

AT THE BAKERY

Foundational inquiry.

Stages

Key Stage 1.

Direct object of learning

Solve problems involving division.

Indirect object of learning

Reasoning: understand how contexts relate to division as both grouping and sharing

Tools

Counters or cubes in at least six different colours. Large squared paper.

Task

Public talk

Orally set up two problems. Explain that you were chatting to the woman who runs a local bakery. It was early in the morning and a big tray of bread buns had just arrived that the owner was putting out. The buns were laid out on the tray in rows of five. (Put a quick sketch up on the board so that the pupils have a clear image of the layout of the buns on part of the tray, see Figure 6.21.)

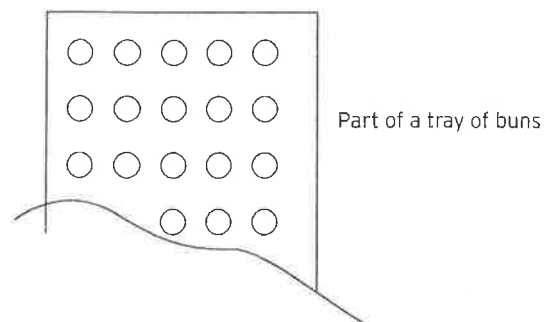


Figure 6.21

'That's a lot of bread buns,' you said to the lady, and she said, 'Yes, we get 75 on a tray.' Explain to the pupils that you were buying a bag of 5 bread buns and so wondered how many bags of 5 the tray of 75 could be used to fill?

Before setting the class off to explore this problem, offer the second problem.

In the window of the bakery, next to the tray of bread buns was a tray of muffins. You noticed that there were five different flavours of muffins: chocolate, raspberry, blueberry, orange and poppy seed. (Again, put up a sketch to show the arrangement of the muffins, making it clear that each flavour is in a separate column, see Figure 6.22.)

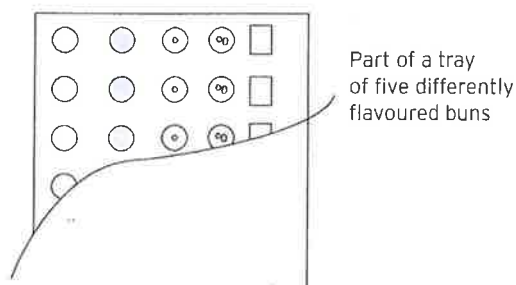
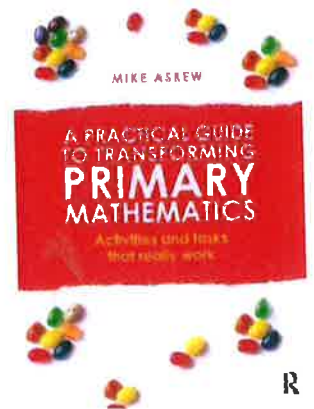


Figure 6.22



'And that's a lot of muffins' you said. 'Yes,' came the reply. 'We get 75 of those in every day.'

So that got you wondering – how many muffins were there in each flavour?

Recap the two problems:

If there were 75 bread buns on the tray, how many bags of 5 buns would the tray fill?

If there are 75 muffins on the tray, in five different flavours, how many of each flavour are there?

Tell the pupils they can solve the problems in either order and find the answer using whatever method they like – setting up a model with counters or cubes, drawing a picture or whatever they think will help.

Private conversation

Although each problem is essentially $75 \div 5$, it is likely that many pupils will not immediately see this underlying connection and solve each problem separately. Help them draw images of arrays (or construct these from interlocking cubes) – these images will help them understand the connection between the two problems. If the buns are in rows of five, the solution to the first problem is found through finding the total number of rows. If there are five columns of different flavoured muffins, the second problem is found by counting the number of items in each column. These are essentially two different ways of describing the same array but focusing on it in different ways – the first attending to the number of rows, the second attending to the number in the columns.

At this stage do not worry if the pupils are not using the formal notation of division.

As these are challenging problems, it might be helpful to bring the class together after a few minutes to share some of the strategies the pupils are using before setting them off again in their pairs.

Assessment

- Do pupils treat these as two distinct problems or can they see any connections between them?
- Are pupils able to create representations of the problems that effectively help them to find solutions?

Select two or three pairs to share their solutions with the class – these need not be the most sophisticated solutions but should be chosen in the expectation that they will prompt a discussion about the links between the two problems. Alert your chosen pairs to the fact that they will be sharing their methods so that they can be prepared for this.

Public talk

As the pupils share their solutions, use the array images to draw the class's attention to the links between the two problems. Did anyone spot that they could use the solution to one problem to find the answer to the other?

Talk about how one problem was a grouping problem – the 75 bread buns were being put into groups of 5 – and how the other was a sharing problem – the 75 muffins were being shared into five equal sized groups, each group being one flavour.

Show how both of these problems can be represented with the mathematical sentence:

$$75 \div 5 = 15$$

Variations

The choice of context here is not arbitrary – the items are ones that are laid out in arrays to encourage the use of the array model in setting up solutions. Pupils will need a lot of experience of work on problems that are either grouping or sharing before they get a sound sense of these being two models underlying division. Other contexts could be things like vegetable patches with equal rows of plants; seats put out for a concert; stamps or stickers on a page; tiles on the floor or wall.

Source

Adapted from the *Young Mathematicians at Work: Working with the Array*, grades 3-5 materials on developing models of division (Hersch, Fosnot, & Cameron, 2004).