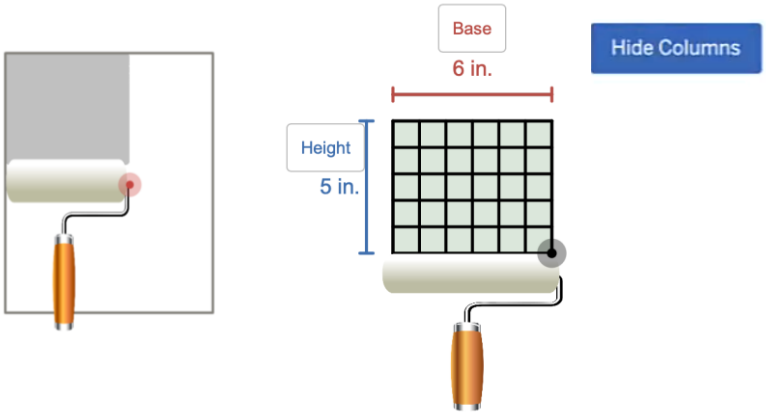
A Dynamic Measurement Approach to Multiplicative Reasoning

ECR Hub
EDU Core Research

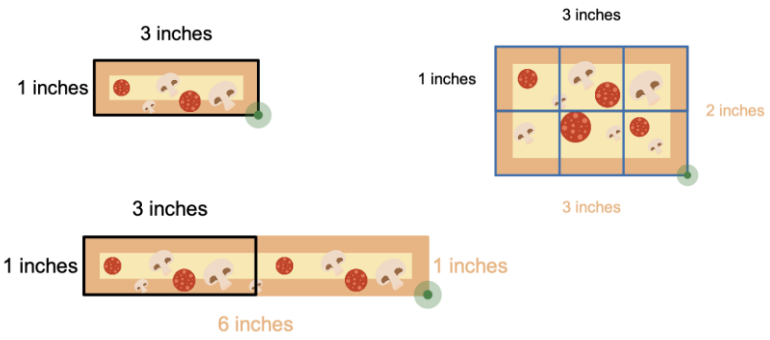
[#2321234: Designing an Equitable Approach to Multiplicative Reasoning through Dynamic Measurement for Area]

Students constructed multiplication expressions as dimensionalized objects (Thompson, 2000) of *base* × *height*

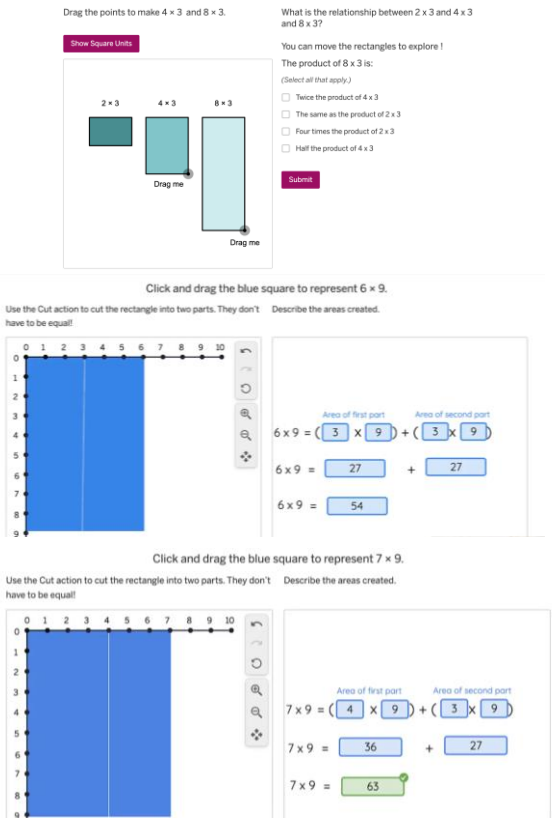


How can we make the area bigger?

"We can change the base or the height."



Students conceptualized multiplication expressions as area that could dynamically be stretched, compressed, equipartitioned, or decomposed to manageable dimensionalized objects



Methods

Design Experiment | Multimodal Analysis

- Tasks designed on Amplify Desmos.
- Two iterations of design experiments (Cobb et al., 2003) with 10 fourth-grade students and 10 third-grade students.
- Multimodal analysis (Chanier & Lamy, 2017) to capture their forms of reasoning and the design that elicited and supported those forms.

Challenge Overcome

Prior Knowledge

We shifted from fourth- to third-grade students because in spring fourth graders would have already memorized many multiplication facts, whereas third graders would be just beginning to develop multiplication concepts, offering a clearer view of their emerging reasoning and the impact of our design.

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Check out our tasks!

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