

## Maker Project Idea

By Jade

*\*\*all names and identifiers have been masked/changed to retain anonymity*

For this Maker Project, I am considering mathematical topics in geometry or fractions. The student I am working with said she enjoys fractions and I'm hoping to make something really cool to help her gain another level of understanding with the project idea. To be honest, fractions were hard for me, so I want to continue with her interest by learning and playing with a manipulative to gain a deeper understanding. I've been playing with a few different ideas to use as a tool, but I am really no where close to design or how it'll function.

For the manipulative, I was thinking of making a sort of cube that's made out of pyramids that connect by hinges, can be connected and disconnected, but has fractions on each side of the triangle. So, if the cube unfolds in half, there will be a fraction that says " $\frac{1}{2}$ " on the inside of the cube. But, mathematically, I'm not really sure how that'll work. I was also thinking of an abacus type of frame and sticks but using fractions. The first stick will be a whole piece, that says "1". The second stick will have two pieces that says " $\frac{1}{2}$ " and " $\frac{1}{2}$ " on each piece, and so forth. The pieces would be removable so the student could essentially, move them around to see which make equivalent fractions. For example, stack one of the " $\frac{1}{2}$ " pieces and she could also see stacking two of the " $\frac{1}{4}$ " pieces are the same height, which means equivalent fractions. I think this would help her visualize fractions easily, and see patterns in the numbers by comparing which are equivalent or not. (Screenshots attached on page 4).

I believe that children already have the knowledge but need tools and resources in order to bring it out of them. As we've been watching the videos of students solving problems, I'm

realizing how intuitively they try to solve things. By giving them a tool that can help them to use the knowledge they already have, I believe makes for a “good” manipulative. One that can help them “see” and visualize the problem and give them the opportunity to use it to “try” it out on their own. In this way, once a child gathers the sense of using tools and manipulatives in furthering their understanding, that they will try to find other things on their own to figure out other problems. I think something that helps students become more critical thinkers not only because they are trying to figure out the problem, but they are figuring out which tools would be most applicable to them in helping to solve it. I think not only does this provide a student to think divergently in finding solutions to solve problems, but also gives them the confidence in their own abilities to “figure things out”.

As with supporting student’s learning, as a teacher, I would want a manipulative that promotes creative thinking and to encourage students to figure out their own ways in solving a problem. But a “good” manipulative to aid in teacher’s teaching is also one that can help to represent mathematical concepts in a variety of ways, in order to provide the student with an opportunity to be able to connect their ideas and concepts in an additional or deeper form. A manipulative to aid in teacher’s teaching should be one that can support new mathematical concepts or even an old concept, but more deeply. The tool should be used to help scaffold child’s thinking, so they arrive at a greater understanding of mathematical concepts that they are solving on their own. This makes it more engaging and supports active learning as they are using the tools that the teacher provides for their own learning.

I’m currently feeling really behind with this project. I understand what the intended use is, and I’m excited about that, but I’m also so lost in where I am to start. I looked over the Van De Walle textbook and saw figure 16.6 which shows fractional relationships using a pie chart

with halves, thirds, fourths, sixths, and twelfths in a partitioned circle. I think the abacus might be helpful in something similar about visualizing fractional relationships, but I'm still not confident in how to go about this or where to start my questions and design. I hope during our meeting together, we could go over some ideas to help start the process.

Design sketches

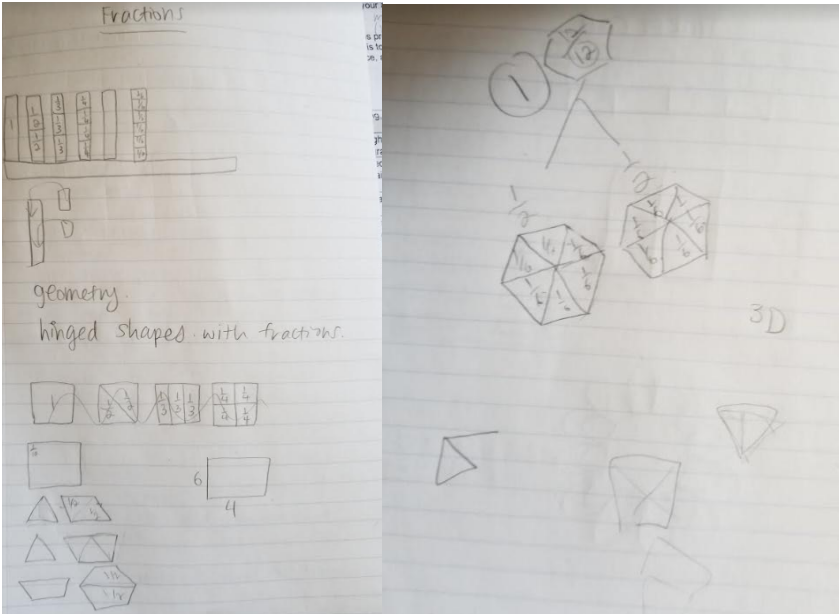


Figure 16.6 [masked]