

At Great Minds®, we receive many questions from parents asking why their child needs to learn more conceptual math and multiple strategies for solving problems. Some parents suggest that simply learning the traditional method for solving a math problem (e.g., $2 + 2 = 4$ or $6 \times 8 = 48$) is enough.

We agree that students need to learn traditional methods for computation. Often, they're the best tool for the job.

However, sometimes students need more options—they need more tools in their toolbox. If students learn multiple math strategies, not only can they solve more kinds of problems more efficiently, but they also gain a deeper understanding of mathematics and how to use it in daily life.

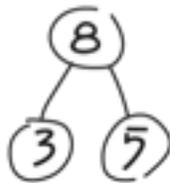
Consider the following three examples.

NUMBER BONDS

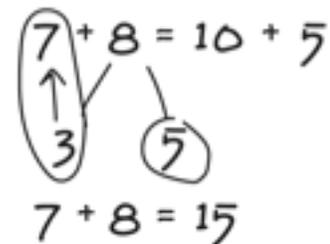
Add 998 and 337.

To solve a problem such as $998 + 337$ with a traditional method, students must learn a complex series of steps. But using number bonds makes this problem simple.

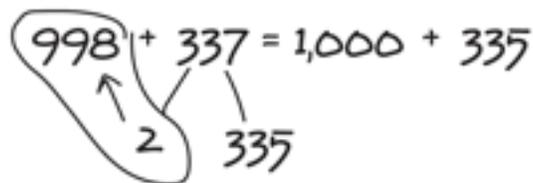
First, students learn to break numbers into small, manageable units.



Then, students can see that $7 + 8$ is the same as $10 + 5$.



Once students understand the concept of number bonds and how to use them in computation, they can quickly solve a more complex problem, such as $998 + 337$. As above, the first step is to make 998 a more manageable number. Notice that 998 is close to 1,000; we just need to add 2. We can get the 2 from 337 by using a number bond: $337 - 2 = 335$.



The two numbers are now 1,000 and 335, which even young students can quickly add to get 1,335, the same sum as $998 + 337$. This method is faster, and the student gains practice in conceptual math.

TAPE DIAGRAMS

Zoe had some stamps. She gave $\frac{2}{5}$ of the stamps to Lionel. She used $\frac{1}{3}$ of the remaining stamps to mail thank-you notes. She has 14 stamps left. How many stamps did Zoe have when she started?

This problem is difficult to solve if you only know the algebraic approach. But by using tape diagrams, a Grade 5 student can solve it in under a minute.

IN KINDERGARTEN, *Eureka Math*™ students learn the basic approach of dividing numbers into units, starting with concrete examples such as apples, blocks, or stamps.



IN GRADE 3, students learn the concept of fractions. For example, saying *two stamps out of every five stamps* is the same as saying $\frac{2}{5}$ of the total number of stamps.



BY GRADE 5, *Eureka Math* students can use tape diagrams to easily solve the stamp problem in four steps.

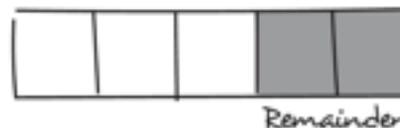
1. Zoe gave $\frac{2}{5}$ of her stamps to Lionel, so you know that the original amount can be divided into 5 units. You also know that Lionel got 2 of those units, so 3 units remain.



2. You know that $\frac{1}{3}$ of the remainder—1 of the 3 units—were used to mail thank-you notes.



3. The problem tells you that Zoe has 14 stamps left over, so you know the remaining 2 units total 14. You also know that the units are the same size. 14 divided by 2 is 7 stamps in each remaining unit.



2 units = 14
1 unit = 7

4. You began with 5 equal units in the tape diagram. Since each unit represents 7 stamps, multiply 7 stamps by 5 units to get the answer of 35 stamps. Zoe started with 35 stamps.

VISUALIZING FRACTIONS

Which is greater, $\frac{1}{3}$ or $\frac{1}{4}$?

Many people incorrectly assume that $\frac{1}{4}$ is the greater fraction. After all, 4 is greater than 3, so doesn't that make $\frac{1}{4}$ greater than $\frac{1}{3}$? No, it does not.

One approach, usually taught in Grade 3, is to find the common denominator, which in this case is 12. To compare the fractions, you must convert them both to have a denominator of 12.

First, multiply $\frac{1}{3}$ by $\frac{4}{4}$ to get $\frac{4}{12}$.

Next, multiply $\frac{1}{4}$ by $\frac{3}{3}$ to get $\frac{3}{12}$.

Finally, see that $\frac{4}{12}$ (or $\frac{1}{3}$) is bigger than $\frac{3}{12}$ (or $\frac{1}{4}$).

You arrived at the answer, but it took computational steps. Instead, try visualizing the problem to get the solution faster. Grab a pencil and paper. Draw a bar and divide it into thirds ($\frac{1}{3} + \frac{1}{3} + \frac{1}{3}$).



Draw another bar of the same size and divide it into fourths ($\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$).



The units in the top bar are obviously bigger than the units in the bottom one, making it visually clear that $\frac{1}{3}$ is greater than $\frac{1}{4}$.

CONCLUSION

We limit our students if we give them only one set of tools to solve math problems. The three examples above show what is possible when students learn multiple approaches.

In school districts that use *Eureka Math*, students are thriving. They're loving math. They're doing well. Parents and teachers, meanwhile, have overcome some initial concerns to become *Eureka Math*'s staunchest ambassadors.

LEARN MORE

Visit www.eureka.support and create an account to access our free Parent Tip Sheets, which include suggested strategies and models, key vocabulary, and tips for how you can support learning at home. Parent Tip Sheets make it easy for you to follow along as your child uses the models described in this Student Tools handout in the classroom.