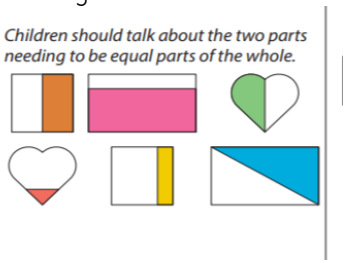
Appendix to the Calculations policy

Fractions policy

Year group	Priorities (fractions)	Practical activities to reinforce mental images	Decimals (Y4, 5 & 6) and Percentages (Y5 & 6)	Questions to promote reasoning	Arithmetic with fractions
Year 1	Recognise, find and name a half Then… Recognise, find, name □ as four equal parts	Colour half of each whole shape (but look: no pre-drawn lines):  Find half of: a lump of plasticene; a banana; a pack of post-it notes; a can of pop Show half of this group:  Four children share a bag of 12 marbles equally. Show how many marbles each child gets. What fraction of the bag of marbles does each child get? Show that □ of 8 is smaller than □ of 6		Which of these show half of each whole shape? Explain your reasoning.  Half the children at a party are girls. How many children could be at the party? Give four different answers. Explain your reasoning. What is half of this amount?  	

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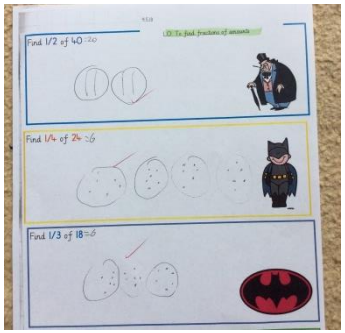
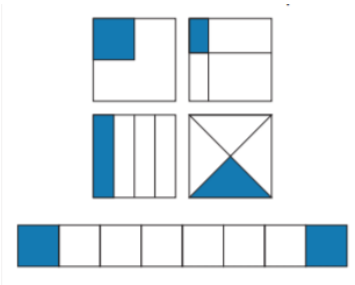
Year 2	Revise Y1 concepts then… Recognise, find, name and write fractions: □ (find half and half again) 2/4 □ 1/3 Recognise equivalence of □ = 2/4	Use fractions with: length shapes set of objects quantities Use materials then move on to pictorial representations to show fractions – e.g. □ of 24 =6  Be able to prove that 2/4 = □ Count in fractions up to 10, starting from any number using pictures and equipment		Bob says that the shaded part of the whole square below does not show a half because there are three pieces, not two. Do you agree? Explain your reasoning  Sam bought a bag of 18 cherries. Sam ate 6 cherries. What fraction of the bag of cherries did Sam eat? Which of these diagrams have □ of the whole shaded? Explain your reasoning. 	

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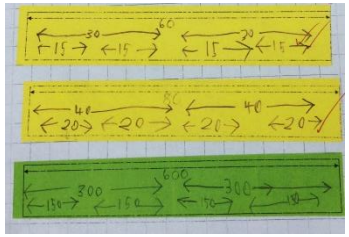
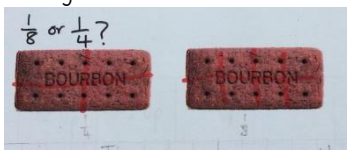
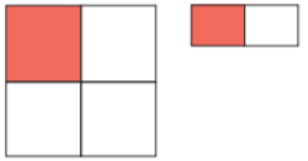
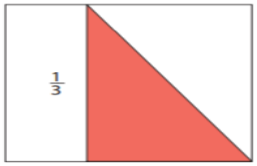
Year 3	Revise □ (half it & half it)  2/4 □ 1/3 Introduce 2/3 Tenths Fifths Develop ideas of equivalent fractions with fifths & tenths Introduce adding & subtracting fractions within one whole Introduce comparing fractions	Count up & down in thirds, quarters, fifths & tenths with pictorial representations and equipment Use **bar models** to show (and recognise, find & write) fractions of a discrete set of objects Show (and recognise, find & write) fractions of lengths, weights, money, biscuits, cakes, e.g. "would you rather have 1/4 or 1/8 of this?"  Prove, using diagrams, pictures & equipment: 2/4 = □ 1/5 = 2/10 □ = 5/10 Prove, using diagrams, pictures & equipment: *□ is bigger than 1/5 *of the same thing* *3/5 bigger than 2/5 *of the same thing*	Count up & down in tenths with pictorial representations and equipment (without using the term decimals or decimal notation)	Bob says the diagrams below show that □ > □ . Do you agree? Explain why.  This is 2/5 of a bag of marbles. How many marbles are in a full bag?  What fraction of the square is shaded? Explain your reasoning.  "If this is a □ part, what is the whole?" "The answer to my fraction problem is 8. What could the word problem be?"	Use equipment and diagrams to support calculations like these: 2/5 + 2/5 2/10 + 3/10 I subtract 2/5 I subtract □ I subtract 3/10

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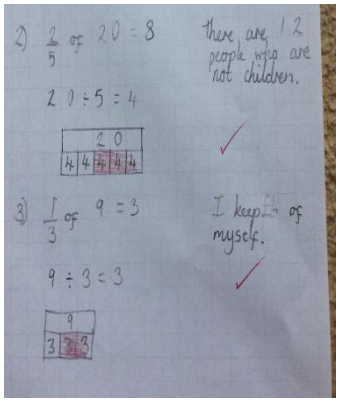
Year 4	Revise Y3 concepts of quarters, thirds, fifths, tenths Introduce: Sixths Eighths Hundredths (only when pupils' understanding of tenths is secure) Teach **fraction families** of common equivalent fractions Develop ideas of finding fractions of amounts □ of 2/5 of Investigate dividing by 10	Show, using diagrams & equipment, (e.g **fraction walls**) families of common equivalent fractions: □ = 2/4 = 4/8 □ = 6/8 1/3 = 2/6 2/3 = 4/6 Use equipment & pictorial representations (**bar models**)to calculate fractions of numbers: □ of, 2/3 of moving on to 2/5 of, 5/6 of, 3/8 of, 7/10 of  Use number lines to practise counting with fractions both forwards and backwards.	Introduce decimal equivalents of tenths (and hundredths if appropriate) e.g.: 7/10 = 0.7 7/100 = 0.07 Recognise, and show using pictorial representations & equipment, □ = 5/10 = 50/100 = 0.50 Use pictorial representations & equipment to round decimals with 1 decimal place to the nearest whole number Use number lines to practise counting with decimals both forwards and backwards. Use equipment to find the effect of dividing a one- or two-digit number by 10; identify the value of the digits in the answer as ones & tenths	Put these fractions on the number line: 2/3, □, □, 3/6, 3/8  What's the same? What's different?  True or false? 1/5 + 2/5 = 3/5 1/5 + 2/5 = 3/10 1/5 + 2/5 = 6/10 Explain your reasoning If the picture represents 1/5 of a rectangle, draw a picture of the whole rectangle. Can you draw it in two different ways?  Which fraction is the odd one out & why? 1/3, 1/6, 3/9	Use equipment and diagrams to support calculations like these: 3/5 + 3/5 2 subtract 3/8 9/10 – 4/10

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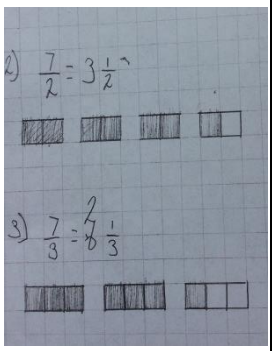
Year 5	Revise Y3 & 4 concepts Compare & order fractions whose denominators are all multiples of the same number Equivalent fractions of 50/100 25/100 75/100 10/100 Convert between improper fractions & mixed number fractions Add & subtract fractions whose denominators are multiples of the same number Introduce multiplication of fractions	Prove, using equipment & pictorial representations: □ = 3/6 3/8>1/4 7/10<4/5 Prove, using equipment & pictorial representations, equivalent fractions: 50/100=5/10=1/2 25/100=1/4 75/100=3/4 10/100=1/10 Use equipment & pictorial representations to convert mixed-number fractions to improper fractions & vice-versa  Use number lines to practise counting forwards and backwards in fractions, including bridging 0.	Revise decimal notation of hundredths; read and write decimal numbers as fractions , e.g, 0.71 = 71/100 Use money, other equipment & pictorial representations to round decimals with 2 decimal places to the nearest whole number. Order and compare numbers with 1 & 2 decimal places Introduce the per cent symbol (%); understand that per cent relates to 'number of parts per 100'; write percentages as hundredths and decimals 71%=71/100=0.71 Recognise, and show using pictorial representations & equipment, □ = 50/100 = 0.50 = 50% □ = 25/100 = 0.25 = 25% □ = 75/100 = 0.75 = 75% 1/10 = 10/100 = 0.1 = 10%	Bob says 3/8 > □ because 8 > 4. Do you agree? Explain your reasoning. Bob wanted to buy a coat that cost £80. He saw the coat on sale in one shop at 1/5 off. He saw the same coat on sale in another shop at 25% off. Which shop has the coat at a cheaper price? Explain your reasoning. Choose numbers for each numerator to make this number sentence true. $\frac{\square}{15} > \frac{\square}{10}$ "Would you rather...?" questions when finding fractions of amounts	Use equipment and diagrams to support calculations like these: 2/5 + 4/5 = 6/5 = 1 and 1/5 2/3 + 2/3 + 2/3 1 and 1/8 subtract 3/8 □ x □ □ x 1/3 (x says "of") Use equipment and diagrams to support calculations like these before moving on to mentally adding and subtracting tenths, and one-digit whole numbers and tenths.

Year group	Priorities	Practical activities to reinforce mental images	Decimals (Y4, 5 & 6) and Percentages (Y5 & 6)	Questions to promote reasoning	Arithmetic with fractions
Year 6	Revise Y3,4 & 5 concepts Simplify fractions using common factors Use equivalent fractions to order & compare fractions Introduce thousandths Introduce division of fractions	Prove, using equipment & pictorial representations, equivalent and simplified fractions	Identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places; identify the value of the digits in the answer in correct place value terms Multiply one-digit numbers with up to 2 decimal places by whole numbers Use written division methods in cases where the answer has up to 2 decimal places Round to the nearest whole number and to one decimal place Develop fluency of recall (and use) equivalences between simple fractions, decimals and percentages	Which is the odd one out? 2/5, .04, 4/10, 3/6, 6/15 Explain your choice. Bob added two fractions together and got 7/8 as the answer. Write down two fractions that Sam could have added (but only one of them can be /8) Tom wrote down two fractions. He subtracted the smaller fraction from the larger and got 1/5 as the answer. Write down two fractions that Tom could have subtracted (one of them was greater than 1) Tom and Sam shared equally one third of a chocolate bar. What fraction of the chocolate bar did each child get?	Use equipment and diagrams to support calculations like these: □ + 1/6 □ - 3/8 4/5 + 3/10 1 and 1/5 – 3/10 □ x □ = 1/8 4/5 -:- 2 1/3 -:- 2 = 1/6