**Activity: How Many in This Array?**

How many different arrays can you make with 12, 24, and 48 cans of coke?

* Draw a picture to represent your arrays, label the dimensions, and write a mathematical expression and/or explain your reasoning.
* What patterns do you notice in the rectangles with the same area?
* Choose your own number to come up with a conjecture to see if it works with your new number.

- Presented this way the activity is open to encourage multiple methods, pathways, and representations, poses a problem before teaching the method, allows all learners to contribute to the learning and have room for extension, gives students the opportunity to authentically share their thinking with their peers, ads a visual component, and the requirement to convince, reason, and be skeptical.

- Before starting the activity I would have kids look around the room to find different things that come in arrays. I would use the vocabulary needed such as: arrays, rows, columns, dimensions, as they arise in the context so that students get a clear meaning of the vocabulary in meaningful context. I would present the activity and encourage them to persevere in solving the problem and give them as many positive growth mindset messages as possible. I would encourage them to find alternative solutions and explain their thinking. As students would present their strategies I would encourage them to draw a representation and make connections between the drawing and notation. If some students would come up with a specific strategy, I would encourage them to find another way into the problem, or explain why it works and how their strategy is similar or different from another. For the students who are not sure about the dimensions of the arrays, I would use colored tiles or cubes to represent their arrays, or encourage them to imagine an array familiar to them and construct that with tiles or cubes. Also pictures of common grocery store arrays (labeled) could be used and displayed in the classroom to be referred to throughout the discussion.

Rubric

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| Notice Patterns | Very clear and  Organized. | Starting to | Not yet |
| Connection to multiplications | Writes a multiplication expression | Notices repeated addition | Not yet |
| Organizing evidence | Explains, reasons systematically, labels, and understands similarities and differences. | Some explanations/reasoning  Not a clear understanding | Not yet |