S-Pattern Task – CLIP 2
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District: Pittsburgh Public Schools
Grades: 11-12

Group 2 - Second Interaction with Teacher

90 91 92	T:	Okay, I'm back. All right, so when I left, I asked the group to come up and explain how we came up with $2x + (x - 1)^2$ and where that relates in the picture. So are you ready to tell me?
93	S:	Yeah.
94	T:	Okay.
95	S:	Well, actually I think that she made a different equation. I think hers is better.
96	S:	I thought we were just going to go with this one.
97	S:	We have one.
98	S:	Hers is $x^2 + 1$.
99	S:	Yeah, but that doesn't explain the picture.
100	T:	What I asked when I left was does $2x + (x - 1)^2$ fit the pattern, correct?
101	S:	It fit the pattern.
102	S:	Yeah.
103	T:	Okay. What I wanted to know when I left was how does it relate to the tiles?
104	S:	Um…
105	T:	Where is $2x$ in these tiles? Where is the $(x - 1)^2$ in these tiles?
106	S:	Well x is that number right there.
107	T:	Okay.
108	S:	And 2, you just multiply 2 by that number…
109	T:	Why?
110	S:	Which gives you…

111	T:	Why?
112	S:	Because, um…
113	T:	The tiles…
114	S:	Because it gets bigger. It doubles.
115	S:	Yeah, it doubles…
116	T:	What doubles?
117	S:	That…that…the tiles. Like for 1, it doubles and then for 2 it doubles, 3 it doubles.
118	S:	That's the top and the bottom.
119	S:	Oh, it's the top…oh it's the…oh, yeah. Those 2.
120	S:	The x is the top number and the bottom.
121	T:	What's the matter?
122	S:	I don't…I mean, I understand but I can't really explain it. Like those 2…
123 124	T:	If you want, see, my thoughts always were if you really, truly understood then explaining would be the easy part.
125	S:	Well, I do understand but…2 is right here. That's where they got the 2 from.
126	S:	$2x$.
127	S:	Like $2x$ 'cause you just take out those 2 and then use that. And then x - 1 is like 4 - 1.
128	S:	Which is 3.
129 130	S:	Three. Oh yeah. How much is…each row right there. Then you square it and that's how much is in the middle.
131	T:	Okay, so…
132	S:	Has to be a square number.
133 134	T:	Take the sheet of paper right now. Take number 4. Separate…I want you to actually manipulate those black tiles on here. Show me the $2x$, show me the $(x - 1)^2$.
135	S:	All right.
136	T:	Okay.

Group 1 -– Second Interaction with Teacher

137	S:	You add 1.
138	T:	Are you listening? *(Teacher directs this to the student he is sitting next to.)*
139	S:	I am.
140 141	S:	All right, you have 2 on the bottom, 2 on the top *(referring to the second figure in the sequence).*
142	S:	I get it.
143 144	S:	You got 1 in the middle that's an extra. So you add that. That's plus 1. So it's 2 and 2 is 4. That's 2 squared is 4 then you add this extra 1 in the middle. That's 5.
145	T:	Okay. What is, what is he telling me here? Where $(x + 1)^2$ came from.
146	S:	Are you asking me?
147	T:	Yeah, I'm asking you.
148 149	S:	Oh, I get it. It's like, because you start off with 1 and then you times it by itself and then you add 1.
150	T:	Okay.
151	S:	And then you just keep going...you want me to keep going?
152 153 154	T:	No, what I want you to do is...I want you to take these, these black tiles that are sitting right here *(referring to the figures of tiles)* and I want you to show me, I want you to show me, where do you see 2 squared? And then where's the plus 1 at?
155	S:	Like…
156	T:	Where's the 2 squared?
157	S:	Right here.
158	T:	What's that?
159	S:	And right here. These are 2.
160	T:	Okay.
161	S:	Then the 1 is the middle.

162	T:	Okay. So, for number 2, for pattern 2, top row and the bottom row, you're putting those
163		2 together, making a square and adding 1 to it. So, if I did the same thing in pattern
164		number 3, I took the top row and the bottom row and I put them together, is that 3
165		times 3? Is there 1 left over? *(Students acknowledge that this doesn't seem to work.)* So,
166		what I'm telling you is, how do you manipulate these tiles for your $x^2 + 1$. If it obviously
167		works…
168	S:	I mean, 'cause look, there's 1, 2, 3; 1, 2, 3; 1, 2, 3, we're just doing it like that.
169	T:	Where?
170	S:	And there's the 1 left over.
171	S:	You can do that.
172	S:	Come on, I can do this.
173	S:	And this is the way to do 4, 4, 4.
174	T:	Okay, you have…How many tiles do you have in pattern 3? How many tiles do you have
175		in pattern 3?
176	S:	10.
177	T:	Okay. I'm giving you 10 individual tiles on this piece of paper. Okay? They're not
178		touching.
179	S:	They're a new pattern?
180	T:	I want you to take those 10 tiles and I want you to show me how you put them together
181		to get $x^2 + 1$. That's what I want you to show me.
182	S:	We can go like this. Look.
183	T:	I'll be back.
184	S:	No, just stay with us.
185	S:	"I'll be back" *(mimicking the teacher)*.