# Tips for Tutors 2024: Using Math Manipulatives

Ideally, student learning happens according to this progression: concrete, pictorial, abstract.

Here's what I mean: _ + 7 = 10 is a fairly simple problem for you and me to solve, but it's a very abstract statement. Before students can approach a problem like this, they need to visualize what it means for some amount, combined with 7, to make 10. Even better than a picture, and better for younger students, is something concrete, in their hands and in front of them. With math manipulatives, students can make a group of 10 things and see how it divides into a group of 7 and a group of 3.

The manipulatives at your sites are a tool you and your student can use together to help give students a better understanding of what numbers look like and what operations like addition or multiplication actually mean. You can find helpful videos on how to use these resources on our website at:
https://www.whizkidstutoring.com/math-resources
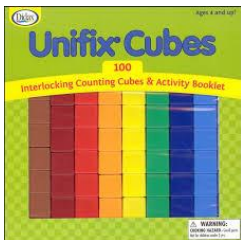
Unifix Cubes:

Unifix Cubes are one of my favorite math manipulatives. You can use them for so many things including: counting, addition, subtraction, multiplication, and division.

Sample Problems:

Addition with regrouping:

Subtraction with regrouping:

Multiplication:
- 3 x 4 =

Division:
- 12 ÷ 3 =

Helpful Videos:
- Using Unifix Cubes for Addition with Regrouping:
  https://www.youtube.com/watch?v=L1nYPbQc6Yg
- Using Unifix Cubes for Subtraction with Regrouping:
  https://www.youtube.com/watch?v=IqmccJc1R38
- Using Unifix Cubes for Multiplication and Division:
  https://vimeo.com/756443364

Base 10 Blocks:

Ways you can use Base 10 Blocks:

- Representing numbers and their values
    - 72 = 7 tens and 2 ones

- Comparing numbers
    - Ex. 265 > 247

- Addition
    - Ex. 35 + 27 = 62

- Subtraction
    - Ex. 34 – 16 = 18

- Multiplication
    - Ex. 4 x 14 = 56

- Division
    - 45 ÷ 3 = 15

Helpful Videos:

- How to use base 10 blocks:
  https://www.youtube.com/watch?v=p6bvKB4jUf8&t=4s
- Learn more about base 10 blocks: https://www.hand2mind.com/blog/how-to-use-base-ten-blocks

Place Value Chart:

Place value is the basis of our entire number system. It is the value of each digit in a number. In other words, the position of a digit in a number determines its value. For example, the 5 in 350 represents 5 tens, or 50; however, the 5 in 5,006 represents 5 thousands, or 5,000.

Activities to try with your student:
- Write a number on a dry erase board and have your student build it using the base 10 blocks and the place value mat.
- Write out a number and ask your student what the value of a certain number is. Ex. In 2,364 what is the value of the three, the 3 actually represents 300 because it's in the hundreds place.

Place Value Mats Video: https://www.youtube.com/watch?v=m6cxpRXaeSw
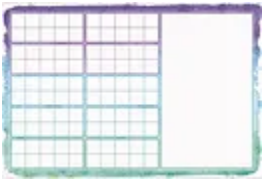
10 Frames:

Our math system is a base 10 system. Most of us know what numbers match up to make a 10 without even thinking. We hear 7 and think 3. But for our students who are not there yet, a ten frame can be a helpful tool to give them a better visual and understanding of how numbers work and fit together.

10 Frames help students:

- Keep track of counting
- See number relationships
  - o Ex. Fill out as many 10 frames to show the different numbers you can add together to get 7.
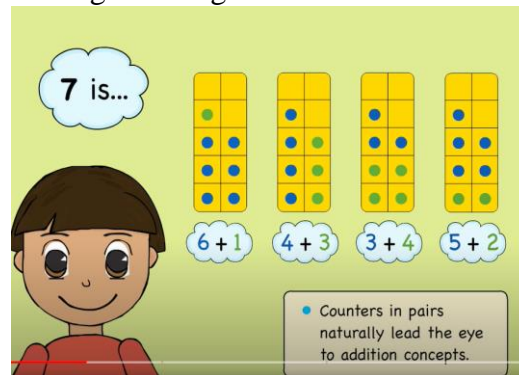
- Learn addition to 10
- Understand place value

Helpful Video:

- Getting started with 10 frames:
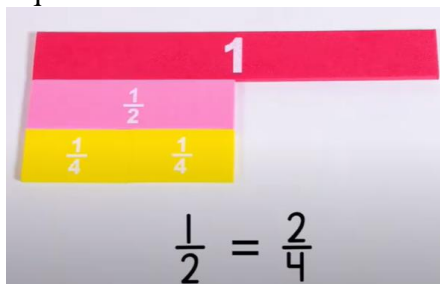 https://www.youtube.com/watch?v=p6RaMGDPfJg

Fraction Cubes:

Fraction cubes are broken into equal fractional parts that use the same-size whole. This enables students to explore many fractional concepts including:
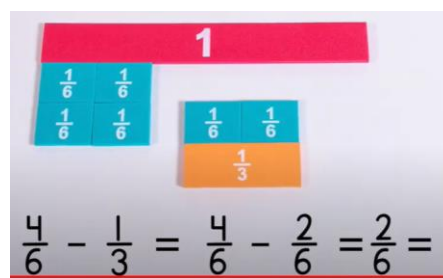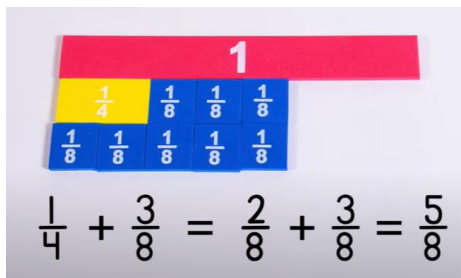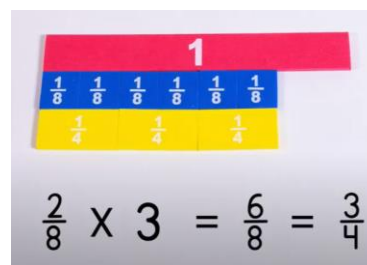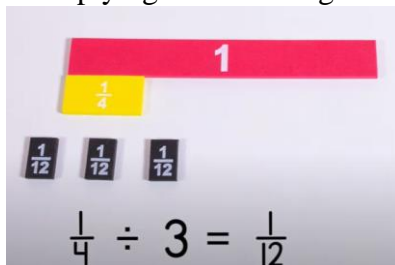
- Representing fractions

$$\frac{2}{3}$$

- Equivalent Fractions

$$\frac{1}{2} = \frac{2}{4}$$

- Add and Subtract Fractions

$$\frac{1}{4} + \frac{3}{8} = \frac{2}{8} + \frac{3}{8} = \frac{5}{8}$$

$$\frac{4}{6} - \frac{1}{3} = \frac{4}{6} - \frac{2}{6} = \frac{2}{6} =$$

- Multiplying and Dividing Fractions

$$\frac{1}{4} \div 3 = \frac{1}{12}$$

$$\frac{2}{8} \times 3 = \frac{6}{8} = \frac{3}{4}$$

- Compare Fractions

$$\frac{1}{3} > \frac{1}{8}$$

Helpful Video: https://www.youtube.com/watch?v=c4Jyj5cBWIY

- How to use fraction cubes: https://www.youtube.com/watch?v=c4Jyj5cBWIY