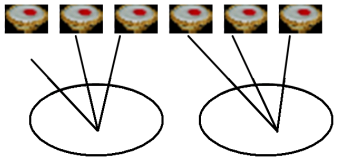
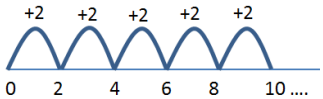
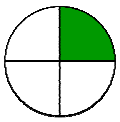
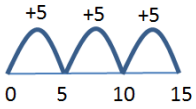
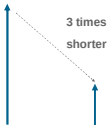
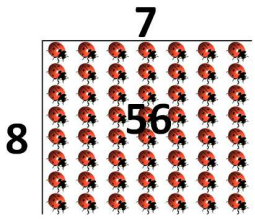
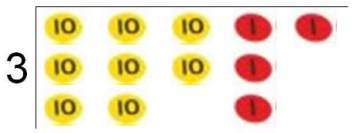
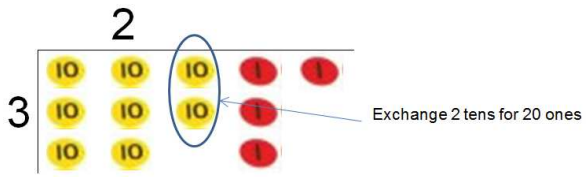
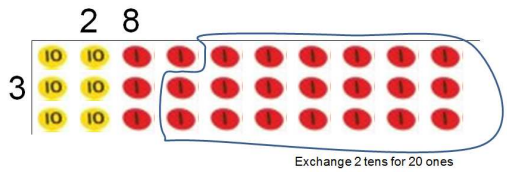
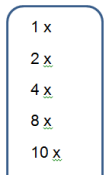
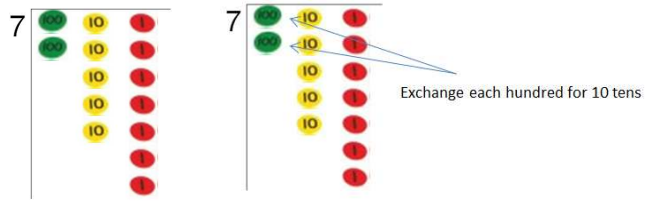
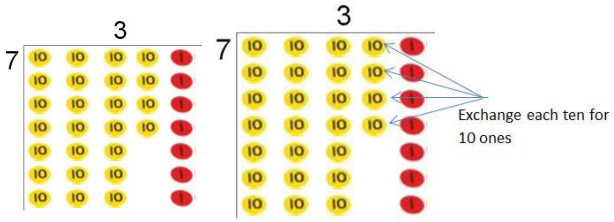
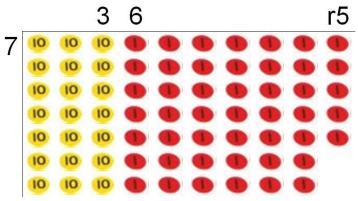
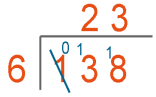
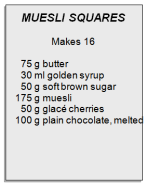
Progression in Calculation – Minimum Expectations in Division

Year	Calculating	Counting & Mental Calculation
Minimum expectations by end of EYFS	Pupils use concrete objects and practical situations to explore sharing to answer questions such as: Share the biscuits out so that everyone has the same (or an equal) number. With up to 20 objects. Cut the sandwich in half. How many pieces are there? 	Halving a number of objects.
1	Pupils solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. Pupils use sharing and grouping to solve division problems. <u>Arrays</u> Grouping 10 teddies into groups of 2.  10 ÷ 2 = 5 <u>Sharing</u> e.g. 6 cakes are shared equally between 2 people. How many cakes does each person get?  <u>Grouping</u> How many pairs of socks can we make from this pile of socks? Count the pairs.  Modelling this on a number line  Linking to repeated addition. <u>Fractions</u> Finding $\frac{1}{2}$ and $\frac{1}{4}$ of a set of objects (related to the sharing image). e.g. sharing 12 teddies into 2 equal hoops. Shading $\frac{1}{2}$ and $\frac{1}{4}$ of a shape. e.g.  $\frac{1}{4}$ is shaded	Counting in 2, 5 and 10 from zero forwards and backwards (linking into the grouping image).

2	Pupils calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs. 4 x 5 = 20 5 x 4 = 20 20 ÷ 4 = 5 20 ÷ 5 = 4 To know that 2 x 3 is the same answer as 3 x 2 (commutativity) but 12 ÷ 3 is not the same as 3 ÷ 12. Complete number sentences, e.g. 6 ÷ 2 = □, 20 ÷ □ = 2, □ ÷ 5 = 10 Pupils solve problems involving multiplication and division, using practical materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts, e.g. 15 pencils are put into boxes of 5. How many boxes of pencils will there be? (grouping)  modelled on a number line There will be 3 boxes of 5 pencils. e.g. 15 pencils are to be divided equally between 5 children. How many pencils will each child get? (sharing) Each child will get 3 pencils. <u>Arrays</u>  Use arrays to model division. 15 ÷ 3 = 5 and 15 ÷ 5 = 3 Link to time intervals, dividing a clock face into 12 equal parts. How many lots of 5 minutes are in 15 minutes?  <u>Fractions</u> Finding $\frac{1}{3}, \frac{1}{4}, \frac{2}{4}, \frac{3}{4}$ of a length, shape, set of objects or quantity. e.g.  What fraction is shaded? Find $\frac{3}{4}$ of the set of cars.  Finding $\frac{1}{4}$ of 12cm. This is the same as 12 ÷ 4 = 3 cm	• Counting forwards and backwards in steps of 2, 5 and 10. • Count in Fractions up to 10 starting from any number and using the ½ and 2/4 equivalence on the numberline e.g. 1 ¼, 1 2/4 (or 1 ½), 1 ¾, 2. Mental Calculations • Practise and become fluent in the 2, 5 and 10 multiplication tables up to 12 x 2, 12 x 5, 12 x 10 and their related division facts • Explore what happens to digits as we move them to the left or the right

3	Pupils write and calculate mathematical statements for division using the multiplication tables that they know, using mental and progressing to formal written methods. Use knowledge of multiplication facts and repeated addition to answer division questions, e.g. How many 3s are there in 39?  Extending to use all tables that pupils know and to explore the idea of the remainder. 1 x 2 x 4 x 8 x 10 x 5 x <u>Scaling</u> Pupils explore the use of scaling as a model for division, e.g. My ribbon is 24 cm long. Can you cut a ribbon 3 times shorter?  Pupils are introduced to the formal written method of short division with whole number answers, using the image of the array and place value apparatus initially. E.g. 56 ÷ 8 = 7  Begin to deal with remainders in context. e.g. if I have 31 children sleeping in 4 man tents, how many tents will I need? Pupils progress to use the <u>formal written method of short</u> division. e.g. 84 ÷ 3    Pupils should tackle word problems, e.g. If I have 84 eggs that I am packing into boxes of 6, how many boxes will I need? Begin to deal with remainders in context.	• Counting forwards and backwards in steps of 2, 3, 4, 5, 8, 10, 50, 100 <u>Mental Calculations</u> • To know 2, 3, 4, 5, 8, 10 times tables up to 12 x **and** their related division facts.

	<u>Fractions</u> Finding $\frac{1}{10}$ of a set of objects and relate this to tenths in place value. Finding unit fractions of objects, amounts and measures, e.g. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \ldots, \frac{1}{10}$ Linking fractions of an amount to division, e.g. $\frac{1}{8}$ of 24 is the same as 24 ÷ 8 Placing unit fractions on a 0 to 1 number line. To count up and down in tenths	
4	Pupils continue to use the number line to support mental division. Extend to HTU ÷ U, e.g. 257 ÷ 7, using key fact strategy and a formal method of short division Some pupils may need to use the place value counters.     Pupils continue to become fluent with the formal written method of short division with exact answers, e.g.  <u>Scaling</u>  What would be the ingredients for 2 people? To solve two- step division problems in contexts To solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number.	• Counting forwards and backwards in steps of 6, 7, 9, 25, 100 <u>Mental Calculations</u> • Know times tables up to 12 x 12 and their related division facts • Factor pairs of a number, e.g. 12 = 1 x 12, 2 x 6, 3 x 4 • Explore rules of divisibility for tables up to 12 x 12 (x2, x3, x5, x9) • U ÷ 10, U ÷ 100, TU ÷ 10, TU ÷ 100 (moving the digits NOT the decimal point) To count up and down in hundredths
	Pupils divide numbers <u>up to</u> 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context,	• Counting in ½, ¼ etc

5	e.g. 432 school children go on a camping trip. Each tent sleeps five. How many tents will they need to take? 432 ÷ 5 becomes 8 6 r2 5 | 4 3 2 3 Answer: 86 remainder 2 Answer: They will need to take 87 tents Begin to introduce long division with and without remainders (in context) HTU ÷ TU using key facts. <u>Fractions</u> Simplifying fractions, e.g. $\frac{3}{27} = \frac{1}{9}$ by dividing both numerator and denominator by 3.	<u>Mental Calculations</u> • Consolidate times tables up to 12 x 12 **and** their related division facts • Know prime numbers to 19 (2, 3, 5, 7, 11, 13, 17, 19) • To know and use the terms: factor, multiple and prime • ÷ of whole numbers and decimals by 10, 100, 1000 by moving the digits NOT the decimal point
6	Pupils divide numbers <u>up to</u> 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. Progressing to expressing the remainder as a decimal, e.g. £432 was raised at the school fair and is to be shared equally between 15 classes. How much will each class receive? 432 ÷ 15 becomes 2 8 · 8 1 5 | 4 3 2 · 0 3 0 ↓ 1 3 2 1 2 0 ↓ 1 2 0 1 2 0 0 Answer: 28·8 Answer: Each class will receive £28.80 Pupils divide numbers up to 4 digits by a two-digit number using the formal written method of short division (up to ÷ 12 in line with times tables recall) where appropriate, interpreting remainders according to the context, e.g. 496 pupils attend a football tournament. When they are put into teams of 11, how many full teams will there be? Will everyone be in a team? 496 ÷ 11 becomes 4 5 r1 1 1 | 4 9 6 5 Answer: there will be 45 full teams of 11 players and one pupil will not have a team. Division of numbers with up to 2 decimal places by U and TU, e.g. £1.32 ÷ 3 To use rounding and estimation to check answers to calculations and to determine, in the context of a problem, an appropriate degree of accuracy. <u>Fractions</u> Convert fractions to decimals, e.g. $\frac{3}{8}$ Use common factors to simplify fractions, e.g. $\frac{24}{36} = \frac{2}{3}$ dividing both numerator and denominator by the highest	<u>Mental Calculations</u> • Find common factors of a pair of numbers, e.g. the common factors of 12 and 18 factors of 12 are **1, 2, 3**, 4, **6**, 12 factors of 18 are **1, 2, 3, 6**, 9, 18 so common factors are: 1, 2, 3 and 6 • know prime numbers up to 30 • ÷ numbers by 10, 100, 1000 involving decimals

	common factor which is 12. Divide proper fractions (where the numerator is smaller than the denominator) by whole numbers, e.g. $\frac{1}{3} \div 2$ using models and images.	