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Calculating colours teacher notes

Teachers should read through the following activity ideas and make their own risk assessment for them before proceeding with them in the classroom.

Resources (this activity is suited to a group of up to 30 pupils)

1. 10l red coloured water (add 7ml red food colouring to 10l water – **it is vital to test these concentrations before the activity, as different food colouring brands can have different strengths and these figures may need to be changed)**

2. 10l blue coloured water (add 25ml blue food colouring to 10l water – **it is vital to test these concentrations before the activity, as different food colouring brands can have different strengths and these figures may need to be changed)**

3. 60 glass beakers that can hold over 300ml liquid (glass allows colour of contents to be more accurately judged)

4. 10 x 250ml measuring cylinders

5. 10 x measuring jugs (need to hold over a litre)

6. 10 funnels

7. Small stickers for labelling fractions contained in each glass

8. Pencils for recording rather than pens

Introducing the topic to the class

Slides two to four can be used to structure the introduction of the topic and practical work to the class. Concepts and ideas can match up with the slides as shown below. It is helpful for the worksheet to be given to pupils as the practical activity is introduced.

Slide Two (begins 'What is mathematics about?')

· Discuss the first two questions and consider how numbers are used (particularly in measures, and non-whole numbers).

· With point four, introduce the concept of quantifying colours by constituent parts (eg. mixing colours of paint).

Slide Three (begins 'What is important when following a recipe?')

· Discuss the fact that when baking cakes, we need to make sure we have an appropriate balance of different ingredients.

· What would a cake be like if you put in lots and lots of flour, or none at all?

· Clarify that we need a recipe and that how much we need of one ingredient is linked with how much we use of another. If we used more of one, we would need more of the others (key concept – proportionality). So we could make a lot of cake mix or just a little, but we need the cake to have the same taste and texture.

· So the recipe allows us to repeat the process.

Slide Four (begins 'We can say the same thing in different ways')

· How do we describe parts of a whole? Encourage children to mention words relating to proportion.

· Discuss the sorts of circumstances in which different ones of these might be useful, eg making particular shade of paint by mixing tins in same ratio; using fractions for sharing etc.

Introducing and organising the practical activity

· At the front of the class, demonstrate creating 300ml of liquid that is ½ blue and ½ red. Ensure that the pupils understand the difference between recording the fractions of liquid and the amount needed for the special case of making 300ml. Discuss beaker one from the worksheet with the pupils and identify the value of 1/5 of 300ml. Explain that information about each beaker should be filled in before they start mixing that colour.

· Each group has a jug of red water and a jug of blue water on their tables

· Children then work in groups of six (these groups can work as two threes) to make up solutions which are 1/5, 2/5, 3/5 and 4/5 (0/5 and 5/5 provide an opportunity to discuss 100% and 0% etc.) red/ blue. Label the beakers as they go along (the worksheets support this activity, with reminders that for 300ml of solution, 1/5 is 60ml)

· Each group put their beakers in order, showing progression from least blue to most blue. Any groups finishing this particularly early can work with adults on the Challenges at the end of the sheet.

· Once all tables have completed their fifths solutions, they can come up with their own 'mystery fraction'. They must know and record what fraction they are making and calculate the amount of each
pupils to consider whether making a quantity other than 300ml will help create different fractions – such as 280ml being useful for making sevenths.

Post-activity discussion

· Once each group has a 'mystery mixture', bring these to the front of the class. Using a set of the beakers one to five as a scale, ask pupils to compare. They may feel that a mystery colour had the same composition as one already in the scale, or they will be

able to identify two beakers between which the mystery mixture falls. Groups can then identify the fraction that was used.

Reviewing the work

· When we mix colours in different proportions, there are several ways of recognising these.

· We have just been using our eyes to judge different proportions and identify whether a fraction is more blue/more red than another.

· Machines called colorimeters analyse samples of liquids to identify their colour composition. This allows people to analyse their composition. It can be used to find out about levels of pollution in river water. If we used this equipment, we would be able to judge much more closely than we can by eye.

· The third alternative is to use mathematics to compare different fractions.

Further activities

Slides five to eleven provide an extension activity, which introduces pupils to the concept of common subdivision in a visual way.