ROBIN EVERAGE: I'm going to be doing a lesson on area and perimeter, focusing a little bit more on area, but also letting my students, kind of, explore into perimeters and see how far they can go. That is one of our standards that we have to teach according to our standards, so that will be my lesson.

I chose this lesson because we are learning about area and perimeter. We've done a little bit with area, but also I wanted my students to be able to notice the relationship between area and perimeter, and this lesson allows them to, kind of, get into it, manipulate it, move it, get some good conversation with each other.

One, I was hoping for some really good conversation, getting them to use some of their math vocabulary words correctly, instead of just, it's bigger, it's smaller, but a little bit more, making sure they're using area, using perimeter, square units, just inches. I—also, at this lesson, I wanted to see them manipulate the actual square tile pieces to build their, basically, arrays. To build, to figure out the areas, and for them to be able to come up with the correct multiplication problem for area, along with seeing what could they do with perimeter.

You know, would they come up with the correct equation for that? Could they see the relationship between the two? Is there anything different, the same about it?

Some of the strategies I will expect to see from my students will be straight on multiplication because some of them just go right to it, along with, I know, they will lay out the blocks, the square tiles to figure it out. They'll draw right away. They will do some conversation with each other to figure out their problems. I'm hoping that they use the correct terminology, but I may have to redirect them with that, in that area.

With this lesson, some of the misconceptions I could see is they're going to do straight multiplication for area and perimeter. They're just going to draw it and go, "Oh, well it's six by two." Boom, get the answer and not really see the difference between area is multiplication, perimeter, I want more addition, so that's our biggest misconception. Also, some of the things we might see is with perimeter; they're going to look at each individual, the whole entire square, instead of just what's on the inside.

Versus perimeter, I need them to look on just the outside and not the inside. So it will be interesting for them to be able to really, kind of, see that whole entire shape. The way I set up this lesson, I had my students on the floor to where they could freely move. They didn't seem so constrained in a desk. They also, with my class, they talk better with each other.

I wanted the manipulatives in there for them to actually build the shape that they were working with to find the area, to help them space it out, and for them to be able to see more of a visual of the shape they were drawing. Being able to outline the pencils, drawing it so they could remove the shape, and also just be able to see the rectangular shape and discuss the area that they would find.

ROBIN EVERAGE: We're going to start rolling and we're going to go. You make mistakes, it's no big deal. We make mistakes in here all the time, don't we?

STUDENT: Yes.

ROBIN EVERAGE: This is where I need Brent. “I make them all the time!”. So, all right. Does everyone have their date written on their paper?

STUDENT: Yes.

ROBIN EVERAGE: All right. Next thing we're going to do is I want you to look at the pattern piece, okay? And I just want you to think in your head everything that you know about this math problem, okay? We're not talking, you're just thinking. So I'm going to have you look at it and then I'm going to write it on the board. You may copy it down as you are thinking quietly to yourself. You can go ahead and write if you would like. Go ahead and prepare yourself. And go ahead and whisper, keyword, whisper to your island friends what you know about this problem. Go.

ROBIN EVERAGE: All right. Bring your track to me please. Let's see who's tracking. All right. What can you tell me about the six and the four? All right, sorry. You can just call out.

STUDENT: Factors.

ROBIN EVERAGE: Factors. And what else? What are we going to be finding? Sorry.

STUDENT: The products.

ROBIN EVERAGE: Okay. We are going to be finding our product. Now, we have also discussed this word.

STUDENT: Array.

ROBIN EVERAGE: Array. Discuss with your island friends. If I wanted you to create an array, what would these numbers tell us about our array? Talk to each other.

STUDENT: It could be like four columns or six columns and four rows, or six rows.

ROBIN EVERAGE: Okay. I've heard a lot of great conversations. I heard—what are two words you think I'm looking for? You can tell me. Just tell me.

STUDENT: Columns and rows.

ROBIN EVERAGE: Columns and rows. You pick how you want—well, what number you want as the column, which one you want as the row, okay? You pick, and I want you to create your array on your paper. Don't look at somebody else's. Create your own, hide it a little bit, and then we're going to share and you're going to talk about which way you created it. Got it? Go. Everyone whose answers are finished and then share, okay? If they are done, whisper, share. One at a time.

STUDENT: I put six rows and four columns and, uh, we, uh, we can actually count it or count by fours or six to find the product.

STUDENT: I did four columns and six rows and I counted by sixes to find my product. And I went 4 times 6.

STUDENT: I put as my columns, I put six columns and four rows, and I did 6 times 4.

STUDENT: I disagree with you because you put four columns and six rows. Because rows go side to side, columns go up and down. Like if you—like if you're rowing on the boat, you go like this, you go side to side. And if—it's like there's a column, like out there—there it goes up and down, it doesn't go side to side.

STUDENT: Like a pole?

STUDENT: Yeah.

STUDENT: Yes.

STUDENT: Okay.

ROBIN EVERAGE: All right, look up here on the board. I just drew one of the ways, which way did I draw do you think?

STUDENT: Four rows and six columns.

ROBIN EVERAGE: Why not six columns and four rows? Could it be?

STUDENT: Yes.

ROBIN EVERAGE: Right. So I would, I would like for you to do where I got it—I want you to go ahead and draw me a rectangle around it, okay? And go ahead and let's draw our lines down to show our columns, and our lines across to show our rows. You do it, I'm not. And then while you're doing that, I want you to think about what you're finding out. And I'm not looking for the word product. What do you think we're finding out? And I'm not looking for the word product, but don't say anything yet, but I'm going to have a chance to get through this.

STUDENT: Chloe, wha—what do you think we're finding out?

STUDENT: Area. Area.

ROBIN EVERAGE: Talk to each other, what you were finding out and what your answer was.

STUDENT: I—my total was 24 because if you count 4, 8, 12, 16, 20, 24, and you have 16 fingers up, and you just counted by fours. I mean six fingers.

ROBIN EVERAGE: Andrea, what do you think we were finding out?

STUDENT: The area.

ROBIN EVERAGE: What do you guys think? Do you agree or disagree? Um, Levi?

STUDENT: Um—

ROBIN EVERAGE: Remember, you're tracking Levi, who's talking.

STUDENT: We were finding—

ROBIN EVERAGE: No. Do you agree with her? Why do you agree with her?

STUDENT: I agree with her because we were—

ROBIN EVERAGE: With?

STUDENT: I agree with Andrea because we were finding the area of, um, our rectangle, um, becau—

ROBIN EVERAGE: So we're finding the area of our rectangle?

STUDENT: Yes.

ROBIN EVERAGE: Do you guys agree or disagree with that?

STUDENT: I agree.

ROBIN EVERAGE: You agree? Does anyone else have a different answer? Bianca?

STUDENT: Um, we could, um, be finding the perimeter?

ROBIN EVERAGE: We're finding the perimeter? What do you guys think? Do you agree or disagree with, um, Bianca? Lucas, you're agreeing?

STUDENT: I agree because, um, before it this happened, you said, um, we were working on area and perimeter.

ROBIN EVERAGE: Okay. I said we are working on both, but what were we finding here?

STUDENT: The area.

ROBIN EVERAGE: Okay. Why are we finding perimeter? Talk to each other.

STUDENT: Also because we co—we are finding the area because we don't have, um, grid lines outside to show us how much we need to and we know that it's like six and four or like four and six, but we don't, like, we have t—actually just—

STUDENT: Actually, um, I have more proof that we aren't looking for perimeter, because if we were looking for perimeter, it would really be 8 times 12 because you have 4 plus 4, and then you have 6 plus 6.

STUDENT: We don't do, if we—

ROBIN EVERAGE: I did say area and perimeter, but what we were looking for in here—Hannah, what were you saying?

STUDENT: We were figuring out the area because, um, if we figure the, um, perimeter it's different than the area.

ROBIN EVERAGE: Why is it different? Do you know?

STUDENT: Um, because there's two more sides added?

ROBIN EVERAGE: There's two more sides added? Anyone else want to help out on what we're thinking? Because I'm not going to give the full answer here for a reason. Georgia, what are your thoughts?

STUDENT: My thoughts is that we were trying to find the area instead—we're trying to find the area instead of the perimeter because the perimeter's outside.

ROBIN EVERAGE: What do you guys think of that one? The perimeter's the outside? So, you think what woul—if the perimeter is on the outside, the area's what?

STUDENT: On the inside.

ROBIN EVERAGE: On the inside? So, you think we were finding out what was inside?

STUDENT: Yes.

ROBIN EVERAGE: Agree, disagree? Okay. We are finding the area. I'm not going anymore into perimeter for a reason, because of what you're going to step into doing next. You'll see how that will come about. So, I'm not going there yet because I want you to be able to figure it out with our lesson today. So, what is our area by the way?

STUDENT: Twenty-four.

ROBIN EVERAGE: You sure?

STUDENT: Yes.

ROBIN EVERAGE: Positive?

STUDENT: Yes.

ROBIN EVERAGE: All right, good. But if I was writing area, what would I say? Twenty-four?

STUDENT: Square units.

ROBIN EVERAGE: Square units. So let's just write that down here just so we have that word up here for us. Okay. Then you can actually put all of that away so you can listen to the instructions for your next activity. Working in your islands, because you're working on the floor. You will need a pencil and you—[inaudible] . You will need a pencil, you will need your crayons and, actually, just one box. So whoever is the island leader, you take your crayons. Does that make sense? Does everyone have one? Who is yours? You're island leader? All right. Perfect. Everyone has one, right?

STUDENT: No. Here is our island leader.

ROBIN EVERAGE: Let Ayven be the leader today.

STUDENT: Okay.

ROBIN EVERAGE: You have one? And you guys have one?

STUDENT: Yes.

ROBIN EVERAGE: We're not touching him yet, okay? You're going to get a box or a bag of the square tiles. Do we understand? And you're going to sit on the floor. I'm going to give you an area, okay? And then with that area, you're going to figure out what rectangle you can make with that area, okay? I do need your names on the top of the paper. Just first names. We good? Okay. You want to pass out the papers? I need one group right here. You guys will be here. You guys are going to be right back there. You guys are there. Yeah, can you move those backpacks back, Bianca? Let's see. We'll put you two here. You two here. I'm looking straight at you. The two of you here, and then I'm going to make this back, and you two are going over here. You all can move.

ROBIN EVERAGE: You need to be sitting somewhere around your paper. If I give you—oh, by the way, if you notice on your paper, it's big graph paper. Do you see that? And those square tiles will fit perfectly inside of each square, okay? When you guys are doing this, make it a real size of the square, okay? If I gave you the area of 12, whisper to your partner, how many blocks do you think you'll be using?

STUDENT: Twelve.

STUDENT: Twelve. I think—

ROBIN EVERAGE: If you have that number, go ahead and get that number out.

STUDENT: Okay, I get six, you get six. 1, 2, 3, 4, 5, 6. [inaudible]

ROBIN EVERAGE: Can you do me a favor? Can you—how many are you getting out?

STUDENT: Twelve.

ROBIN EVERAGE: So you only get 1 to 12 out. You're going to share this one. Once you have 12, your eyes are on me. You put them on the paper. That's fine.

STUDENT: 1, 2, 3, 4, 5, 6.

STUDENT: [inaudible]

ROBIN EVERAGE: If it's on the paper on the tile, either one is correct. Are we lining them up right now? All right. You guys have 12?

STUDENT: Yes.

STUDENT: Yes.

ROBIN EVERAGE: Yeah you guys have 12? Georgia?

STUDENT: Twelve.

STUDENT: Twelve.

ROBIN EVERAGE: The other Hannah and Chloe, do you guys have 12? All right. So on your paper and I'm going to ask for space reasons to start in one area, don't start in the middle of the paper, because you're going to have to work more than one thing on this paper. So start it from one, one area, I don't care where, you pick. But I would like for you with these 12 tiles, create an array for me that shows me the area of 12. Work together.

STUDENT: We've put it in like this, making this two, six to make it twelve.

ROBIN EVERAGE: Put it into the squares on the paper. Make sure you remember it's not in the middle of the paper, pick a side.

STUDENT: Right there. Like 3, 5, 6. Now we do another round on top of it.

STUDENT: Wait. But is it in the right spot?

STUDENT: No.

ROBIN EVERAGE: The shape that you created, and what would be the math problem you could write down, for this to find the area of what you built and why?

STUDENT: We could do 3 times 4, 4 times 4, 4 times 2—.

STUDENT: Why?

STUDENT: Because it's the perimeter. And the perimeter, like, if three—the perimeter—it can't be, like, four—like 3 times 3, 6, 4 times 4, 8, like, um, 8 times 6. We can't do that because it's not equal 12, which is our area. So we have to do 3 times 4.

STUDENT: Or we could do 4 times 3, because there's three on that and four on that, so we could do 4 times 3.

ROBIN EVERAGE: I want you to draw the shape that you just had on that paper. So you can do it—you can do it next to it, you can do it around it. But make sure it's on the lines. Go ahead and draw. You can pick someone to draw it or you all can draw it together.

STUDENT: 1, 2, 3. Now, we have to go down, 1, 2.

ROBIN EVERAGE: After you draw that, then I would like for you to write the math problem to find your area. What would we—

STUDENT: Yes, because there's this two right here and six like this.

STUDENT: 2, 4, 6.

STUDENT: [inaudible]

STUDENT: Twelve. Then we count it by six, and we count the number 12. Then the second time count it by six.

STUDENT: And when it by—And when it's by two by six times, it will equal 12 too.

STUDENT: Yeah, because 2, 4, 6, 8.

ROBIN EVERAGE: I really hope when you get your area, it's just not a number because you should have something else here with it. Where do you write that? Wherever you want, you write it. And then your area would be what?

STUDENT: Twelve.

ROBIN EVERAGE: Twelve?

STUDENT: Square meters.

ROBIN EVERAGE: Okay. Now, what I would like for you to do, here's your challenge. Figure out the perimeter. What do you think the perimeter is of that?

STUDENT: Because [inaudible] A equals 12 square units.

STUDENT: I have two questions.

ROBIN EVERAGE: Yes.

STUDENT: Um, so would it be inches or units? And do we write the lines in them?

ROBIN EVERAGE: You may write that area, do we do inches, do we do square units? What do we do?

STUDENT: Square units.

ROBIN EVERAGE: What does it say?

STUDENT: On area we do square units.

ROBIN EVERAGE: Okay. And then what do you think you're going to do for perimeter?

STUDENT: Square inches.

STUDENT: Square inches.

ROBIN EVERAGE: Square inches?

STUDENT: No, it's square—

ROBIN EVERAGE: Look at your perimeter part, that has the orange. Do you see anything square for perimeter? It's just inches. We don't do square inches, okay? So you need to write actually the math equation. How did you find 12? So write the actual, what do you say?

STUDENT: Like, um, we did 6 times 2.

ROBIN EVERAGE: So then you keep drawing. So you would write 6 times 2 equals 12 square units. And then you gotta show me how you found the perimeter. Also I need the math problem for that.

STUDENT: Okay.

ROBIN EVERAGE: Does that make sense?

STUDENT: Yeah.

ROBIN EVERAGE: Okay, good job, keep going. Show me exactly what you did.

STUDENT: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14.

ROBIN EVERAGE: Okay, so what kind of a math problem did you write down? Show me that, how you got 14?

STUDENT: Addition.

ROBIN EVERAGE: Okay. So what kind of an addition sentence could you write to show me that?

STUDENT: 3 plus 3 plus 3.

STUDENT: We could do—

ROBIN EVERAGE: You tell me, where's three at? Where did you find three?

STUDENT: Here. Then we did three.

ROBIN EVERAGE: Okay. Then what did you find over here?

STUDENT: Three.

STUDENT: Four.

STUDENT: Well, three, three. But there's not three down there because we already filled in that one.

ROBIN EVERAGE: Why did you say four?

STUDENT: Because of this four—these squares are [inaudible].

ROBIN EVERAGE: Okay. So you can write—you already wrote three here, could you write four here? Do it so you don't forget. It doesn't have to be perfect. And then what do you guys have down here?

STUDENT: Three.

STUDENT: Three.

ROBIN EVERAGE: Write it. And what do you have over there, on the other side?

STUDENT: Four.

STUDENT: Four.

ROBIN EVERAGE: Okay. So then what addition sentence could you write?

STUDENT: 6 plus 8.

ROBIN EVERAGE: You keep changing numbers on me. You could, why—how—where did you get six from? Eight from?

STUDENT: You add the 3 and 3 together, which is 6 and then add the four.

ROBIN EVERAGE: You guys write what you think and get the perimeter.

STUDENT: We could do three, four times.

ROBIN EVERAGE: What do you think is your perimeter?

STUDENT: Seventeen.

ROBIN EVERAGE: How did you get 17? Show me.

STUDENT: Counting the sides.

ROBIN EVERAGE: Show me. Count while you do it, please.

STUDENT: 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16.

STUDENT: Sixteen. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16. Sixteen.

ROBIN EVERAGE: So what addition sentence could you—

STUDENT: Six.

ROBIN EVERAGE: Is that a six? So what addition sentence could you be writing to show me the perimeter?

STUDENT: Um, by like, um, 16.

ROBIN EVERAGE: Think about what you did.

STUDENT: 2 plus 6.

ROBIN EVERAGE: Two plus six? Well, how many do you see right here?

STUDENT: Two.

STUDENT: Two.

STUDENT: Two.

ROBIN EVERAGE: So write a two there. Okay, how many you see on this side?

STUDENT: 1, 2, 3, 4, 5, 6, 7.

ROBIN EVERAGE: How many?

STUDENT: Six.

ROBIN EVERAGE: We're doing just this side, Ayven. So 1, 2, 3, 4, 5, 6. So how many do you see down here?

STUDENT: Two.

STUDENT: Two.

ROBIN EVERAGE: What about the other side?

STUDENT: Six.

STUDENT: Six.

STUDENT: Six.

ROBIN EVERAGE: So what addition problem can you come up with using those numbers?

STUDENT: 2 plus 2.

ROBIN EVERAGE: I'll come back and check, you guys talk about it.

STUDENT: How about we do 2 plus 2 is 4, and 6 and 6 is 12 and um—

ROBIN EVERAGE: Perfect. I'll be right back.

STUDENT: Um, also plus six, and that's 6 plus 6.

STUDENT: So we can do like 2 plus 2 is 4, and 6 plus 6 is 12, and 12, um, and 12 plus 2 is 16.

STUDENT: So we're going to write—

STUDENT: 2 plus 2.

STUDENT: 2 plus—oh my gosh, why is it wet there? Plus six.

STUDENT: No, no, no, no, no. 2 plus 2 equals 4 and then 6 plus 6 equals 12 and then 12 plus 2 equals 16.

ROBIN EVERAGE: All right. So here is your next part. Using just the 12 that you have for the area of 12, create all the other ways you can find that area of 12, just using those. Now, you are more than welcome to re-use your tiles into whichever way you want. Draw out the outline of that shape. I want your, um, math equation for area and the math equation for perimeter also.

ROBIN EVERAGE: So find all the other ways you can show me the area of 12. Got it? All right, go for it. Keep going now, find another way to find the area using those 12. Use these blocks again. You can put them up there and arrange them how you want to to make—create another shape with the area of 12.

STUDENT: Does it have to be in a rectangle?

ROBIN EVERAGE: You tell me. Every end needs to be touching, I need that. Please.

STUDENT: So we can do it here right now, it can be fancy, because we did that last time. We don't have to do it right there. How about we do it right here?

STUDENT: Let's do it up, like, right here.

STUDENT: I can't reach that, though.

STUDENT: Then you scoot up. Look at it.

ROBIN EVERAGE: Remember when you're creating and assessing with your partners, use your math words.

STUDENT: That's two columns. A, and then these—

STUDENT: And this one goes right here. And this one goes right—

STUDENT: What? I don't get that, no, no, no, no. [laughter]

STUDENT: That's another rectangle.

STUDENT: We take it over here.

STUDENT: She said it doesn't have to be a rectangle, as long as the sides are touching.

STUDENT: It's a square. That's a square.

STUDENT: All right. So let's copy it down.

STUDENT: I'm gonna copy this side. Can, can I do that side?

STUDENT: No, because you did—

STUDENT: Let me just do one more side, I just want to do one side. Let me do one side.

STUDENT: It's over here, it's over here.

STUDENT: Oh my gosh, you ruined the rectangle. It's three, um, squares. It's only three squares.

STUDENT: I'll go four, and then three.

ROBIN EVERAGE: How is that one different from that one?

STUDENT: Because it's three.

ROBIN EVERAGE: What do you mean?

STUDENT: Like, um, instead of—

STUDENT: The three on the top and bottom, that's—

ROBIN EVERAGE: So what do we call those threes?

STUDENT: Um.

ROBIN EVERAGE: What would be the math—no, what would be the math word with the rays that we can call those threes?

STUDENT: Columns?

ROBIN EVERAGE: Huh?

STUDENT: Columns.

STUDENT: Columns are those.

ROBIN EVERAGE: So the three would be what?

STUDENT: The columns.

ROBIN EVERAGE: So over here, you are saying there's three columns. What are you saying over here?

STUDENT: That there's four rows.

ROBIN EVERAGE: Okay. Now find a totally different rectangular shape you can create with the area of 12. Use these again. You can move them. Manipulate them however way you want to do, but build me something up.

STUDENT: We can add onto them?

ROBIN EVERAGE: No, only 12. Area of 12.

STUDENT: Okay.

ROBIN EVERAGE: So you have to start all over. You cannot build this shape again. What other shape could you build to show?

STUDENT: We could do two, bottom row six. Do you want to talk about what stays on this side? On the sides?

STUDENT: You could do it like that. Ah. So that would, would—that one.

STUDENT: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12. We've got 12.

STUDENT: Okay.

ROBIN EVERAGE: Do it over there, [inaudible], okay?

STUDENT: We have to hold and make the rectangle. Like that.

STUDENT: So now—

STUDENT: Yeah, but then now, the sides are equal to the, the blue.

STUDENT: What is that?

STUDENT: Twelve is next to it, I guess.

STUDENT: What is this number?

STUDENT: Wait, can't, can't we just do that?

STUDENT: It's different, though.

STUDENT: No, it isn't.

STUDENT: Yes, it is.

STUDENT: We should do it this way.

STUDENT: It's different. Technically, all of them are the same. Okay.

STUDENT: P equals—

STUDENT: It's perimeter equals four—

STUDENT: No, 16. Wait. Six, and six, and the sides like that. You go—no, 16. Yes. Wait.

STUDENT: What are you doing?

STUDENT: Seeing what's wrong.

STUDENT: That's 8 plus 4 equals 12.

STUDENT: No, 12 plus 12; 24.

STUDENT: That is not 12.

STUDENT: Twenty-four. That means that P is wrong.

STUDENT: What?

STUDENT: Equals 12.

STUDENT: Wait. How did you get 24?

STUDENT: Look.

STUDENT: Oh, because you add the six and the six—

STUDENT: That, that's 12 plus 12.

STUDENT: 12 plus 12 equals 24.

STUDENT: Four—there's four, and then there's 20. Okay. We got to do a different one. If we just tilt this one up—so it's easy to do it right here.

ROBIN EVERAGE: Prove it. If you think you can, prove it.

STUDENT: Let me see if it's that. That's not what we put together.

ROBIN EVERAGE: Wait, you have to do the other side.

STUDENT: Kind of sloppy, kind of rough, because of—

STUDENT: Where's the [inaudible]?

STUDENT: I agree with you because—I agree with you because that's just like this switched around, so I agree with you.

ROBIN EVERAGE: So what are you guys doing over here? Explain what you got so far.

STUDENT: So we did it in different ways and different ways.

ROBIN EVERAGE: What do you mean different ways? Give me some math words instead of, "Different ways."

STUDENT: It's like, um—

STUDENT: We did different arrays.

ROBIN EVERAGE: How?

STUDENT: Switching them. Like, if this is, like, um, two, um, columns and, uh, six rows, then this is two rows and six columns.

ROBIN EVERAGE: Huh, okay. Finding out the—so finding the area and the perimeter there? Okay. Can you do me a favor? If you were saying that this one is, um, two—what did you say, two what?

STUDENT: Two and six.

ROBIN EVERAGE: No. What did you call the two? Did you say rows or columns?

STUDENT: Two—it'd be—two on columns.

STUDENT: It'd be two columns.

ROBIN EVERAGE: Yeah. So can you—underneath the two, could you write, "Columns"? And then underneath the six you would write—

STUDENT: Rows.

ROBIN EVERAGE: And then label that one over there. And then [inaudible] label these two whichever way it is. Okay?

STUDENT: Columns. [inaudible] The perimeter equals—the perimeter is 16.

STUDENT: 1, 2, 3; 1, 2, and 3.

ROBIN EVERAGE: How is this different from this?

STUDENT: It's different because there's—this one has six, um, six rows and this one has two rows, and this one has two columns, and this one has six columns.

ROBIN EVERAGE: And the area is still the same?

STUDENT: Yes. [inaudible] Okay, and then that will be 12.

STUDENT: [inaudible], don't do the same thing. Do this other one.

ROBIN EVERAGE: Area.

STUDENT: Yes.

ROBIN EVERAGE: So now what do we find? Okay, if we looked at a perimeter chart, are we adding, subtracting, multiplying, dividing, what are we going to do to find the perimeter?

STUDENT: Um, [inaudible].

ROBIN EVERAGE: So, what would we be adding?

STUDENT: Um, well...12? Or one?

ROBIN EVERAGE: Did you write that down and try it?

STUDENT: But it's 24, because 12 plus 12 is 24.

ROBIN EVERAGE: Hold on. You said 12 and 12 is what?

STUDENT: 24.

ROBIN EVERAGE: And what's one and one?

STUDENT: Two.

ROBIN EVERAGE: And then what?

ROBIN EVERAGE: What's 24 plus 2?

STUDENT: 26.

ROBIN EVERAGE: Write it down, I'm gonna show you. Come on, write it down! Now is it squared? What are we doing, look on perimeter? Do we write squares or it's just inches?

STUDENT: Inches.

ROBIN EVERAGE: So, what did you guys do to find 12? What did you do, you basically what?

STUDENT: Added—

ROBIN EVERAGE: You counted right? So, count that for me.

STUDENT: One, two, three, four, five, six, seven eight, nine, ten, eleven, twelve.

ROBIN EVERAGE: So, I'm going to show you how to use a strategy that they used over there, our tick marks. Remember? Can I see your pencil? When you're counting, when you make a tick mark to show one, two...you do it.

STUDENTS: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24.

ROBIN EVERAGE: So how many do you have on this side, count again.

STUDENTS: One, two, three, four, five, six, seven eight, nine, ten, eleven.

ROBIN EVERAGE: How many do you have here?

STUDENTS: One, two, three, four, five, six, seven, eight, nine, ten, eleven.

ROBIN EVERAGE: What was the area we were supposed to have?

STUDENT: We're missing one.

ROBIN EVERAGE: Okay, so what are we going to do to fix it? So, show me the fixing.

STUDENT: [inaudible]

ROBIN EVERAGE: But then what's this going to change to? Or is it twelve?

STUDENT: Twelve.

ROBIN EVERAGE: What do you need to put your tick mark here? So now if you counted them all, would you get 26 inches for your perimeter? Count all your tick marks slowly.

STUDENTS: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26.

ROBIN EVERAGE: So, what happened?

STUDENT: We got one more.

ROBIN EVERAGE: You had to add because you forgot one of them out again. Okay.

ROBIN EVERAGE: Eyes on me real quick. I know somebody you are finishing up and you can finish after I'm done talking. I want you to look at all the different shapes you created, and I want you to look at all the areas you came up with, all the perimeters you came up with, everything.

And what do you notice about them? What do you notice with your answers? Anything? What do you notice about your areas and perimeters? Looking at what you built in the problems you created. Talk with your island friends. Go.

STUDENT: I also want to add anything, if we didn't take away anything, if we didn't add anything, it's the same thing. [inaudible]

STUDENT: That the perimeter [inaudible] all kept changing.

STUDENT: Those, but Ms. Everage said...

STUDENT:16 and 14. Is you add those two together. It does once [inaudible].

ROBIN EVERAGE: So, what do you guys notice about your area and your perimeters here?

STUDENT: Area always equals the same amount.

ROBIN EVERAGE: It does?

STUDENT: Yes. It's 12, because one times 12 is always the same number times itself. So, times one it'd be 12. And 2 times 6 you count to six two times it equals 12 and if you count 3, 4 times two times.

STUDENT: Three *times* four.

ROBIN EVERAGE: So, then what about that? What about perimeter? What did you notice?

STUDENT: Perimeter is always—

STUDENT: Sometimes they could kind of be an equation, because look 12 plus 14 equals 26 as this perimeter. Area, perimeter.

ROBIN EVERAGE: Okay, but what do you notice about this perimeter, that perimeter, and that perimeter?

STUDENT: They're all different.

ROBIN EVERAGE: Why do you think that is?

STUDENT: They're all different. They're all different because if you add them, like we did— it's 6, 6 and 2, 2 so it would be 4.

ROBIN EVERAGE: What did you say, Georgia?

STUDENT: They're different shapes.

ROBIN EVERAGE: They're different shapes. Well, this one was extremely long, correct? So that showed us the different perimeter of a—

STUDENT: Also, if you add the sides, it's 12 and 12, but none of them have that good amount because...

ROBIN EVERAGE: So, the side length, the whole length of the side is changing.

STUDENT: Yeah.

ROBIN EVERAGE: Correct on each one.

STUDENT: It's changing except these two because they're technically same thing but they're...

ROBIN EVERAGE: Okay, good. I'm going to talk to other groups so this in your assignment. You're going to turn this over. Be careful on this top part, it's sticky. So, don't use the dirty size. Actually, nope there are no squares, so we're going to get a new paper.

STUDENT: Okay.

ROBIN EVERAGE: And then the new area you're going to work with is 36.

STUDENT: 36, okay.

ROBIN EVERAGE: So, if you want to go and get your 36 blocks ready and then I'll get you another paper.

STUDENT: This is twelve or 48...

STUDENT: So, these are also—basically the pattern would be, it's twos—

STUDENT: Six ways.

STUDENT: There's another way.

STUDENT: But on that one, it's, um, it's another ten.

STUDENT: Let's ask, let's see if we're done.

STUDENT: So, we noticed that it's going by twos—

STUDENT: And then it comes—it's a ten.

STUDENT: And then it goes another ten, but it's still by twos.

STUDENT: I agree with you, that is true because, like, 14, 16, like, 10, 26, yeah, that's it. Those are the perimeters, because the areas were all the same, because we just changed the shape.

STUDENT: Yeah, we just changed the strategy and the shape.

ROBIN EVERAGE: Your perimeters changed? Why do you think your perimeters changed?

STUDENT: Because we made different shapes.

ROBIN EVERAGE: You made different shapes? But didn't you use the same amount of tiles?

STUDENTS: Yes.

ROBIN EVERAGE: So why do you think it changed?

STUDENT: It changed because of the way we were putting it, um, it kept switching—it kept changing the ways that it was.

ROBIN EVERAGE: Do a little bit more explaining, what do you mean—how you changed it. Can you show me what you're, like, what you're talking about?

STUDENT: We, um, used the tiles and made this long shape. And we—

ROBIN EVERAGE: So, you had them like this where they're nice and long?

STUDENT: Mm-hmm.

ROBIN EVERAGE: So, now what are you changing it to?

STUDENT: Shorter.

ROBIN EVERAGE: Shorter? What about fatter, a little bit maybe? So, you were changing it and because you changed it, what changed for you guys, your area or your perimeter?

STUDENT: Perimeter.

ROBIN EVERAGE: Okay, and I'm going to have to fix you on one thing. Over here we said perimeter was just inches, right? So, what do you think our perimeter needs to be on all the other ones?

STUDENT: Inches.

ROBIN EVERAGE: Inches. Can you switch that for me? Okay, switch that and then I'm going to go get your new piece of paper and you're getting a new area, and then you're going to create everything you can with that one—actually, Ms. [inaudible] got it for us—um, and do your area and your perimeter. Your new area is 36.

STUDENT: I knew it. Because I hear you say it—

ROBIN EVERAGE: You heard me say it? Yeah. All right, can you move those?

STUDENT: What are we gonna do with the crayons?

ROBIN EVERAGE: You can just hold on to them.

STUDENT: Wait, I know, I know, I know. One, two, three, four, five.

STUDENT: Five, 10, 15, 20, 25, 30, 35—

STUDENT: Wait. One, two, three, four, five, six, seven. Seven.

STUDENT: Seven, 14, 21, 28, 3—what? I don't get it.

STUDENT: Okay. Good.

STUDENT: Six, 12, 18, 21—wait no. Six, 12, 18, 24, 36? Shouldn't it be 36?

STUDENT: Change it. Change the shape.

ROBIN EVERAGE: Okay, explain this whole up by two, doubles by 10 thing to me. How do you guys see that and what are you doing? Explain it to me.

STUDENT: So, this one is 14 and it's—and this one, it goes to 16, so—

ROBIN EVERAGE: So, why do you think it did to 16? Wh—If you said it went up by two, why do you think it went up by two? What made it go up by two?

STUDENT: Um, um, probably it's the way that we like, um, mi—like got this away then did that, and then just made it longer.

STUDENT: Maybe because we were adding twos.

STUDENT: This is like that.

STUDENT: Because, see—

STUDENT: If you did it that way, there's this and this, and those are both twos and that would be adding two more if you put them like that.

ROBIN EVERAGE: Okay, and what did you guys see over here with 10s or something?

STUDENT: Um, the 16 adds a 10 because this is 26, and then one plus one is two. And then the six is right here [inaudible]

ROBIN EVERAGE: So, why? Why would that be 10?

STUDENT: Because if, like if we put, um—like if we add—if we do 16 ti—plus 10, it would equal, like, 26 because, like I said, one plus one is two and then the zero—it's a zero. It's like, one, zero, and then one plus—wait. One plus one because it's like 16, plus one, and then the zero to the six is just six.

ROBIN EVERAGE: But what did you have to do to get that to be 10 more? What did you guys do with that shape?

STUDENT: We, like, moved it to one only.

ROBIN EVERAGE: One what?

STUDENT: We moved it like this.

STUDENT: One row.

ROBIN EVERAGE: You moved it to one row?

STUDENT: It'd be like three, two, one.

ROBIN EVERAGE: Okay.

STUDENT: Three, two, one.

ROBIN EVERAGE: All right. So, that paper, your area's 36. Find all the ways and show the area and the perimeter and be ready to discuss what you see is the same and what is different. Okay?

ROBIN EVERAGE: Well, I can see you have different ones, but what are you guys drawing? What are you showing me?

STUDENT: Um, I'm—We're showing you how, like, there's so many ways to part 12.

ROBIN EVERAGE: Okay, but what were my directions? Let's think about that for a second. I said to create a rectangular shape, correct? Would this one be one of those? Hold on, don't erase it, don't erase it, don't erase it. This would be what we would call an irregular shape versus what you call, I guess, a regular shape because this is what would be a rectangle, okay? I like what you did, I see your thinking. I know you got your area, you're getting your perimeter, but I need you guys to go back to just doing regular shapes instead of irregular. Does that make sense?

STUDENT: That one looks [inaudible]

ROBIN EVERAGE: I know but I need you guys going back to just regular shapes. And I like that one.

STUDENT: I have three [inaudible]

ROBIN EVERAGE: Uh-huh. I see what you did for that. Was that your area or your perimeter? When you found this out, was this your area or your perimeter?

STUDENT: Perimeter.

ROBIN EVERAGE: Your perimeter, okay. And what do we write next to perimeter? Not just the number, what else do we write?

STUDENT: Um, um—

ROBIN EVERAGE: What'd you say?

STUDENT: I-N squared.

ROBIN EVERAGE: Which stands for? What does I-N—

STUDENT: Inches.

ROBIN EVERAGE: Inches, good. So, I'm going to have you stop on that one because I don't want the irregular shapes. Right now, we're just doing these shapes, okay? That's a later lesson. We'll get into that one but this is what I want for right now. So, leave this paper alone and I want you to start on this one, okay? And you're going to—You have a new area of 36. But are we going to create irregular shapes?

STUDENT: No!

ROBIN EVERAGE: Okay. I mean, what you did, yes, I see it. You got the perimeter, you got the area, that's fine, but that's not what we asked for this lesson.

STUDENT: That looks like a times. This one's a times. It's multiplication.

STUDENT: Oh my god. Plus, okay.

STUDENT: Okay, that should be it. Now we can—wait, hold on. [inaudible] 3, 6, 9, 12, 18.

STUDENT: What's 7 times 6 again?

STUDENT: 21, 27, 30, 27. Wait no, I messed up. 3, 6, 9, 12, 18, no, 18, 21, 24, 27, 30.

STUDENT: No, it's—

STUDENT: 30, 33, 36, so it'd be—

STUDENT: You kinda messed up, right?

STUDENT: We already did that.

STUDENT: Six—6, 12, 18.

STUDENT: What could we win if we could do it?

STUDENT: Okay, so, I'll do the inside.

STUDENT: Okay. Six times six equals 36. A equals 36 square units. P equals—and then if this is—so this is six plus six plus six plus six equals—

STUDENT: Oh yeah.

STUDENT: Twelve.

STUDENT: That's 12.

STUDENT: Equals 24, 24 inches.

STUDENT: Oh so the area would be—are you sure it's 24?

STUDENT: Okay. I think we're done. No, we're not.

STUDENT: 1, 2, 3, 4, 5, 6, 7. 14, 15, 16, 17, 18.

STUDENT: Okay.

STUDENT: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18.

STUDENT: I'm going to do it the opposite way.

STUDENT: It's still going to be uneven.

ROBIN EVERAGE: Okay, s So keep moving around. Let's see how you can make it—- to make—- to where it will work. Six. So why didn't you go to five?
STUDENT: 5, 10, 15, 20, 25, 30, 35. It doesn't go to 36.

ROBIN EVERAGE: Okay. I need to see your actual math equations for each one of these. Can you write these like in one straight line? And then how else could you write a math equation using that? What other ways have you seen our math written from multiplication? How else could you write it?

STUDENT: You could do parenthesis. My God. And, and equals. And we could do, um, we could do, three. No, we could do four.

STUDENT: We can still do five because it's a—8 times 5, but then I add six. You're not—you're not actually counting by fives.

STUDENT: Exactly.

STUDENT: But you got kind of the fives. [LAUGHTER]

STUDENT: I know. So now I put the equation here. Put that equation there, put my equation here.

STUDENT: Okay.

STUDENT: So we could do 3 times 12 equals 36, and parenthesis 6 times 6 equals 36.

STUDENT: Now we can do the same thing on the top.

STUDENT: The twelve—that area.

STUDENT: Wait, let's—what would the perimeter be? The perimeter—

STUDENT: Um, one, two, three, five.

STUDENT: There.

STUDENT: Oh my gosh.

STUDENT: And the perimeter would be 1, 2, 3, 4, 5, 6, 7, 8, 9. Twenty-six is the perimeter.

ROBIN EVERAGE: Okay. We have three, we have four, we have six. What else could we try?

STUDENT: Okay, Levi. Okay, I'm going to try this. [inaudible] Excuse me. Excuse me, I'm going to move out like the—

STUDENT: Something times something, so 9 times 4 equals 36.

STUDENT: Now it's not equal.

STUDENT: Twenty-six is on the other equation.

STUDENT: I'll try this, how about 9 times 4 plus four equals 26. Um, 36.

STUDENT: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18.

STUDENT: That's 36. So you have 36 plus 4.

STUDENT: Four.

STUDENT: Thirty-six plus 4, yeah. Thirty-six plus 4 equals—

STUDENT: Yeah. Thirty-six plus four, that equals 40. I know because it's this. 36, 37, 38, 39, 40.

STUDENT: And it all reached different thing. Can you erase?

STUDENT: I'll erase. Can you do around the bottom?

STUDENT: I just do this so we can, like, mark— [inaudible]

ROBIN EVERAGE: I'd like you to finish up whichever one—

ROBIN EVERAGE: If you are done, then I would like for you to start discussing what you notice about the area and the perimeter of these shapes that you're creating right now.

STUDENT: Okay someone can use this. Hannah.

STUDENT: She just [inaudible] the last one, so we just need that. We can have two.

STUDENT: Oh, we gotta check. One, two, three, four, five, six, seven, eight, nine, 10, 11, 12, 13, 14—

ROBIN EVERAGE: Finish that one and then start discussing what you notice about the area and the perimeter.

STUDENT: Thirty, 36.

ROBIN EVERAGE: Are you guys done with this one?

STUDENT: Yes, we're doing our two, we're doing our second—

ROBIN EVERAGE: All right, then do that one and then discuss your area and your perimeters, what you see on all of your shapes.

STUDENT: The difference between all of these is that they have different sizes.

STUDENT: Eighteen times two equals, hmm.

STUDENT: Thirty-six.

STUDENT: Thirty-six. 6A equals 36 square—

STUDENT: Units.

STUDENT: ...units. And then if we do that—

STUDENT: P would equal—

STUDENT: ...18 plus 18 plus 2 plus 2 plus that, it's 36.

STUDENT: Thirty-six.

STUDENT: That's four.

STUDENT: Four, so—

STUDENT: Plus, four equals 40.

STUDENT: Forty!

STUDENT: P equals 40 inches. I noticed—

STUDENT: But would it be square inches?

STUDENT: Just inches, she said inches.

STUDENT: Okay.

STUDENT: Okay, I think the area is all the same because when it was 36 all the areas equaled 36. And um, uh, the squares were all different, so the perimeter is different be—because if y— 'Cause that one's six, six, six, six but that one's nine, nine and four, four. And this one is—

STUDENT: So, what you're saying is that—

STUDENT: Three, three, three, three and 12, 12, and 18, 18, and 2, 2.

STUDENT: So, what you're saying is they all have different shapes and sizes because—

STUDENT: Yeah, so it's a different perimeter.

ROBIN EVERAGE: I'm going to ask a question, a few questions, and I want you to talk with your group, when you're looking at your papers, to think about the answers that you used. Or, excuse me, the strategies that you used to get your answer. So, here's your first question. What strategy did you use to find the different-sized rectangles? Think about it for a second. What strategy did you use to find the different sizes of your rectangles? Talk to each other, go.

STUDENT: Addition.

ROBIN EVERAGE: Okay, more than one word would be fantastic.

ROBIN EVERAGE: All right, hold on. When you're answering this, answer it as if you were teaching me. If you had to teach me this, how would you answer that question? More than one word, try to explain what you did.

STUDENT: A strategy you could use was multiples to find which one had 36. Mm-hmm.

STUDENT: Has multiples, you count the multiples to get the answer. And addition is you're adding it to the perimeter.

STUDENT: Now how is that gonna work? Because we had 36, so we just need 12.

STUDENT: Three rows of three—

STUDENT: Twelve.

STUDENT: Three rows—yeah, three rows of 12—

ROBIN EVERAGE: I'm going to call Malaree and Chloe, so both of you, what strategies did you guys use?

STUDENT: We used—

ROBIN EVERAGE: Hold on, I need everyone tracking the speaker. Levi. Go ahead.

STUDENT: We used fives to find 36 but—and we count by fives, but, um, there—it didn't go to 36, it went to 35, so, um, we couldn't use 30—I mean we couldn't use the fives.

ROBIN EVERAGE: Is that what you guys were saying? So, you were counting kinda by multiples and you realized counting by fives would or would not work?

STUDENTS: Would not work.

ROBIN EVERAGE: Okay, you guys hear that? That was a strategy—I know, I think you guys used that as a strategy as well, didn't you? Okay here's your next question for you to be thinking about. What kind of rectangle had the sm—smallest perimeter, or the smaller perimeters, and why do you think that?

STUDENT: So, then this one's the little one.

STUDENT: But how [inaudible] for this one?

STUDENT: It's 24. They were talking—

STUDENT: How many problems?

STUDENT: [inaudible] so it would be 12 times 2, right?

ROBIN EVERAGE: Okay, so over here, which one had the smallest perimeter?

STUDENT: This one.

ROBIN EVERAGE: Okay, why?

STUDENT: Because this one has, um, 26 as the perimeter and this one has 36.

ROBIN EVERAGE: Okay, why? What can you tell me about that shape, the difference of that shape and that shape that, that would give that the smaller perimeter? Why did you say that?

STUDENT: Um, because, um, this one has like, um, if you count these, it has, um, shorter distance and this one has a longer distance of that.

ROBIN EVERAGE: So, you're saying from here to here is a shorter distance from here to here?

STUDENT: Mm-hmm.

ROBIN EVERAGE: Okay, good. What do you notice about these two? I want you two to ta—or you three to talk about the difference of these, the perimeter of these. You're not writing any more, talk about the difference of these two, go.

STUDENT: Okay, the difference of these two is that this one's three and this one's four.

STUDENT: Yeah and, and this one is, um, 1, 2, 3, 4, 5, 6, 7, 8.

STUDENT: This is 12—

STUDENT: This one's nine.

STUDENT: This is 12 in columns; this has nine in columns.

STUDENT: Oh 'cause the [inaudible].

STUDENT: Four columns nine and three columns of 12.

STUDENT: This has nine rows and this one has 12 rows.

STUDENT: I agree with you.

ROBIN EVERAGE: Here's your next question. What kind of rectangle had the largest and why do you think that?

STUDENT: Yeah. The mat equaled, the mat equaled, um, 36 in total and the other ones just equal 36 for the higher perimeter. But that, that was only two of the sides. So then we had two more to do, which were two.

STUDENT: This one is the greater one because, um, this—because this one has 30, this one has 24.

STUDENT: That one has 36.

STUDENT: And, um, the 40 is the more greater one because it's more greater than the others. Because 20 is less than 30, and 30 is less than 40, and 36 is less than that 40. And also, um, this one is 18, and 18 is four.

STUDENT: Yeah. But most of the, the outside is—it is used in the inside of the Earth, then it's not even touched.

ROBIN EVERAGE: Okay. All right, let's bring it back together. I'm going to have a couple of groups share what they were thinking. Um, you three, what were you seeing about either being smaller or bigger, and why did you think that of the perimeters with the rectangles? Go.

ROBIN EVERAGE: Everyone's tracking them. You got to talk loud.

STUDENT: We said that this one was smaller because two of them aren't being used but in these all of them are being used.

ROBIN EVERAGE: So you're saying you're not using which part of your rectangle: inside, outside, sides? What?

STUDENT: We're not using inside. Like right here, these two squares are inside and we're not using them.

ROBIN EVERAGE: Did you guys hear that? Okay. They were saying how on their one, they did not use any of the inside of the rectangles, but the one that was the longer one, they used all of their different squares in there.

STUDENT: We said that we had one that was, um, was on the smaller perimeter, we could find that out because, um, one of our perimeters, it was, um, 26 and then on the other, it was 30. So we knew which one was the smallest one because the other ones were smaller. And, um, we found, found that out because also because, um, on top, the distance was shorter than the distance from the bigger one, um, which the perimeter was 30.

ROBIN EVERAGE: Okay. So they were looking at, um, rectangles that were this way. And they said one of them was shorter and the other one was longer. So talk to your other friends. What do you think about that?

STUDENT: No, we don't. But she said 32 when hers—she said that hers went from this one was the biggest; So that is six, but then that's three. I know like from the size at the top but that doesn't changed the—our perimeter.

STUDENT: All these, these three are smaller, this one because we had 18, this one had six, and 12 and nine?

ROBIN EVERAGE: All right. Nice job. Stand up for a second please. Look at your partners. Partner or partners. Tell them they did a fantastic job.

STUDENTS: You did a fantastic job.

ROBIN EVERAGE: And give them a high five. And guess what? We're done.

STUDENTS: Yay.

ROBIN EVERAGE: I was quite surprised when some of my students started using tick marks when they were counting the perimeter around because that's not a strategy we had actually discussed, but I was quite pleased because it helped them count correctly, and to see what the perimeter actually was. I did have one group that knew what the answer should be because they knew the math. They knew it should be 12, 12, 1, and 1, but when they kept counting, they didn't get the right number and it came down to, with the tick marks and recounting, that they were a square short. So that was neat for them to be able to figure out, “oh, well we're a square short.” They put the square on and then they were able to see what, you know, kinda what they had done wrong, but they had fixed it themselves without me saying, “you're one short.” They were able to figure that out as well.

My next steps for tomorrow—our lesson for tomorrow is some of my students started making irregular shapes, which was interesting. We had slightly discussed that a little bit, but that was not the point of this lesson, so I had to kinda go over to them and redirect them to what I needed for this lesson. So we'll be looking at some irregular shapes and discussing the difference between the two. Along with this was a little bit of an introduction to perimeter, so taking perimeter further and getting them to understand what perimeter truly means and how we're going to get it in the strategies to use for that.

Something that I thought was—that I saw that was interesting my students did was when they created an array, they did 6 by 2, six columns, two rows, and then when I asked them to go ahead and create all the different ways, they switched it and did two columns and six rows, and they said, "Well, we just flipped it." Okay, well, why did you flip it? And it had them getting into that deeper discussion of what they actually did. And then I prompted them: “What's another way besides just flipping it, which is fine, but what's another shape, a bigger or a smaller shape that you can create with the area of 12?”

Something that was interesting is when we were talking about the perimeter, there was one group that noticed on the shape that had the larger perimeter, they counted every single square versus the shape that had the smaller perimeter. They noticed that the squares that were on the inside, they didn't need to count those squares. So that was for the area and not the outside of the perimeter. Overall, I was very pleased with the lesson. I did notice some of my students that used our poster that talks about area and perimeter, which I found was interesting because I actually haven't discussed that poster with them, the anchor chart with them, so I found it quite neat that they were referring to it and drawing that information on their own. I know one group was sitting there talking about, “No, with perimeter we need to add, because that's what the chart had said,” but I had not brought any attention to that prior to the lesson, so I was excited to see that. I was real intrigued to see how they really dived in, they went ahead with it. It was very interesting to see them just flipping shapes and saying, “Well, this is a different shape. Well, okay, I can see that, but how else can you do it?” And once they got the gist of that, they went and I was real happy that they were able to explore perimeter all on their own. It was all student-led. I did very little, redirected them, but they were able to figure it out, which will then lead into tomorrow's lesson and the next day after that when we dive deeper into perimeter, and they'll be able to see it and solve it themselves using the strategies they discovered today.