Transcript** *Manjit K. Sran*

| 263. | | Milin: | Sure! See |
|---|---|---|---|
| 264. | | R2: | Now hold on Mike and Milin how many |
| 265. | | Milin: | Thirty two now. |

| 266. | | R2: | You think there are thirty two? You want How do you think you know that? |
|---|---|---|---|
| 267. | 26.56 | Milin: | Because right now we can't find any doul |
| 268. | | R2: | Okay. |
| 269. | | Milin: | Now. See we had a little problem because place. I mean yeah this in the wrong place pairs of towers) These two got stuck toge together and now I just switched them ba we still think there is thirty two. (Milin po |
| 270. | | R2: | You still think there is thirty two. Okay. T hear from everybody? Did everyone have more group who didn't have a chance to e what you have. I want to talk to all of you you have. Okay, can we have our last gro Jenifer then we go to Ankur and see what find? How many? |
| 271. | | Matt | We found thirty two. |
| 272. | | R2: | That what you believe there are? How did |
| 273. | | Matt: | Well every time we found a pattern we we have yellow, yellow, yellow, red, yellow t |
| 274. | | R2: | Okay. How did you work with Jennifer? I |
| 275. | | Jennifer: | I made them. |
| 276. | | Matt: | Every time I found a pattern I would tell l |

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| Line | Time | Name | Transcript |
|---|---|---|---|
| | | | duplicate and I keep on finding a pattern would duplicate. |
| 277. | | R2: | Uh huh! So you took turns doing that. Is t have found them all? |
| 278. | | Matt: | Well we kept on trying to get more but ev |
| 279. | | R2: | You couldn't find any more. I see. That's has to tell us about his way of trying to fi interesting. |
| 280. | | Ankur: | Over here we made three, we had a patter |
| 281. | | R2: | Okay now, let's look at this. Let's look at about these patterns? |
| 282. | | Ankur: | Well – you go (lets Joey explain) |
| 283. | | Joey: | We kind of mixed them up like, over here and yellow over here we have three reds two reds/one yellow/ two reds. Two yello one red/one yellow/three reds.......... |
| 284. | | Ankur: | We put them in the same place with differ |
| 285. | | Joey: | One yellow/one red/ and three yellows. |
| 286. | 00:29:52 | R2: | This set I set you only have one red and h these and they are in the middle position you have one yellow but you put it here c it with this group? You didn't put it with t group. Can you tell me why? That's inter |

| 287. | | **Ankur:** | Because in here it is one, this is two, then |
| 288. | | **R2:** | And which one would this be? How man |
| 289. | | **Ankur:** | None |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | . |
|---|---|---|---|
| 290. | | **R2:** | So you have none, one, two, three and fou want to. Then you have the opposites her interesting! I wonder if we should share v class. Is there a way that we could share t |
| 291. | | **Amy:** | Yes |
| 292. | 00:30:47 | **R2:** | Cause' what you have done here I haven' people to think about it. Okay. Amy is go |
| 293. | | **Amy:** | You want all this in one piece? |
| 294. | | **R2:** | Now this is Ankur and your name is? |
| 295. | | **Joey:** | Joey |
| 296. | | **R2:** | Ankur and Joey did something interesting ones they found. That I haven't seen yet s interested in seeing it. Are you interested' |
| 297. | | **Student:** | I didn't hear him. |
| 298. | | **R2:** | You didn't hear it? They are going to tell |
| 299. | | **Amy:** | Can I put these up against each other? |
| 300. | | **R2:** | These three go together. You could put th |

| 301. | | Amy: | Is that okay? Can we put them together li |
| 302. | | Ankur: | Y eah |
| 303. | | R2: | You can explain what you did here. |
| 304. | | Amy: | We can hold it up |
| 305. | | R2: | Let's do this group first. Then we can talk class too. |

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**Line Time Name Transcript** *Manjit K. Sran*

| 306. | | Amy: | Powerful tape! |
| 307. | | R2: | Why don't you come and stand up here ar all kind of can see what they did here and have done something like this if it were ir up and explain to the class what you did. |
| 308. | 00:32:03 | Ankur: | Over here we used one all red. We used o three yellows and then four yellows all fi used one red two reds, three reds, and the |
| 309. | 00:32:29 | R2: | Let me see, here. Can you all see this? Ca be sure you...I guess Ankur is having us l covering the other part with my hand. See me before how many yellows there were there on this one? This first one (she poin |
| 310. | | Ankur: | Zero |
| 311. | | R2: | There were zero yellows. And the next or |

| 312. | | Ankur: | One |
|------|--|---------|-----|
| 313. | | R2: | And the next one had two, three, four and You see that? The same thing similar thin like that? Anybody else? Did you do som towers made by a group in the front) |
| 314. | 00:33: | Student: | We did like a yellow then red, yellow, yel |
| 315. | | R2: | So you made stairs like that. What about left side of the taped set of towers the tow the middle positions) This is interesting h for...I will hold and you talk |
| 316. | | Joey: | For these right here and these we kind of |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|--|--|--|--|
| | | | thing as them like we put three red then y here we got two and yellow and two, one yellow red and we did the same thing her yellows, two yellows a red and two yellov got a whole row. |
| 317. | | R2: | Okay now. I saw other people do somethi one red and here they put it in the middle understand they did something different. red. Let's say the second floor. Can we sa tower red on the third floor, only one red floor? I say gee! Where is your tower wh bottom floor and only one red on the top you did. Isn't it? When you showed the o floor. How many of you did that? Show o |

| | | | |
|---|---|---|---|
| | | | hand if you did that. I saw a few of you u one yellow on every floor. But they didn' this pattern here. And I asked them why u they did because they used that one red o pattern this other pattern. I noticed Jeff: s that what he ended up doing I think you e you Jeff:? You were using it for one patte used it for the other pattern isn't that right |
| **318.** | 00:35:35 | **Jeff:** | Yeah well |
| **319.** | | **R2:** | And you ending up with more than thirty |
| **320.** | | **Jeff:** | Yeah we got more than thirty two but we |
| **321.** | | **R2:** | Ahh! So you are down to thirty. But you me follow your pattern you see that becau organizing these. Now this ids exactly on am kind of interested in what you did wit exactly two yellows did anybody look fo |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| | | | exactly two yellows? I am kind of curious your partner and think and take a look at there? Do you see any thing in that? |
| **322.** | | **Milin:** | Holds up a tower |
| **323.** | | **R2:** | Now that's exactly two. Let's worry abou exactly two reds. Tell me what you can te exactly two reds. Can you help me with t miss any and you didn't count any twice. |

| | | | |
|---|---|---|---|
| | | | have exactly two red cubes in your towers three (students were holding up towers) |
| 324. | 00:36:53 | Student: | I have one. |
| 325. | | R2: | But I want to see all of them with exactly |
| 326. | | Student: | Here! Here! |
| 327. | | R2: | Is that the only one you have? Why don't towers with exactly two reds. |
| 328. | | Students: | Here! |
| 329. | | R2: | You only have four towers with exactly t up four towers) here is another one. |
| 330. | | Student: | We have all these. |
| 331. | | R2: | Why don't you study those for a minute? together? Show me all your. Convince me and there are no more. Just work on these convince me by looking at a pattern that y take that apart we will put it together anot and Joey's Taped towers and helps them t listening? Now somebody at this table tol towers with exactly two reds, there were l walking around and kids are holding up t |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| | | | . |
| 332. | | Student: | Ten |

| | | | |
|---|---|---|---|
| 333. | | R2: | How many got ten towers with exactly tw... you to think tomorrow is how you can co... ten that there can't be eleven or twelve or... you study those towers and you find a wa... all of them. Now let me give you somethi... interesting. Alex showed me this. Now th... bottom floors, right? Is that right? So I ca... easily these two reds are in the bottom flo... we look at these two reds next to them the... right? You see that? The first two reds are... two are on the second and third floor. Wh... have these two reds together? Any ideas? |
| 334. | | Ankur: | Third and fourth |
| 335. | | R2: | Okay, lets find a third and fourth. Does th... possibility? We have the third and fourth. |
| 336. | | Alex: | Fourth and fifth. |
| 337. | | R2: | Where is the fourth and fifth? We have fi... third and fourth, can you give me fourth a... here somewhere? |
| 338. | | Student: | No, we had doubles. |
| 339. | | R2: | You told me that there should be one. Ca... two reds together. First and second, secor... you told me fourth and fifth. May I borro... reds that is three reds. Okay, alright now ... reds are together these ways. Do the two ... |
| 340. | | Students: | No. |

| Line | Time | Name | Transcript |
|------|------|------|-----------|
| 341. | | R2: | No. Now here they are always together. |
| 342. | | Students: | Yes. |
| 343. | | R2: | Can they be separated by two floors? |
| 344. | 00:40:52 | Students: | Yes. |
| 345. | | R2: | Can they be separated by three floors? |
| 346. | | Students: | Yes. |
| 347. | | R2: | Can they be separated by four floors? |
| 348. | | Students: | No. yes. |
| 349. | | R2: | Well can they be separated by four floors where there are two reds separated by fou |
| 350. | 00:41:15 | Michael: | You can't! |
| 351. | | R2: | You told me you can make it so make it f |
| 352. | | Ankur: | You can't unless you have six tall. |
| 353. | | R2: | Only five blocks. So if you only have two them, you can only separate them by how Make it. Show it. Show me the two reds s way to have that (holds up a tower hande red/yellow/red/yellow/yellow. |
| 354. | | Students: | No |

| 355. | | R2: | Is there another-Oh! Then you moved it u (yellow/red/yellow/red/yellow). Is there a separated by one floor? |
| 356. | | Students: | Yes |
| 357. | | R2: | Give me another one I don't want to mak two reds separated by one. |

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**Line Time Name Transcript** *Manjit K. Sran*

| 358. | | Student: | Here, I have one |
| 359. | | R2: | That's not two reds that is four reds. That two reds. |
| 360. | | Student: | Here, here, here |
| 361. | | R2: | That's two reds separated by two. I want. |
| 362. | | Students: | I got one, I got one |
| 363. | | R2: | This is the same I have this one |
| 364. | | Steven: | I have one |
| 365. | | R2: | That's the same as this. Ah here we go. W I want another one. Can you make me an by exactly one. Suppose to think real har hard? We have that one, look. |
| 366. | | Alex: | You can't |

| 367. | | R2: | Why cant you Alex? You mean I can't ha red in the fourth floor and my yellow in t sixth floor? I Can't do that? |
|------|----------|-----------|---|
| 368. | 00:42:58 | Student: | No, you can't do any. |
| 369. | | R2: | Why? |
| 370. | | Student: | You only have five blocks so you can't m |
| 371. | | R2: | Ohh! So these are all that's possible to ha yellow? |
| 372. | | Students: | Yes. |
| 373. | 00:43:09 | R2: | So what about two reds separated by- wh me all the possibilities. |
| 374. | | Michael 2: | I got one here |
| 375. | | Stephen: | Here |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|------|--|-----------|---|
| 376. | | R2: | Alright when you get one raise your hand Where is the second floor? Where is the t Where is the red in the third floor? Think me exactly two reds separated by two. |
| 377. | | Students: | Right here. Right here. |
| 378. | | Milin: | Got one. Uhg. |
| 379. | | Ankur: | There are only two |

| | | | |
|---|---|---|---|
| 380. | | R2: | Why are there only two? He claims there ... you think you know the answer raise your ... Don't speak out. Why do you think there ... if you think you know. Again, exactly two ... you think there are no more? You thinking ... Yes. |
| 381. | 00:44:26 | Michael 2: | Because if you needed one more you wou ... you need another one |
| 382. | | R2: | Wonderful? You would need another bloc ... another way to have two reds separated b ... |
| 383. | | Student: | I have it right here. |
| 384. | | R2: | Ah hah! I want to two reds separated by t ... |
| 385. | | Milin: | There isn't any |
| 386. | | R2: | Why not? |
| 387. | | Milin: | On ones there is only three. On two's ther ... is only one. |
| 388. | | R2: | You believe that? How many of you agree ... two reds how many ways? Can you tell m ... different |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | |
|---|---|---|---|
| | | | ways do I have them? If you know raise y ... many ways are there to have exactly two ... |
| 389. | | Michael 2: | I know |

| | | | |
|---|---|---|---|
| **390.** | | **R2:** | How many ways are there to have exactly |
| **391.** | | **Jaime:** | Ten |
| **392.** | | **R2:** | Could there be any more Jaime? |
| **393.** | | **Jaime:** | No. |
| **394.** | 00:45:26 | **R2:** | Why Not? How many of you are convinc really think that if you had to go to anothe teacher in that you can convince the new reds and there are no others. What do you |
| **395.** | 00:45:45 | **Stephanie:** | I think so. Because with the four you can make, with the that the first one with two one in between you can make three, ,with two, with one in between you can make o you can make one. But you can't make w or any thing else you don't have enough y blocks. |
| **396.** | | **R2:** | That's really great. You know I am going dollar question. Did you ever hear about t four thousand dollars if you answer it rigl |
| **397.** | | **Ankur:** | Yeah. Yeah. |
| **398.** | 00:46:27 | **R2:** | Okay. Now that you have all possible wa are ten with exactly two reds, what do yo to? Look at the hands going up. You knov any building you see them in your mind c them in your mind you |

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**Line Time Name Transcript _Manjit K. Sran_**

| | | | |
|---|---|---|---|
| | | | didn't even have to make them. What do |
| 399. | 00:46:53 | Ankur: | You could just make these yellows red an colors around. |
| 400. | | R2: | How many thought of that? About just sw many more towers do we know with exac more do we have? |
| 401. | | Student: | Um, how many we... |
| 402. | | R2: | We have ten here with exactly two red, h exactly two yellow? |
| 403. | | Michael 2: | I know |
| 404. | | Student: | Ten. |
| 405. | 00:47:20 | R2: | Ten so, all together with exactly two, red have already? |
| 406. | | Student: | Altogether? |
| 407. | | R2: | Yes. |
| 408. | | Student: | Twenty. |
| 409. | | R2: | We have twenty towers with exactly two, take a stranger and tell them there are no I walked around and you were convinced this problem, I mean you really worked h fourth grade class work so long on a matl without stopping you were incredible! Bu many you can find with exactly two. I wa you use the same kind of reasoning when how many there are with exactly three? Y |

| | | | Everybody in this class showed me how r...<br>exactly one, remember that, you did that.<br>I don't remember? With exactly one red f...<br>how many |
| --- | --- | --- | --- |

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**Line Time Name Transcript** *Manjit K. Sran*

| | | | towers did you have? Can you see that in ...<br>imagine it? If you can imagine it raise you...<br>people can imagine it. Great! Wonderful! ...<br>Okay, Jeff: back there, Jeff: tell me how r...<br>mind. |
| --- | --- | --- | --- |
| **410.** | | **Jeff:** | Um, um, |
| **411.** | | **R2:** | You can consult with your partner. |
| **412.** | | **Jeff:** | Okay. One. |
| **413.** | | **Milin:** | No. |
| **414.** | | **R2:** | Oh so we don't agree. Stephanie? |
| **415.** | | **Stephanie:** | With exactly one red five towers high? U... |
| **416.** | | **R2:** | How many agree with Stephanie? Five. S... |
| **417.** | | **Stephanie:** | Alright, well, you have one red |
| **418.** | | **R2:** | Well you have them build just take them ... |
| **419.** | | **Stephanie:** | Alright! |
| **420.** | | **R2:** | Get your friend to help you – get you the ... |

| 421. | | Stephanie: | Here's one. This is the second one, this is |
|------|--|------------|---------------------------------------------|
| 422. | | R2: | Okay, you get the picture? See you can se all see that? Jeff: you agree? |
| 423. | | Stephanie: | Here we go! |
| 424. | | R2: | Okay, how many with exactly one yellow |
| 425. | | Stephanie: | Five! |
| 426. | | R2: | So we now built how many more towers? |

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**Line Time Name Transcript** *Manjit K. Sran*

| 427. | | Stephanie: | Ten |
|------|--|------------|------|
| 428. | | R2: | We have twenty here and we built anothe |
| 429. | | Stephanie: | Uh huh. |
| 430. | | R2: | That's interesting. So we have thirty? I do miss? |
| 431. | | Student: | You don't have all red |
| 432. | | R2: | Oh no, with five red. Okay, how many wi |
| 433. | | Ankur: | Two |
| 434. | | R2: | With five red? |
| 435. | | Milin: | Only one! |
| 436. | | R2: | Okay, so that gives me thirty one. |

| 437. | | **Ankur:** | And you have all yellow. |
|------|--|------------|--------------------------|
| 438. | | **R2:** | Oh that gives me thirty two. That makes home and sleep better tonight cause I real really believe that. I think you are great! |

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