Relating Perimeter and Area
Transcript

Teacher:	Can we generalize it? Looking at these numbers, searching for patterns; that's always what we do. Julia?
Julia:	Um, couldn't you say that the number that you multiply the result perimeter by squared is how much the area increases?
Teacher:	Cory?
Cory:	Yeah. Like three to the power of itself is nine. So like three and like…
Teacher:	Say that one more time. Three to the power of…
Cory:	To the power of itself.
Teacher:	…of itself? Three to the power of three?
Cory:	Yeah.
Students:	No.
Cory:	Well…wait.
Teacher:	Three to the power of…
Cory:	Three with…
Riaz:	No.
Teacher:	…three times itself.
Riaz:	Yeah.
Cory:	…with the little exponent of, of three.
Teacher:	So…
Cory:	And then…
Riaz:	No. It's three squared.
Teacher:	Ok. So what, what does this…?
Cory:	Oh, no. No, no, no. Yeah, yeah, yeah.
Students:	Squared.

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Cory: Never mind.

Teacher: So say it for me, Cory. What do you want me to write here?

Cory: Three squared and then that's nine…

Teacher: Um-hmm.

Cory: …so then it goes up by…yeah, yeah.

Teacher: Interesting. Interesting. So three times itself or three to the power of two gives you the factor that the area goes up. Stephanie, you buying this? James?

James: Yes.

Teacher: Why? Wait, let, let me back up. I, I take that back. What's gonna happen when I multiply the perimeter by four? What's gonna happen to the area of the square? So I've got a perimeter of 1200 feet. The area will increase by…? John?

John: Sixteen times.

Teacher: Sixteen times. Shanetta, you agree?

Teacher: Alright. Michelle, I'm gonna increase the area by a factor of five so I'm gonna go from 300 to 1500 feet. What's gonna happen to that area?

Michelle: Um, it will increase by…

Student (F): 25 times

Michelle: …oh yeah, twenty-five.

Teacher: By twenty-five, good. By twenty-five, yes. So you see the pattern, right?

Student: It's all perfect squares

Teacher: It's, yeah it's squared just like, just like, uh, these ladies said. Now the question becomes, why is that true? Jake?

Jake: Um, because for both of the shapes you're looking at, uh, you find the area by using two dimensions for the triangle; it's the base and the height. And for the rectangle it's the length and the width. So when you multiply each of those dimensions by a certain number you're gonna have to multiply, you're gonna have to multiply that number by itself because you're using a, both of those dimensions.

Teacher: Hmm. Nice, Jake. Can somebody, can somebody who kinda understands what he says can you maybe say it a little bit differently? Like what is he trying to say? I, I follow you, Jake. Uh, I'm not sure everybody follows you. Can, can we clear this up a little bit?

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Monica: Can we have Jake say it?
Teacher: Sure, absolutely. Well, I don't know. Do you mind saying it again?

Jake: Um, alright. So for both, for both of the shapes you look, you find the area by using two dimensions. For the triangle it's the base and the height and for the rectangle it's the length and the width. So if you multiply those two dimensions by a certain number you're gonna have to square the total area because you're using both of those dimensions. So it's not just like you're multiplying something, it's not like you're multiplying the shape by five times; you're multiplying it by five times by five times. So it's, that's why it's by 25 times.

Teacher: So maybe this helps with, with…go ahead Monica.

Monica: So you're saying you have to multiply each dimension by five times?

Jake: Uh, well you have to square, you would, you have to square each dimension since there's like—

Monica: Right.

Jake: Yeah.

Monica: But it's five times by five times because there are…I get it, I just can't like spit it out.

Teacher: Uh, Riaz, go ahead.

Riaz: I think I get what Jake's tryin' to say because like, like say when you're increasing the area you're multiplying both sides by a certain number. And so, um, you have to square it because it's this number times this number, which is essentially squaring.

Teacher: Good, good.

Riaz: You, you see where I'm getting like? You've got the, like say you've got the square and so you're multiplying by one, ok? And then, or let's say two. And you're multiplying by two again over here. So it's two by two on both sides. Just squaring it. Do you get it?

Teacher: Ok, good. A couple more comments. Good Riaz. Coleman?

Coleman: Alright, I think I can, I think I have a visual analogy for why when you double, for why when you double the um, length and width of a square, um, it would eventually quadruple itself in area.

Teacher: Sure, go ahead.

Coleman: Alright. Um, do you suppose I could use the blackboard?

Teacher: Come on up, Coleman.

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89 Coleman: Ok. Alright, so I'm not sure how many people have already thought of this but…

90 Teacher: Let me erase this for you.

91 Coleman: Okay.

92 Student: I think I know what Coleman's—

93 Coleman: (begins to draw) Ok, so we have a square. Alright. And we have the length and we
94 have the width. And let's see…um, what was I doing? Ok. So um, when we double
95 the length, like so, and double the width, like so, um, we basically create three more
96 squares and thus have a square that's quadruple the area of the previous one. It's
97 just, kind of an inevitable consequence.

98 Teacher: Good. Nice. Very clever. Great job.

99 Students: (Applaud)

100 Teacher: Alright, last comment and we'll move on. Julia, did you wanna add something?
101 You had your hand up.

102 Julia: No, I [Inaudible].

103 Teacher: Ok.

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