

Biscuit Decorations

<http://nrich.maths.org/154>

Andrew decorated 20 biscuits to take to a party.

He lined them up and put icing on every second biscuit.

Then he put a cherry on every third biscuit.

Then he put a chocolate button on every fourth biscuit.

So there was nothing on the first biscuit.

How many other biscuits had no decoration? Did any biscuits get all three decorations?



You Will Need:

- 12 white counters
- 12 red counters
- 12 green counters
- 20 circles of card to represent biscuits

Why do this problem?

This problem fits in well with counting and skip-counting (counting by twos etc.) and can be solved by physically modelling the biscuits and decorations with whatever objects are convenient. It is a good opportunity for children to choose the way they represent the problem in order to solve it. It may also be appropriate to introduce vocabulary such as "multiple".

Possible approach

An important element in understanding the problem is the language of ordinal numbers, so 'warm-up' activities which involve using the concepts of first, second, third and fourth would be worthwhile for young children.

Invite learners to work on the problem using whatever they find most helpful - have paper, pens, pencils, cubes, counters etc. easily available. You may like to stop them part way through to share some different representations with the whole group. Some children might have made models with differently-coloured cubes for the decorations, some may have drawn pictures, some may have used symbols. Invite the children to comment on the different ways of recording - what are the advantages of each way? You may find that some learners adopt a different representation following the discussion and it would be interesting to know why this was.

For those children who are more mathematically experienced, consider linking this problem with the idea of common multiples through the multiplication tables and the hundred square.

Key questions

Which other biscuits have icing on?

Which biscuits have a cherry on them as well as the third one?

What about the biscuits with a chocolate button on them? Which ones are they?

Tell me about the biscuits that have no decorations on them.

Possible extension

Generate your own similar problems using a greater number of biscuits and different combinations of skip counting, or encourage investigation of the various possibilities. Can children find a combination of skip-counting that allows every biscuit to be decorated?

Possible support

With practical equipment available to model the problem, it should be accessible to most learners.