

Helping our children with math!

Under *Common Core State Standards*, our students are expected to know much more than just the right answer. **What does it mean to be mathematically proficient?** Being mathematically proficient means to know **when**, why, and **how** to apply calculations to different mathematical situations.

Common Core Mathematical Practice Standard 4:

Model with Mathematics

What It Means: Models are representations (numbers, symbols, objects, diagrams, tables) which allow us to see and manipulate math problems and concepts. By making models, problems are clarified and simplified so we can solve them. When students draw a diagram, use objects or counters to act out a problem, or create an organized table for data they have collected, they are finding ways to see a problem more clearly so they can work towards solving it. Most importantly – when students create and use math models, it enables us to see their mathematical thinking and current level of understanding.

Let's look at the sample problem below to see how making models can help solve problems.

Marissa was in line to buy books. There were 4 people in front of her in the line. There were 3 people behind her in the line. How many people were waiting in line to buy books?

What is the problem asking you to solve? Many students would see the 4 and the 3 in the problem, and recognize that they need to find the 'total' number of people in line and simply add. Adding 4 and 3 however, would not produce the correct answer. Below shows how a student modeled the problem.

M = Marissa

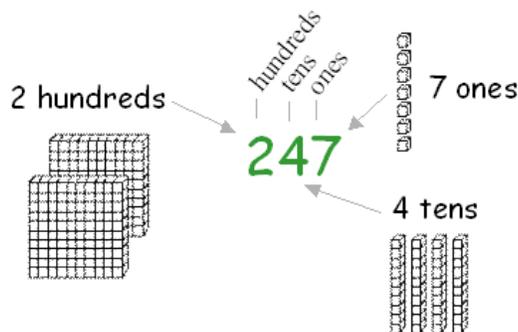
F= People in front of her in the line

B= People behind her in the line

B B B M F F F F

Using this model, a student can clearly see that there were 8 people in line.

Children who draw and use models can better visualize what the data in problems mean and gain insight towards solving the problem.



Information taken from: *Putting the Practices into Action: Implementing the Common Core Standards for Mathematical Practice K-8* by Susan O'Connell and John SanGiovanni

How to Help Your Child Become Successful with This Standard

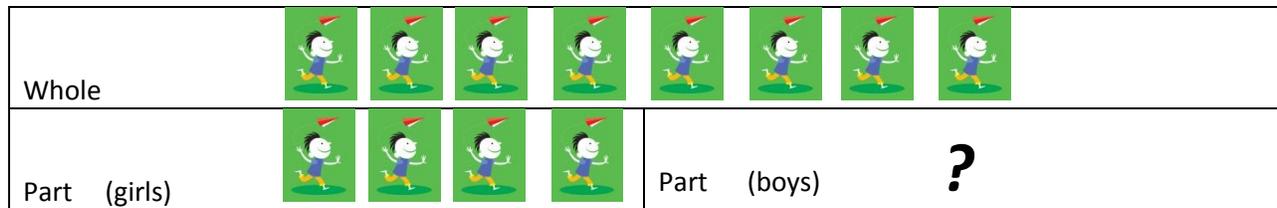
Part-part-whole mats and bar diagrams are helpful models for students to use in order to visualize addition, subtraction, multiplication and division problems.

Part-part-whole mats for addition and subtraction:

There were 4 red candies and 3 yellow candies. How many candies were there in all?



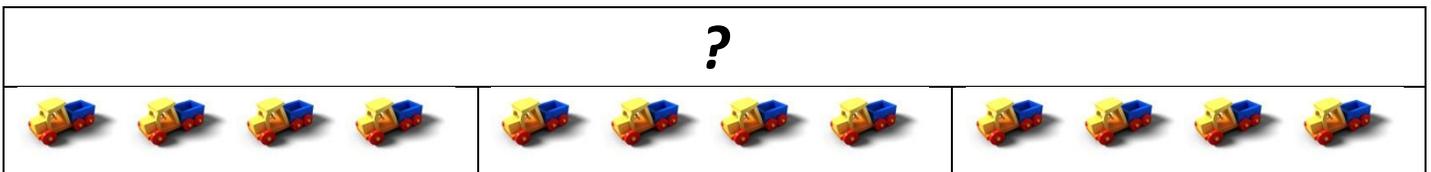
There were 8 children at the park. 4 of the children were girls. How many were boys?



Bar diagrams for multiplication and division:

There are 3 boxes with 4 toys in each box. How many toys are there?

In this problem we know the number of parts (3 boxes) and how many toys are in each part (4 toys). There are 3 groups of 4 toys. We need to find the total number of toys. ($3 \times 4 = 12$ toys)



18 toys are packed 9 to a box. How many boxes are needed?

In this problem we know the total number of toys (18) and the size of each group (9 toys per box). We need to find out how many groups of 9 toys can be created. Using a bar diagram showing a TOTAL of 18 and having 9 in each box to represent a group, a student can reason, "How many groups of 9 will total 18?" This will determine the number of boxes needed. ($18 \div 9 = 2$ boxes)



? (number of groups or boxes of 9 toys created)