



Maths to share - CPD for your school

Fractions

Do you ever hear your staff complain that the children can't understand fractions or can't complete the required National Strategy objectives for Years 3, 4, 5 or 6? In this issue of Maths to Share we consider how fractions could be taught in EYFS and KS1 to enable the children to be ready to learn what they need to in KS2.

You may find it helpful to refer to Maths to Share in **Issue 17** of the Primary Magazine, which featured fractions, decimals and percentages for extra information. There is a **PowerPoint presentation**, which you might find helpful if you lead a staff meeting on this issue.

Before the meeting ask colleagues to read **Fractions: difficult but crucial in mathematics learning**. It will form the basis of a discussion during the reflection part of the session.

The concept of fractions is rarely taught to children until Year 2 where it is expected that they can find quarters, halves, three quarters of shapes and sets of objects. In Year 1, they are encouraged to find halves and quarters in context. These are usually taught for a few days once a term. If this is all they do, it probably isn't surprising that the children are not likely to be ready to do what is expected of them in KS2.

In Reception and Year 1 children come across half, but not specifically within the concept of fractions: half an hour, half a turn, half empty, give me half the cubes. In Year 1, they begin to double and halve.

Their early understanding of fractions comes when they are:

- ▶ in the hall making half a turn
- ▶ in the water tray/sand pit filling half a container
- ▶ sharing chocolates/counters/anything so have half each
- ▶ moving minute hand of a clock half way round the clock face.

They cover sharing in Years R, 1 and 2, but many teachers don't mention that when they share equally each group or person has half, a quarter, third etc. For example, if there are 21 sweets and we share these equally between three children each child will have seven, which is one of three groups or one third; two children will have 14 altogether which is two thirds and the whole amount is three thirds. If we spoke the language of fractions like this when covering sharing, it would really help the children make the links that will help them when they work on fractions. You could discuss the idea with colleagues that sharing is very strongly linked to fractions and encourage them to talk fractions when they work on this with

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their classes.

Fractions are actually operators, for example halving is dividing by or sharing into two, finding a third is dividing by or sharing into three. The article Fractions: difficult but crucial in mathematics learning has some research which indicates that this is a good way into working with fractions with children.

Share with staff these key aspects of fractions that children need to know:

1. fractions are equal parts of a whole, equal amounts or areas, not identical shapes
2. there are different ways to find half, quarter etc.
3. they 'look' different depending on the context
4. the 'whole' can be:
 - ▶ a number
 - ▶ more or less than one
 - ▶ an interval on a number line.

You could talk through these aspects using some of the following activities:

Prove it!

Give pairs of staff three pieces of A4 paper in two colours (two pieces of one colour and one of another). Ask them to fold the piece of one colour in half and tear it. They each then stick one half onto a second piece of paper. Discuss what fraction is outside the square: obviously half because they have covered half of it with the piece they stuck on. Ask them to cut it out and hold it up by one end. Does it look like half? Clearly it doesn't if looking at the shape, so next, ask them to prove that it is.



Were any of them surprised? Discuss how an activity such as this can help the children to realise that a fraction is an area or amount of space, rather than a shape. Sometimes it is the way we present fractions to children that leads them to the misconception that fractions of shapes must look the same.

If asked to find half of a square, they will invariably suggest these ways:



Halving

Give small groups of teachers a pile of 4cm x 4cm pieces of plain paper and ask them to explore as many different ways as they can to find half. You could ask them to blu-tack their suggestions onto the board. Compare their results and notice just how many ways there are! Again, discuss the value of giving the children an investigation like this.

As well as the above, here are some of the results from a Year 2 class when they were set this problem: I want to share this sandwich with a friend, how can I do this so we each get half.



Quarters

Give staff several pieces of rectangular-shaped paper and ask them to find quarters by dividing their rectangles using straight lines. These are common responses:



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If not, draw it on the boards. Does everyone agree that these are quarters? They don't appear to be the same size – because they are not the same shape. Ask someone to prove they are.

If you divide each quarter in half, making eighths, each piece will look to be exactly the same area so proving these are quarters.



Fraction strips

Give pairs of teachers some strips of A4 paper of equal length and ask them to keep one whole and to fold the others into halves, quarters, eighths, thirds, sixths and twelfths:

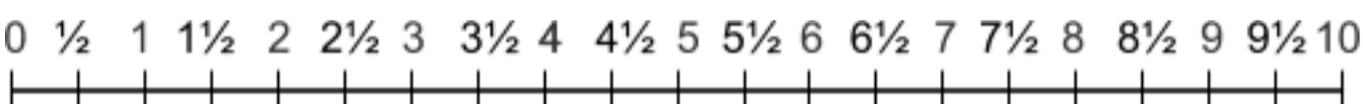


Discuss this as a model, which the children can make for themselves to help them understand that the denominator is the number of parts and that the more parts, the smaller the fractions. So proving that the larger the denominator, the smaller the fraction.

Would staff consider doing this for halves, quarters and eighths in Year 1 or 2? What would be the benefits?

Number lines

When considering fractions on a number line, it is worth suggesting to teachers in KS1 that they might practise counting in steps of half or quarter when using their counting sticks or pendulums, so that the children become confident in using this vocabulary. Also, if they are drawing number lines and asking children to plot numbers onto them, they could ask them to mark on whole and half numbers:



The key experiences for younger children will centre on everyday contexts, practical activities and language. They need lots of opportunities for this to build on from Year 2.

There is a tendency to look at fractions through pizzas and cakes. It is best to avoid using these alone; rectangular items such as chocolate bars are often simpler. The [What makes a good resource](#) microsite has an idea centred around fractions and chocolate bars. It would be helpful to share this with colleagues.

Problem solving is key, rather than just colouring or finding halves/quarters of shapes and numbers. Work through these problems together and discuss how they could be adapted for use in EYFS and KS1.

Fair Feast

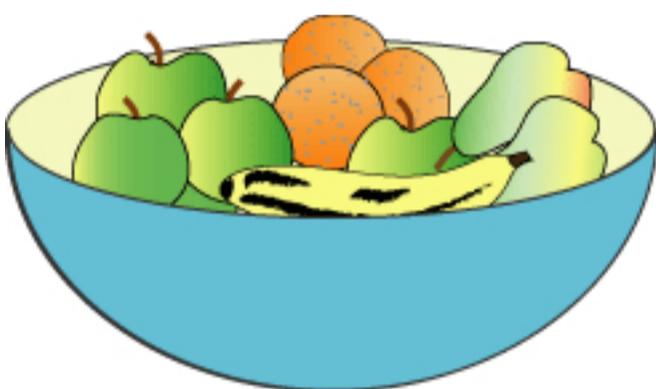
Here is a picnic that Chris and Michael are going to share equally:



Can you tell us what each of them will have?

A Bowl of Fruit

Here is a bowl of fruit:



Half of the pieces of fruit in the bowl are apples. There are also three oranges, two pears and a banana.

How many apples are there in the bowl?

If, instead, one quarter were apples and one quarter were oranges and there were four bananas, three pears and three plums, how many would be apples?

Fair Feast and *A Bowl of Fruit* are reproduced here from **NRICH**, with permission

Key message

Help the children really understand halves and quarters in KS1 so that they can develop their understanding in KS2. Once they really understand these, they will be able to use this knowledge to develop their understanding of all the others.

Reflection

Give your staff a few minutes to reflect on what they have been doing and to make some decisions on how they will alter their current practice to maximise the opportunities to include fractions in their mathematics lessons.

Suggest that the staff explore the fractions section of the Self-evaluation Tools to assess their confidence in teaching these.

Discuss the article *Fractions: difficult but crucial* in mathematics learning. Find out how they feel about introducing fractions through sharing.

It may also be worth having a look at your mathematics policy and adjusting it so that fractions have a higher profile in EYFS and KS1 and that maybe there is an emphasis on linking fractions to sharing.

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 31 August 2011 15:33

I have found that it is important to give models of fractions that show more than the usual vertical line of separation, otherwise we are giving them a limiting set of references upon which to base their concept of a half. Children also need to be able to tell a half of a shape beside its whole, rather than just as part of the total shape. It is important that they acquire the language of fractions as early as possible and in as many contexts as possible.

By [joansmith](#)

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