Foundation Stage — Multiplication and Division

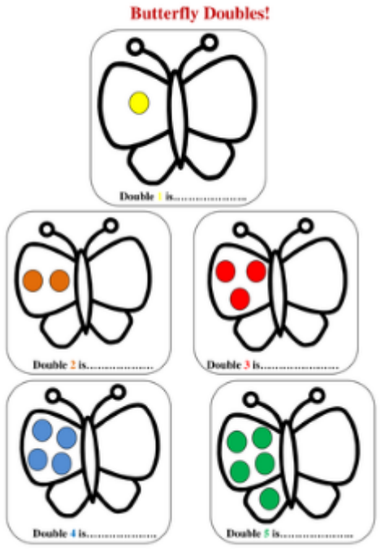
Early Learning Goal	Solve problems involving doubling, halving and sharing

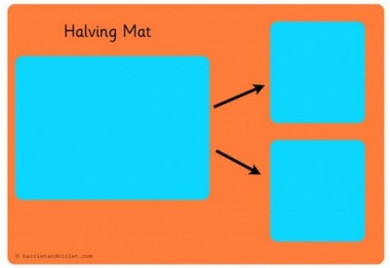
Vocabulary

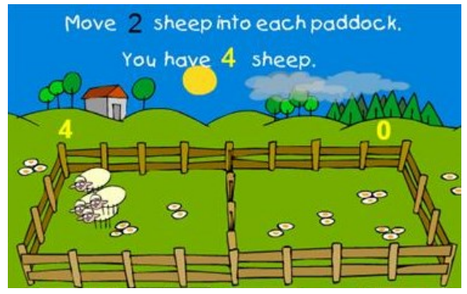
Double, two lots of, two groups of, pair, twice as many, even, half, halve, share, between two, equal, how many each

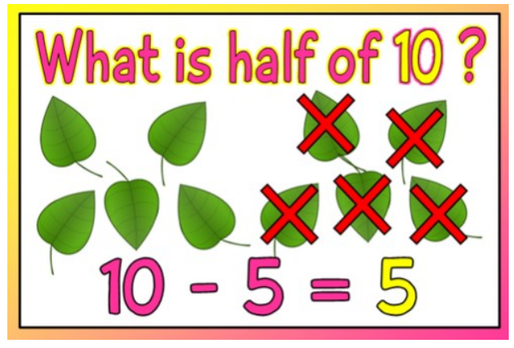
Strategies

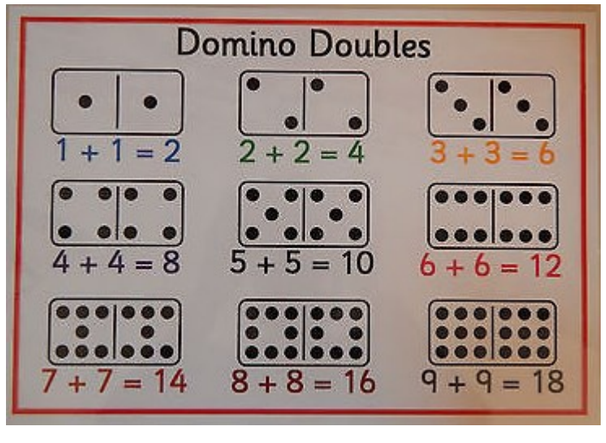
Role-play and skills based e.g. cooking, counting in pairs e.g. hands and feet, songs, sharing using manipulatives, odds and evens, numicon

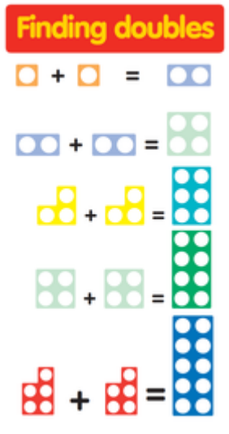


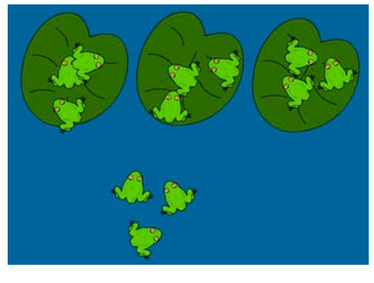


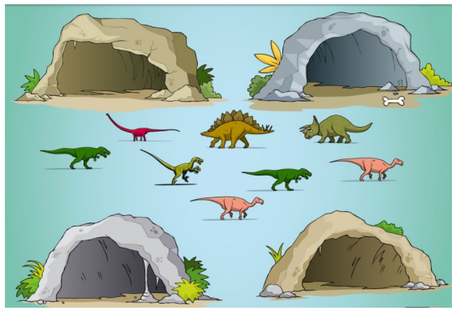












Key Stage 1 — Multiplication and Division

Year 1	Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.
Year 2	Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Vocabulary

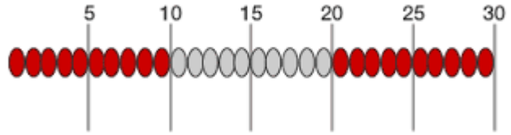
Multiply, times, lots of, groups of, repeated addition

Divide, share equally, group, remainder

Strategies

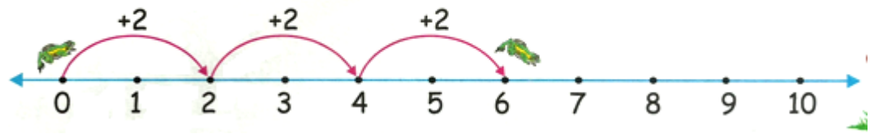
Multiplication: Counting in steps with bead strings, sets of objects, coins, on a hundred square etc., arrays and numicon to show commutative laws, repeated addition on a number line

Division: Sharing using manipulatives and pictoral representations, grouping as repeated subtraction on number line



4 x 5p = 20p

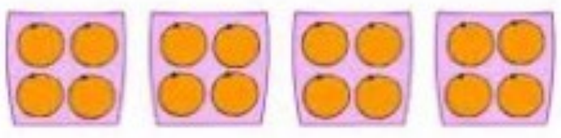
5p + 5p + 5p + 5p = 20p

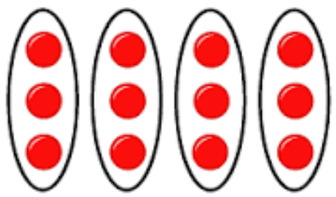


3 x 2 = 6

(a) Divide these 16 oranges equally between 4 families.

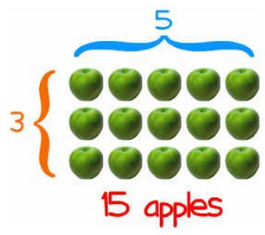
Each family gets 4 oranges.





12 ÷ 3 = 4

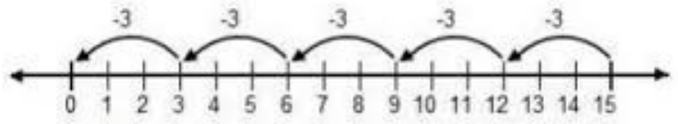
Three groups of two is equal to six.
Six divided into three equal groups is equal to two.



So there are **four related facts**:

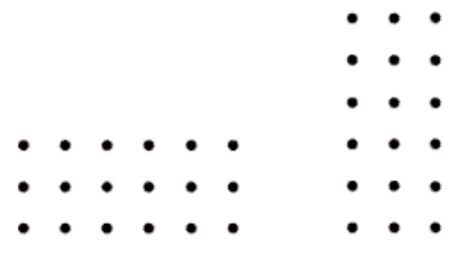
- 3 × 5 = 15
- 5 × 3 = 15
- 15 / 3 = 5
- 15 / 5 = 3

15 ÷ 3 = 5 is the number of times you can subtract 3 from 15 before you get to 0.



15 - 3 - 3 - 3 - 3 - 3 = 0

15 ÷ 3 = 5



Mastery	Mastery with Greater Depth
Sarah is filling party bags with sweets. She has 20 sweets altogether and decides to put 5 in every bag. How many bags can she fill?	How else could 20 sweets be put into bags so that every bag had the same number of sweets? How many bags would be packed each time?

Mastery	Mastery with Greater Depth
Two friends share 12 sweets equally between them. How many do they each get? Write this as a division number sentence. Make up two more sharing stories like this one. Chocolate biscuits come in packs (groups) of 5. Sally wants to buy 20 biscuits in total. How many packs will she need to buy? Write this as a division number sentence. Make up two more grouping stories like this one.	Two friends want to buy some marbles and then share them out equally between them. They could buy a bag of 13 marbles, a bag of 14 marbles or a bag of 19 marbles. What size bag should they buy so that they can share them equally? What other numbers of marbles could be shared equally? Explain your reasoning.

Key Stage 2—Year 3 and 4 — Multiplication and Division

Year 3	Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.
Year 4	Recall multiplication and division facts for multiplication tables up to 12 × 12 Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers Recognise and use factor pairs and commutativity in mental calculations Multiply two-digit and three-digit numbers by a one-digit number using formal written layout Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Vocabulary

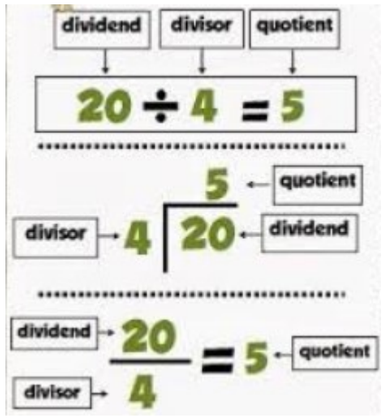
Multiply, times, lots of, groups of, product, repeated addition

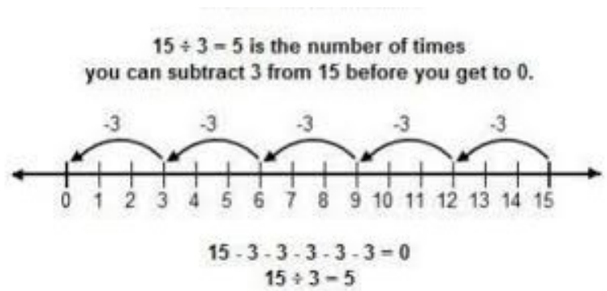
Divide, share equally, group, remainder

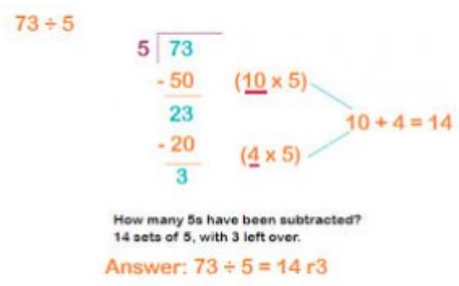
Strategies

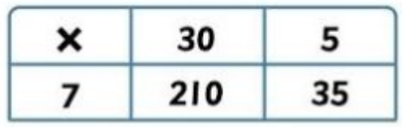
Multiplication: Arrays, repeated addition on number line, grid method, expanded column method (with place value headings and brackets for support)

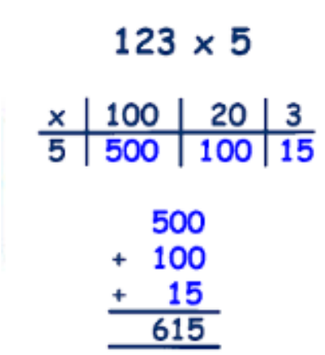
Division: Sharing with manipulatives, grouping as repeated subtraction on a number line, chunking

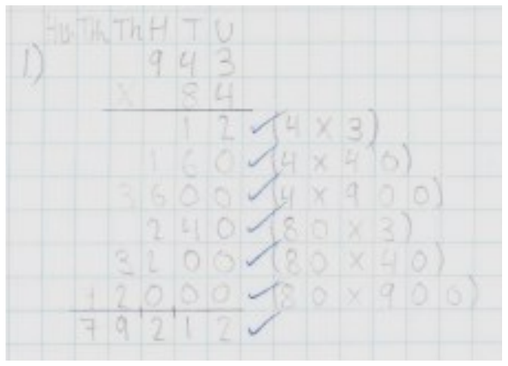












Mastery	Mastery with Greater Depth
Complete the following: 3 × □ = 12 4 × □ = 20 □ × 3 = 15 8 × □ = 24	□ □ × □ = ? Putting the digits 1, 2 and 3 in the empty boxes, how many different calculations can you make? Which one gives the largest answer? Which one gives the smallest answer?
Use a column method to calculate the following: 123 × 3 324 × 4 234 × 8	Find the missing digits. 2□ × 8 = 176 2□ × □ = 112 1□4 × □ = 736

Mastery	Mastery with Greater Depth
Three children calculated 7 × 6 in different ways. Identify each strategy and complete the calculations. Annie: 7 × 6 = 7 × 5 + □ = □ Bertie: 7 × 6 = 7 × 7 - □ = □ Cara used the commutative law: 7 × 6 = □ × □ = □ Now find the answer to 6 × 9 in three different ways.	Multiply a number by itself and then make one factor one more and the other one less. What happens to the product? E.g. 4 × 4 = 16 6 × 6 = 36 5 × 3 = 15 7 × 5 = 35 What do you notice? Will this always happen?
Tom ate 9 grapes at the picnic. Sam ate 3 times as many grapes as Tom. How many grapes did they eat altogether?	Sally has 9 times as many football cards as Sam. Together they have 150 cards. How many more cards does Sally have than Sam?

Key Stage 2—Year 5 and 6 — Multiplication and Division

Year 5	Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers; Establish whether a number up to 100 is prime and recall prime numbers up to 19 Multiply and divide numbers mentally drawing upon known facts; Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 Recognise and use square numbers and cube numbers, and notation for squared and cubed Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes; involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign; involving multiplication and division, including scaling by simple fractions and problems involving simple rates.
Year 6	Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication Divide numbers up to 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 Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context Perform mental calculations, including with mixed operations and large numbers; Identify common factors, common multiples and prime numbers Use their knowledge of the order of operations to carry out calculations involving the four operations Solve problems involving addition, subtraction, multiplication and division. Use estimation to check answers to calculations and determine, in the context of the problem, an appropriate degree of accuracy.

Vocabulary

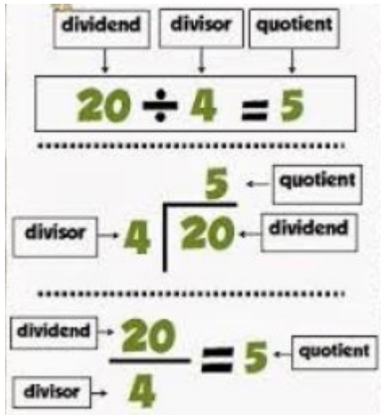
Multiply, times, lots of, groups of, product, repeated addition

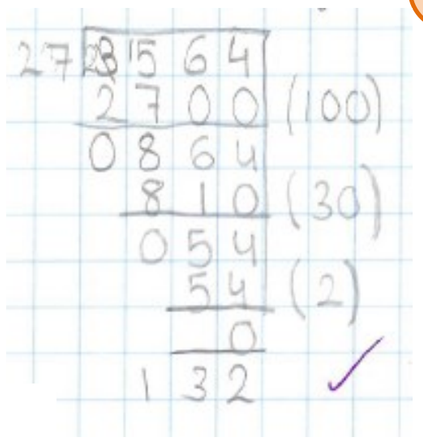
Divide, share equally, group, remainder

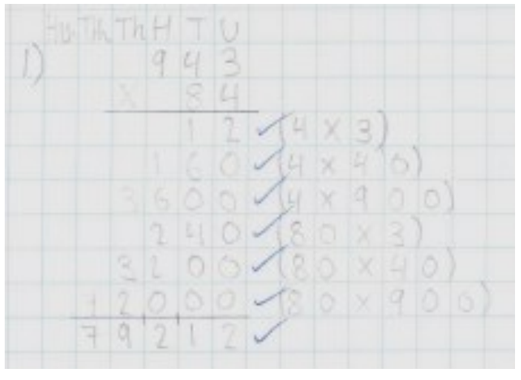
Strategies

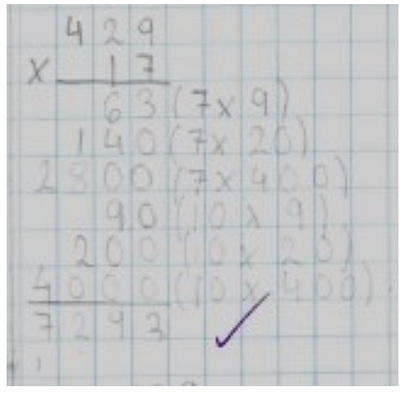
Multiplication: Expanded column method (with then without brackets and place value headings to support) , Short multiplication (progressing to decimals)

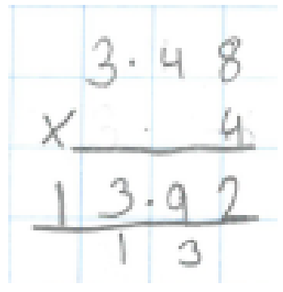
Division: Chunking (for long division) and short division

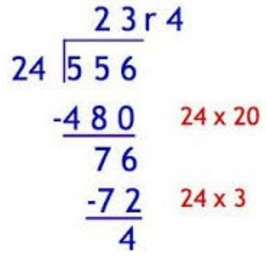


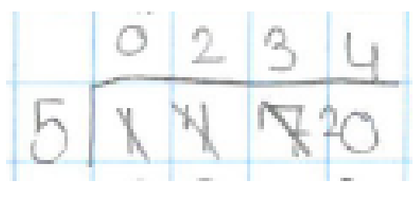


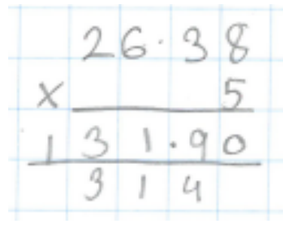












Mastery	Mastery with Greater Depth
It is correct that 273 × 32 = 8736. Use this fact to work out: ■ 27·3 × 3·2 ■ 2·73 × 32 000 ■ 873·6 ÷ 0·32 ■ 87·36 ÷ 27·3 ■ 8736 ÷ 16 ■ 4368 ÷ 1·6	Which calculation is the odd one out? ■ 753 × 1·8 ■ (75·3 × 3) × 6 ■ 753 + 753 ÷ 5 × 4 ■ 7·53 × 1800 ■ 753 × 2 – 753 × 0·2 ■ 750 × 1·8 + 3 × 1·8 Explain your reasoning.

Mastery	Mastery with Greater Depth
Miriam and Alan each buy 12 tins of tomatoes. Miriam buys 3 packs each containing 4 tins. A pack of 4 costs £1·40. Alan buys 2 packs each containing 6 cans. A pack of 6 costs £1·90. Who gets the most change from a £5 note?	Miriam buys 19 tins of soup. All the tins cost the same price. She goes to the shop with just one note, and comes home with the tins and the change in coins. On the way home she drops the change. She looks carefully and she thinks she picks it all up. When she gets home she gives £2·23 change to her mother. Do you think that Miriam picked up all the change that she dropped? Explain your reasoning.