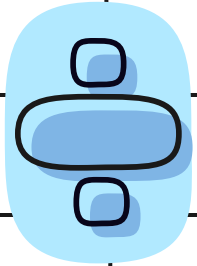
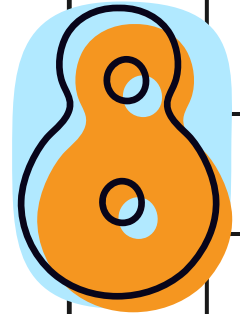


Bar Modeling Parent Workshop



Friday, March 10, 2023

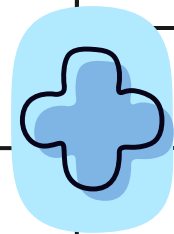
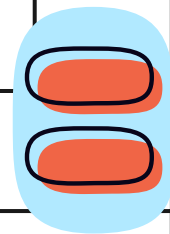
Tom Lehrer's New Math

Click the link above to listen!

How Old is Jake?

Jake is 3 years older than Kayla. Kayla is 5 years younger than Larry. The total of their ages is 41 years. How old is Jake?

You try to solve it!



Bar Models - What Are They?



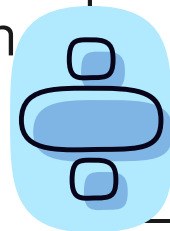
The model method helps students **visualize** the situations; it helps students see relationships between variables *instead* of relying on keywords

Three distinct advantages to bar modeling -

- Derive algebraic expression
- Construct algebraic equations
- Simplify algebraic equations

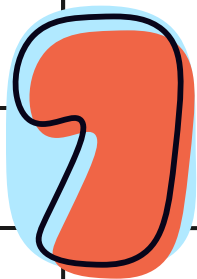
But Why?

The model method allows students to engage in algebraic thinking even before they are ready to handle formal algebra.

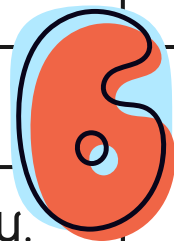


It has been has shown:

- The ability to solve word problems requires conceptual understanding
- Diagrams improve problem-solving abilities



How Old is Jake?



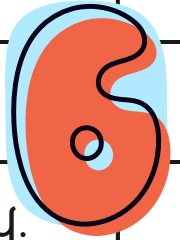
Jake is 3 years older than Kayla. Kayla is 5 years younger than Larry.
The total of their ages is 41 years. How old is Jake?

How did you solve this problem?

Now let's look at how to solve this problem with bar models!



How Old is Jake? - Algebra



Jake is 3 years older than Kayla. Kayla is 5 years younger than Larry.
The total of their ages is 41 years. How old is Jake?

$$\text{Kayla} = x$$

$$\text{Jake} = x + 3$$

$$\text{Larry} = x + 5$$

$$x + x + 3 + x + 5 = 41$$

$$3x + 8 = 41$$

$$3x = 33$$

$$x = 11$$

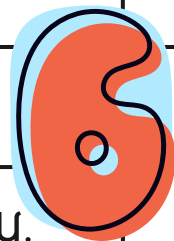
$$\text{Jake} = x + 3$$

$$\text{Jake} = 11 + 3$$

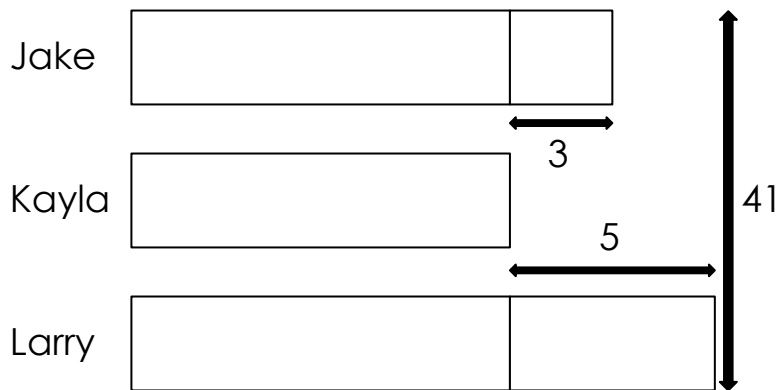
$$\text{Jake} = 14$$



How Old is Jake? - Algebra & Bar Model



Jake is 3 years older than Kayla. Kayla is 5 years younger than Larry.
The total of their ages is 41 years. How old is Jake?



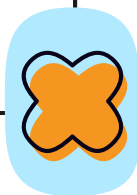
$$3 + 5 = 8$$

$$41 - 8 = 33$$

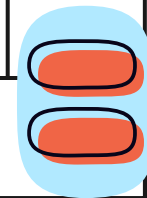
$$33 \div 3 = 11 \text{ (1 unit = 11)}$$

$$11 + 3 = 14$$

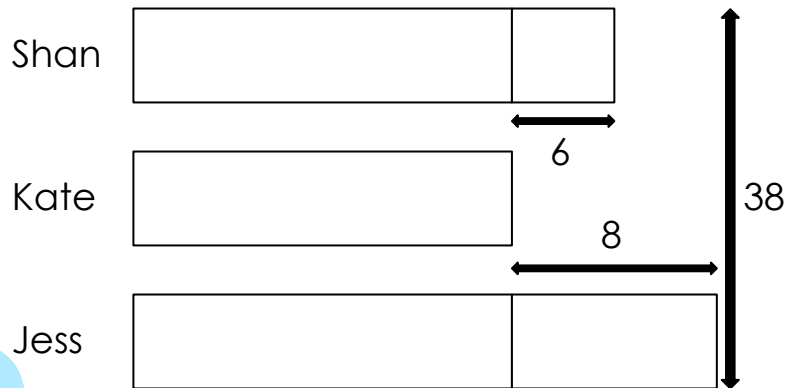
Jake is 14 years old.



Donuts! - With Bar Models!



Shannon, Kate and Jess brought 38 donuts total to the party. Shannon brought 6 more donuts than Kate. Jess brought 8 more donuts than Kate. How many donuts did Jess bring?



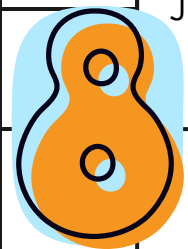
$$6 + 8 = 14$$

$$38 - 14 = 24$$

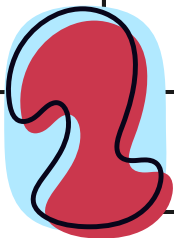
$$24 \div 3 = 8 \text{ (1 unit = 8)}$$

$$8 + 8 = 16$$

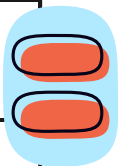
Jess brought 16 donuts.



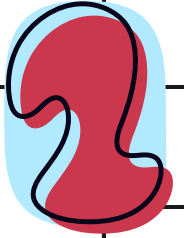
Mathematical Mindset



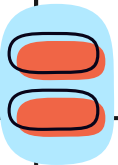
The Problem

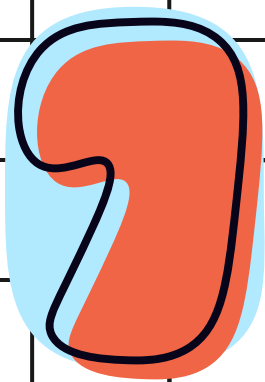


Mathematical Mindset

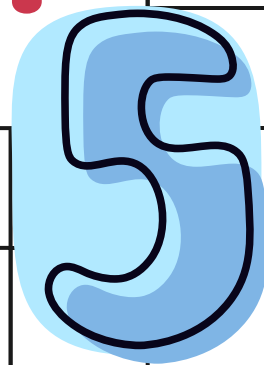


What can we do?





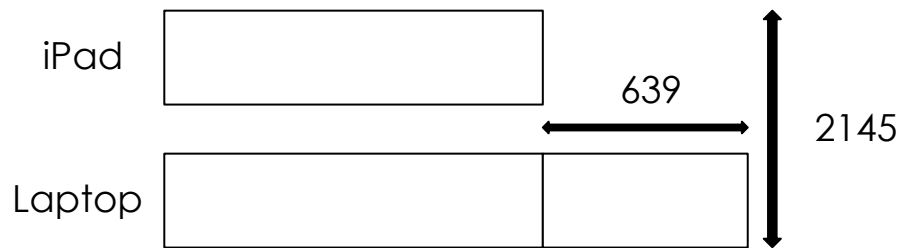
Let's Practice!



More Bar Models!

Let's do this one together!

Mr. Jones paid \$2145 for an iPad and a laptop. The laptop cost \$639 more than the iPad. What was the cost of the laptop?



$$2145 - 639 = 1506$$

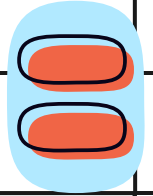
$$1506 \div 2 = 753 \text{ (1 unit = 753)}$$

$$753 + 639 = 1392$$

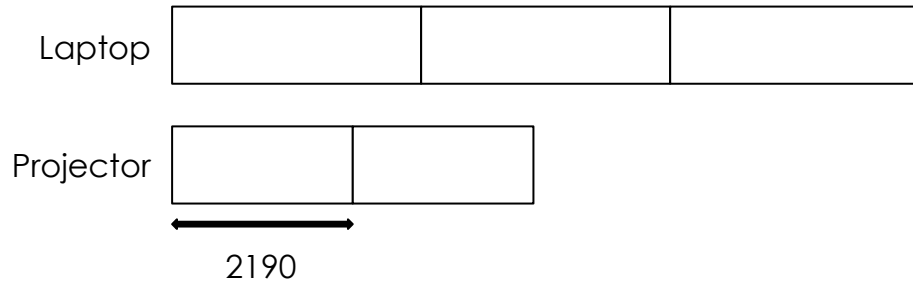
The laptop cost \$1392.



Now you try!



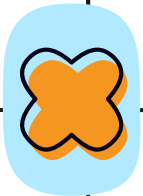
A school paid \$9645 for 3 laptops and 2 projectors. Each projector cost \$2190. How much did each laptop cost?



$$\begin{aligned}2190 \times 2 &= 4380 \\9645 - 4380 &= 5265 \\5265 \div 3 &= 1755 \text{ (1 unit = 1755)}\end{aligned}$$

9645

Each laptop cost \$1755.



Before/After Model - Together!

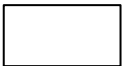
Joey folded 4 times as many paper stars as Terry. After Terry folded another 225 paper stars, they had an equal number of paper stars. How many paper stars did Joey fold?

Before

Joey



Terry



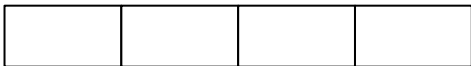
$$225 \div 3 = 75 \text{ (1 unit = 75)}$$

$$75 \times 4 = 300$$

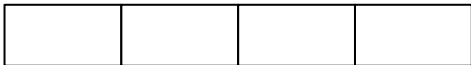
Joey folded 300 stars.

After

Joey



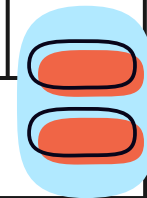
Terry



225



Before/After - You Try!



The library had 6 times as many fiction as nonfiction books. After another 455 nonfiction books were added to the library, they had an equal number of fiction and nonfiction books. How many fiction books did the library have?

Before

Fiction

--	--	--	--	--	--

Non-F

--

After

Fiction

--	--	--	--	--	--

Non-F

--	--	--	--	--	--



455

$$455 \div 5 = 91 \text{ (1 unit = 91)}$$

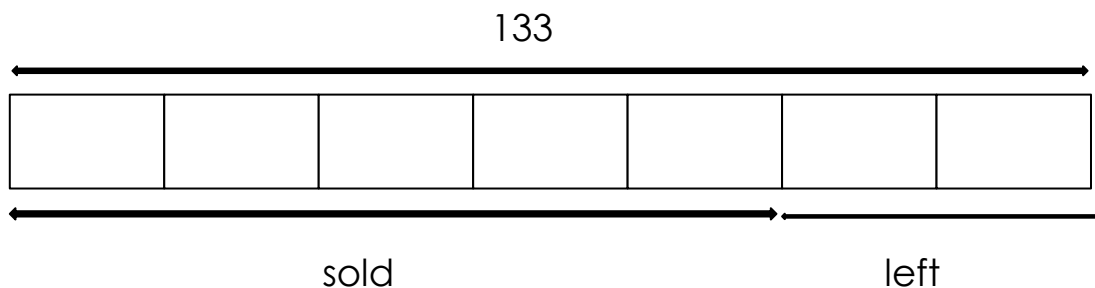
$$91 \times 6 = 546$$

The library had 546 fiction books.



Fractions - Together

A florist had 133 roses. She sold $\frac{5}{7}$ of them. How many roses did she have left?

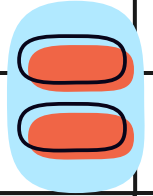


$$133 \div 7 = 19 \text{ (1 unit = 19)}$$
$$19 \times 2 = 38$$

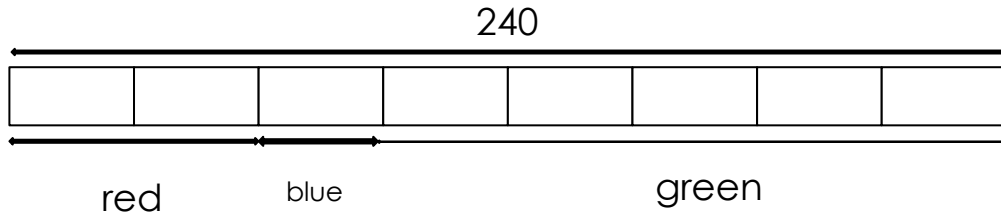
The florist had 38 roses left.



Fractions - You Try!



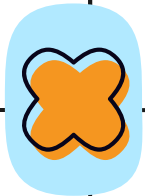
A school clerk bought 240 markers. $\frac{1}{4}$ of them were red markers, $\frac{1}{8}$ of them were blue markers and the rest of them were green markers. How many green markers did she buy?



$$240 \div 8 = 30 \text{ (1 unit = 30)}$$

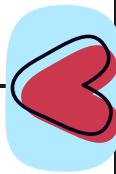
$$30 \times 5 = 150$$

She bought 150 green markers.



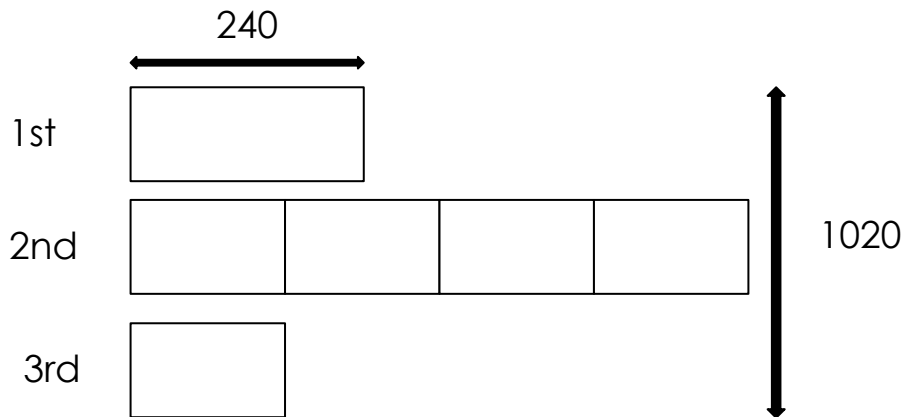
Extra Time...

1. A piece of wire measuring 1020 cm was cut into 3 pieces. The 1st piece was 240 cm long. The 2nd piece was 4 times as long as the 3rd piece. How long was the 2nd piece?
2. A box contained 256 marbles. $\frac{1}{4}$ of them are red marbles. $\frac{3}{8}$ of them are blue marbles and the rest are green marbles. How many green marbles are there in the box?



Extra Time...

A piece of wire measuring 1020 cm was cut into 3 pieces. The 1st piece was 240 cm long. The 2nd piece was 4 times as long as the 3rd piece. How long was the 2nd piece?



$$1020 - 240 = 780$$

$$780 \div 5 = 156 \text{ (1 unit = 156)}$$

$$156 \times 4 = 624$$

The 2nd piece was 624 cm long.



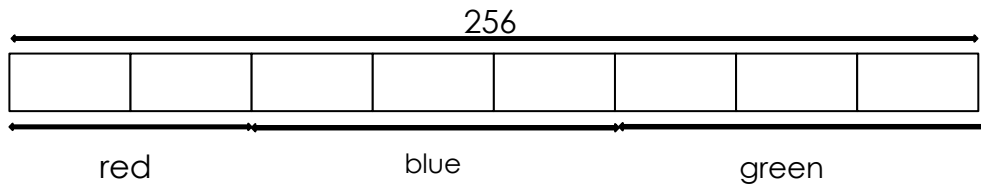
Extra Time...

A box contained 256 marbles. $\frac{1}{4}$ of them are red marbles. $\frac{3}{8}$ of them are blue marbles and the rest are green marbles. How many green marbles are there in the box?

$$256 \div 8 = 30 \text{ (1 unit = 30)}$$

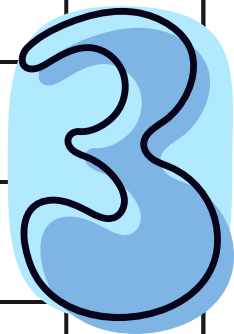
$$30 \times 3 = 90$$

There are 90 green marbles.





Thank You!



Resources:

- *Bar Modeling, A Problem-Solving Tool* by Yeap Ban Har
- *Mathematical Mindsets* by Jo Boaler
- *Process Skills, Level 4* by Li Fanglan

