Explicit Teaching in Problem-based Mathematics
Use Student Thinking to Leverage Student Thinking

[MUSIC]

NARRATOR 1: Use student thinking to leverage student thinking.

NARRATOR 2: Sharing can be more focused, and math talk more purposeful when using approaches in which the ideas of students are expressed and tested against the ideas of others. Use student thinking, examples, and artifacts to propel discussions and to co-construct and model mathematical concepts and ideas. Support student thinking by strategically organizing, annotating, highlighting, and summarizing learning.

Grade 3 students have solved the problem in which they work to find as many unique arrangements as they could make with six tiles. As part of consolidation students use their own examples to uncover why perimeter can change and area stays the same.

BRENDA KRESS: So who can tell me what was the smallest perimeter?

STUDENT 1: It has 10.

BRENDA KRESS: 10 awesome, can you come on up? We're gonna put a piece of tape behind here.

NARRATOR 2: The teacher guides the organization of the students' findings only charts that will enable comparison.

BRENDA KRESS: Perfect, okay, all right did anyone else get a perimeter of 10? Okay, if you had a perimeter of 10 you're gonna come on up. Okay, just place it.

NARRATOR 2: The charts provide a visual focal point that enables students to notice that even though area remains the same the perimeter changes depending on the shape of the arrangement.

STUDENT 2: They all have six area but they're more of the squares are sticking out so that's how they get higher perimeter.

NARRATOR 2: Pairs of grade 6 students are working on perimeter and area tasks that have been differentiated relative to the understandings they demonstrated in their previous days' learning.

ALLISON BERSCHT: All right, so as our final activity is we're going to be meeting with groups that also did the same task as us and my goal for you is that you're going to be sharing some of the strategies you used and how you figured out some of the shapes with the other group. In some cases I saw some really unique ways

and I'm looking for strategies that you could tell the other pair that they could then repeat back when they go back to their own challenge.

So I've brought your two groups together because you've both been challenged with doing task C and task D and I thought that maybe we could share some tips because your group's been doing some really neat things and you can help each other out and maybe get each other started with some unique ideas. So can you tell Daniel and Santi about what you've been doing here?

STUDENT 3: Okay, so what these charts remind me of is how the area's the same but the perimeter goes out as the shape gets bigger. So this reminded me of say you're curled up on a couch like this, you take up less space but there's still the same amount of matter and area in your body but however if you're stretched out you take up more space on the couch but still you're the same area.

ALLISON BERSCHT: So very interesting to note that even though you added more tiles you found a way to make the perimeter go down by like you said scrunching it up more and hiding more of the sides. Now can you two find a way then to go back to your own chart and use that same idea to find some more? Okay.

NARRATOR 2: The team returns to work on task C. They test the idea that the more compact the figure is the less the perimeter might be. They design an arrangement with an area of 8 square units that has a perimeter of just 12. They compare this to an original arrangement with a smaller area of 6 square units but a larger perimeter of 14.

STUDENT 4: The idea from [INAUDIBLE] helped us because we weren't really making it more compact so that we got a smaller perimeter. Over here we did straight line but then this one we did two lines together and it made it more compact and we got a smaller perimeter and a bigger area.

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