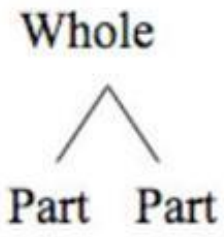
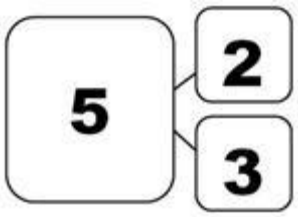
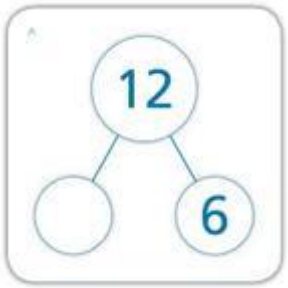
The Importance of Number Bonds

Number bonds help students see that numbers can be "broken" into pieces to make computation easier (decomposing/composing). With number bonds, students recognise the relationships between numbers through a written model that shows how the numbers are related. A number bond helps student clearly visualise the Part/Whole relationship.

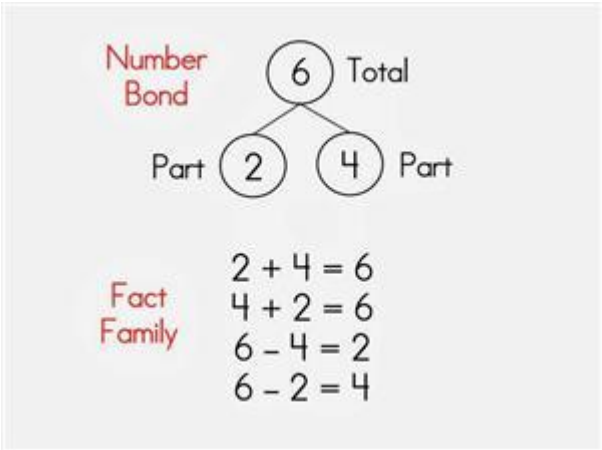
A number bond for the numbers 2, 3, and 5 might look like the model below. Children will also see the whole on top with the parts branching down. The circles or squares are just a visual representation that students should begin with.





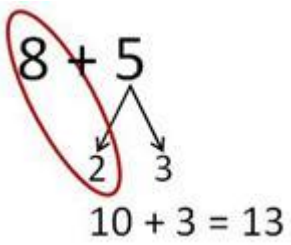


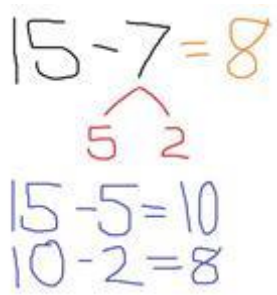
You might notice a similarity to fact families, and you'd be right. There are a couple of differences, however. First, we often teach fact families through rote memorisation only. Children can rattle off 2 + 3 = 5, 3 + 2 = 5, 5 - 2 = 3, and 5 - 3 = 2, but they often don't really understand how the addition and subtraction sentences are related.

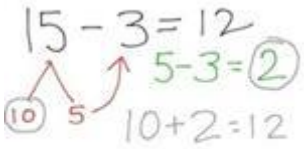


Second, we don't usually focus on all the fact families for a given number, for example 5. Through working with number bonds, children learn that 2 and 3 make 5, but so do 4 and 1. In other words, they experience multiple ways to decompose the same number. Start out working with smaller numbers and gradually work toward larger ones, and of course the children will need LOTS of concrete practice. The part/part/whole mat pictured below is a great tool.

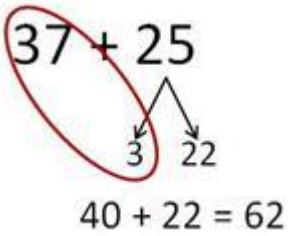
So let's look at this example, which shows one way a child might determine the sum of 8 and 5 ("add and subtract within 20...use strategies such as...making 10") using the skills they have learnt previously. The child knows he wants 2 more to put with the 8 to make 10, and he knows he can decompose 5 into 2 and 3. So now he is thinking of 10 + 3, or 13.

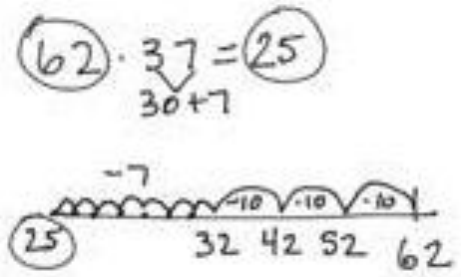




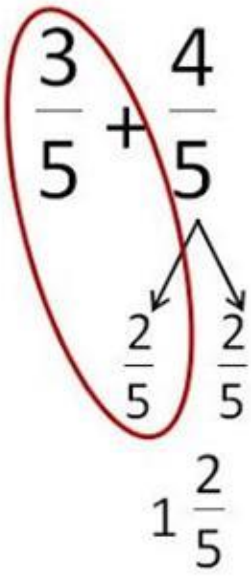


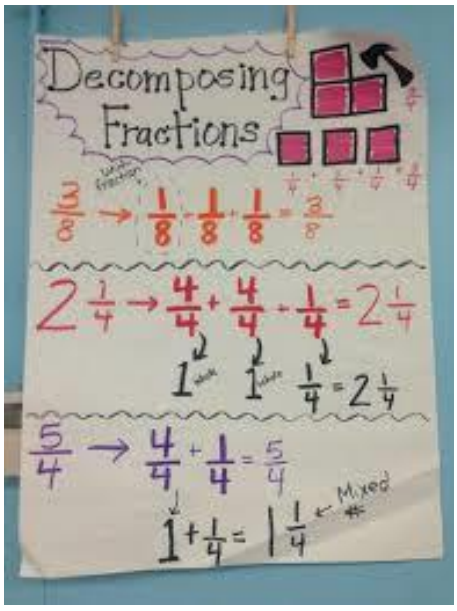
Let's move on, children are expected to "add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction". Now our children are faced with finding the sum of 37 and 25, which would normally be thought of as a "regrouping" problem. This child is still looking to make 10s, so she knows she needs 3 more to make 37 into 40. And notice that she is really still splitting 5, even though now it's actually 25. After splitting, she's got an easy mental problem in 40 + 22.





Let's move on to fractions. Children must "decompose a fraction into a sum of fractions with the same denominator in more than one way" and "add and subtract mixed numbers with like denominators". Let's see how our number bond knowledge can help here. We split the 4/5 into 2/5 and 2/5 to create a whole out of the 3/5, resulting in 1 2/5. This is a bit more conceptual than finding an improper fraction and then introducing a totally different procedure for converting it to a mixed number.





How about measurement? Elapsed time maybe? Doesn't this actually mirror what we do when we calculate elapsed time mentally?