



Welcome fellow Recovering Traditionalists to Episode 161: A candy bar is better than a pie...when it comes to fractions

Before we get into the episode, this week's positivity comes from the chat from our recent Math Strategy Session. These sessions are something we created for the members of the Build Math Minds PD site, but we decided to do the recordings live so that anyone could attend. So if you are interested in attending our next two sessions that we are doing live go to <https://buildmathminds.com/strategy-sessions> to register for free. But you have to be there live as the recordings are only available inside the BMM site for our members.

Irma posted in the chat during our last session on the Place Value Decomposition strategy, she said: "Today's session has been amazing. I love spending Sunday with you all. It's so wonderful and inspiring to be amongst such a professional group of teachers." Well, thank you Irma for attending and I'm so glad you've been enjoying the sessions.

This last week we just had Pi Day, 3.14...March 14. Which on a side note happens to be one of my best friends' birthday, Happy Birthday Mel. I know lots of educators use pie (like apple & cherry) to help kids understand Pi (the ratio of a circle's circumference to its diameter), but there is one area of math that PIE is used a lot but it really shouldn't be: Fractions. And not just PIE, but circles in general are overused when we are trying to help kids develop their understanding of fractions.

Let me clarify, I'm NOT saying we should never use circles but it isn't the best model and should be used sparingly instead of as the main fraction model. Instead, bar models are a much better choice.

In the book *Fractions, Percentages, Decimals, and Proportions: A Learning-Teaching Trajectory for Grade 4, 5, and 6* by Frans van Galen, et al they show many examples of contexts that elicit the bar model instead of circles. Two examples they show are a loaf of bread and the status bar when downloading (or uploading) something on a computer. On page 35 they write:

"Well-chosen contexts enable students to make the transition to working with a bar or another model. In the context of a story about a baker, the students can be asked how they can divide a French loaf into six parts. It is natural to envisage the French loaf as a bar.

Working from this sort of situation, the bar can become a model for the students to imagine the procedure for dividing something into equal parts. The bar is the unit and at the same time the object to be divided.

Students will recognize the bar as showing the part that has already been downloaded or copied. The figure on this page shows that about two-thirds - 65% according to the computer - of the file has been copied. In this book we will mainly pay attention to the bar model and the double number line.

However, these are not the only models that can play a role in this part of the curriculum. In some contexts, a rectangle or circle might be more suitable, and some fractions can be more easily read from these shapes. For percentages and decimals in general, the bar or the number line are the most obvious representational form to choose. They have the advantage that they can be used to express the proportional aspect of fractions, percentages and decimals by writing different numbers above and below the line. Moreover, these models are useful not only for representing concrete situations, but also for providing visual support when reasoning with number relationships. By using bars and number lines with fractions, percentages and, decimals - as well with as proportions - we make a clear connection between the different parts of the curriculum.”

So to summarize what I take away from this is that bar models and number lines are one of the best ways to represent fractions (they aren't the only way). I personally love them because it doesn't take much to draw them, they are easy to ensure you are making multiples of them the same size when comparing fractions, and it's easier to partition and ensure the pieces are equal sizes. However, they also help your students as they extend their understanding to ideas of ratios, percents, proportions, and decimals.

This book helps us see just how powerful the bar model and number line are long term for students. Throughout the book they show multiple examples of using these models. But I'd like to share a couple of my favorite math scenarios that they are super helpful for. I'm going to be showing visuals as I share these so if you are listening to this you might prefer to watch instead. Go to [youtube.com/buildmathminds](https://www.youtube.com/buildmathminds) to see what I'm sharing.

#1 fraction sense of relating fractions to benchmark numbers. Benchmark numbers are the $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2 and so on. Which you can see $\frac{1}{2}$ and 1 easily on a circle but take a look at the difference in the visuals. When you show $2\frac{1}{2}$ using circles it's not a continuous thing, they are seen as separate pieces. When it's in a bar model it's seen more continuously and this model can easily connect to a number line.

#2 helping kids understand a fraction of a set and understanding that the value of a fraction changes based upon the value of the WHOLE $\frac{1}{2}$ is half of the whole but the VALUE of that changes based upon if the whole is 1 thing, 4 things, or 400 things.

#3 This one was a big AHA to me and it's using number lines (or double number lines) to help me better understand % of problems. Like do you remember problems like “If \$15 is 25% of the cost of the bill at the restaurant, what was the total bill?” I hated those problems. I was taught set of rules that basically made me a number plucker. IS means you put the equal sign there and OF is where you put the multiplication sign...so it becomes $15 = .25 \times B$. Then we had to solve for the variable. Instead if I put this on a number line it actually helps me make sense of the problem. \$15 is at the 25% mark and so if I double that it gets me to 50% of the bill so if \$30 is 50% then 100% of the bill is \$60. That was seriously mind blowing to me and I never was taught that way. It was something I learned as an adult.

Again these are not the only math scenarios that being able to visualize fractions linearly (like in a bar model and number line) is helpful...they are just some that have helped me personally. And don't forget circles can be a great model for certain fraction situations but they should NOT be the main model we are using because it doesn't transfer to other mathematical concepts.

So next time you are working with fractions with your students, use scenarios that involve rectangular items like candy bars instead of circular items, like pie, as your context so they can visualize a bar model and not a circular model.

Until next week my Fellow Recovering Traditionalists, keep Building Math Minds.

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