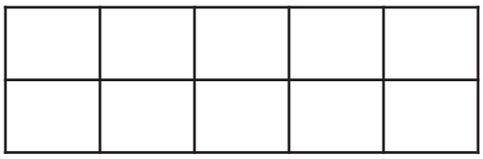
Sweet Counter

Mike Askew's love of peppermint creams inspires children to collaborate, explore number facts and work systematically...

Learning about number bonds to 10 and beyond is a key skill in maths, but its unlikely to produce spontaneous outbreaks of cheering from over excited pupils. However, I have found that making boxes of peppermint creams provides a problem solving context that helps children explore this theme with a little more enthusiasm.

Before the lesson, I prepare a number of papers, which the children will use later to record their results. These show arrays of squares, two by five, which are big enough to draw a simple 'peppermint cream' in. I find that you can fit six arrays on a sheet of A4, but you should cut these up so they are all on separate slips.



You can set up the lesson context by talking about the boxes of sweets you made for friends over the Christmas break. Having a few peppermint creams for children to taste will also cause them to sit up and take notice!

"Every year I make boxes of peppermint creams for family and friends at Christmas. Who has made or tasted peppermint creams? (We discuss these, and other sweets that the children like.) I always pack my peppermint creams in a box like this (I hold up one of the blank arrays). Turn to the person next to you. Agree with that person how many creams can I put in a box."

I ask children to explain how they know there are spaces for 10 creams without counting them all. Who saw 5 + 5? Who saw 5 lots of 2?

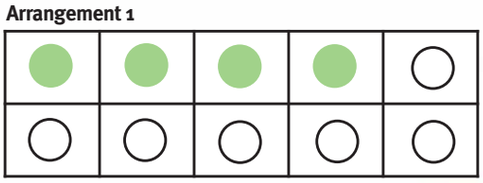
"I make the peppermint creams in two colours. Some are white and some are green. I put some white and some green in each box. Talk to your partner, decide on a box of creams to make and how many white and how many green creams would be in the box?"

Taking some suggestions from the children, I choose one example, say 4 green and 6 white. I invite children to help me decide where to put the creams in the box, recording this on an array as we go.

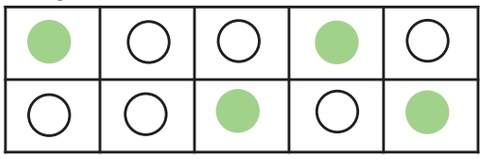
"Turn to your partner. How can you be sure that there are 4 green and 6 white creams?"

While the children are checking that I've made the box up correctly, I record a different arrangement of the 4/6 split.

Arrangement 1



Arrangement 2



I show the children this second arrangement and ask partners to talk about whether or not this is a different box. I deliberately leave the question vague here: in one sense it is different in that the creams are arranged differently, in another sense it is not different, in that there are still 6 white and 4 green peppermints. I steer the children round to the idea that, for this lesson, we are going to think of these as the same box of creams. Boxes are only going to be different if the numbers of green and white creams are different.

"I was wondering, if I put a different number of green and white creams in each box, how many different boxes can I make? This is the problem I would like you to help me solve. I'd like to make as many different boxes of two types of peppermint creams as I can."

I invite pairs to re-explain the problem to each other, and check back that everyone is clear.

"You are going to work together to record the different boxes of creams and take it in turns. Here is how. One person will be the recorder and the other person the chooser. The chooser will say how many of each type of cream to put in the box and the recorder will quickly draw the numbers of each type. Then you swap over."

A child comes up to be my partner and we model the way of working.

Paired activity 1

As the children settle down to work in pairs, I concentrate on their taking turns appropriately and listening to each other's instructions. I don't let this part of the lesson run too long – once the pairs have generated six or so boxes I direct their attention back to the board as a whole class.

Back to the problem

With everyone back together, I go round the groups and ask them for one of their boxes. I put this up on the board using Blutack. Once every pair has offered up a box, I ask the class if they think we have them all or if any pair has another box that we have not yet got. More are usually more offered and inevitably we end up with some boxes that look different but actually contain the same number of each cream. If that doesn't happen, I'll 'engineer' it by picking out and displaying some duplicates.

With a good number of boxes on display, I ask the children to have a close look and check if the ones we have got are all different. Once they begin to notice there are some duplicates, I ask them to talk to their partner about how I could organise the boxes so that we can see if there are any duplicates and any missing. Working with their suggestions we order the boxes 1,9; 2,8; 3,7 and so forth. Duplicates can be placed above each other and spaces left for any missing combinations. I set the children back off in their pairs to continue and try and make a complete set of boxes.

Paired activity 2

Returning to the problem the children are more organised in checking for duplicates and missing combinations. As they get close to creating a complete set of boxes, I provide them with sugar paper and glue sticks so that they can make a poster of their set in a 'tidy' way. (Most find nine solutions, although there are 11 in total if you allow boxes that are all green or all white).

Review and reflect

Gathering the children back together, I choose one or more pairs to show their poster and talk about how they organised their boxes. What patterns can the children see?

Finally we work on recording the combinations using appropriate numerals and symbols. The posters go up on display to provide reference points to pairs of numbers that make ten.

Extension Activities

BUILDING ON THE BASIC LESSON...

Once the class has got the basic idea of making up boxes of creams, there are a number of variations and extensions that allow for further differentiation:

- **What happens with three types of creams: white, pink and green. Four types?**
- **What if we make boxes of 20?**
- **Suppose boxes do not have to be 2 x 5. Twelve creams could be packed in a 2 x 6 box. What other shapes of boxes would hold 12 creams? What about 24 creams?**
- **A box can have more than one layer. What boxes can hold 12 creams?**
- **White creams cost 1p, green creams cost 2p. How much does each of the boxes cost? If I have 20p to spend, what different combinations of green and white creams can I buy?**

And of course, there's plenty of weighing and measuring to be got out of actually making some peppermint creams.

Find out More

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