



**Topic: Solving problems
multiplication and division**

Year: 7

NC Strand: Number

What should I already know?

- How to multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- How to 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
- How to 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
- How to perform mental calculations, including with mixed operations and large numbers
- How to identify common factors, common multiples and prime numbers

What will I know by the end of the unit?

- | | |
|---|--|
| <ul style="list-style-type: none"> • How to apply the properties of multiplication and division • How to understand and use multiples • How to understand and use factors • How to multiply and divide integers and decimals by powers of ten • How to multiply by 0.1 and 0.01 • How to convert metric units • How to use formal methods to multiply integers • How to use formal methods to multiply decimals | <ul style="list-style-type: none"> • How to use formal methods to divide integers • How to use formal methods to divide decimals • How to use order of operations • How to solve problems using area of rectangles and parallelograms • How to solve problems using area of triangles • How to solve problems using area of trapezia • How to solve problems using the mean • How to multiply and divide algebraic expressions |
|---|--|

Vocabulary

Product	Even	Ones	Efficient
Multiply	Venn Diagram	Metric	Integer
Divide	Integer	Convert	Estimate
Inverse	Multiple	Milli	Adjust
Quotient	Common	Centi	Divisor
Commutative	Lowest Common Multiple	Kilo	Dividend
Factor	Place Value	Litre	Remainder
Array	Hundredths	Gram	Decimal
Odd	Tenths	Metre	Priority
Order	Operation	Base	Parallelogram
Perpendicular height	Parallel	Trapezium	Mean
Average	Median	Range	Coefficient
Expression	Simplify	Term	

Investigate/Homework tasks



**Topic: Solving problems
multiplication and division**

Year: 7

NC Strand: Number

- Homework will be set by your teacher using google classroom
- You should complete at least 30 minutes of maths tasks using the website and log in provided by your teacher. Please attend help sessions if you do not have access to the internet at home
- Additional work you could complete:
 - Find out more about the meaning of the vocabulary list using <http://www.amathsdictionaryforkids.com/>
- To challenge yourself: Answer the key questions to deepen your knowledge

Key Information/Diagrams

The aim is to get to the formal method but the children need to understand how it works.

$$\begin{array}{r} 6 \times 23 = \\ 23 \\ \times 6 \\ \hline 138 \\ 1 \end{array}$$

Long division

To get 744 children have solved 6×124
To get 2480 they have solved 20×124

$$\begin{array}{r} 124 \\ \times 26 \\ \hline 744 \\ 2480 \\ \hline 3224 \end{array}$$

Answer: 3224

$$\begin{array}{r} 123 \\ 5 \overline{) 615} \\ \underline{5} \\ 11 \\ \underline{10} \\ 15 \\ \underline{15} \\ 0 \end{array}$$

Use of the 'bus stop method' using grouping and counters. Key language for grouping- how many groups of X can we make with X hundreds- *this can also be done using sharing!*

$$615 \div 5$$

Step 1: make 615

Step 2: Circle your groups of 5

Step 3: Exchange 1H for 10T and circle groups of 5

Step 4: exchange 1T for 10ones and circle groups of 5

Concrete

2544 \div 12

How many groups of 12 thousands do we have? None

Exchange 2 thousand for 20 hundreds.

How many groups of 12 are in 25 hundreds? 2 groups. Circle them.

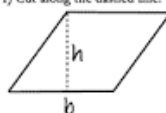
We have grouped 24 hundreds so can take them off and we are left with one.

Exchange the one hundred for ten tens so now we have 14 tens. How many groups of 12 are in 14? 1 remainder 2.

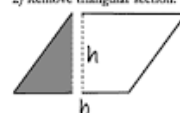
Exchange the two tens for twenty ones so now we have 24 ones. How many groups of 12 are in 24? 2

Transforming a Parallelogram into a Rectangle.

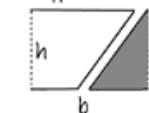
1) Cut along the dashed line.



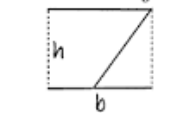
2) Remove triangular section.



3) Place triangular section on opposite side.



4) Rest the triangular shape until it forms a rectangle.



© MATHguide.com

Transforming a Trapezoid into a Parallelogram.

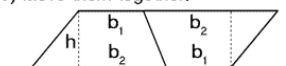
1) Duplicate the trapezoid.



2) Flip one trapezoid.



3) Move them together.



© MATHguide.com

Key Questions

If $a = b \times c$ what other multiplication and division facts do we know?
Why is doubling and doubling again the same as multiplying by 4?
Is $\times 10$ and then $\div 2$ a quick way of multiplying by 5?
Find a similar way to divide by 50.

How do you work out the factors of a number?
Which numbers have an odd number of factors? Explain why.
The larger the number the more factors it has. True or false?
Why are factors always integers? 💡

How do multiples relate to times-table facts?
Is 0 a multiple of every number?
Can multiples be negative?
Do multiples have to be a whole number?
Explain how 18 can be both a factor and a multiple number.

What's the same and what's different about dividing 30 by 10 and 3 by 10?
Why is dividing a number by 10 and then dividing by 10 again the same as dividing the original number by 100?
What's different about multiplying an integer by 10, 100 or 1000 and multiplying a non-integer by 10, 100 or 1000?

What decimal is the same as $\frac{1}{10}$?
How do you find one-tenth of a number?
Explain why $\times 0.1$ is the same as $\div 10$
Give an example of when multiplication makes a number bigger, and one where it makes a number smaller.


What do the words milli-, centi- and kilo- mean?
How do you convert km to m and kg to g? What's the same, what's different?
What do you think a centilitre is? What about a kilolitre?
Do these measurements exist?
Why can you not convert metres to milligrams?



**Topic: Solving problems
multiplication and division**

Year: 7

NC Strand: Number

<p>Why would it not be sensible to show 27×39 using place value counters?</p> <p>Is a formal method always the best way to solve a multiplication?</p> <p>How would you work out 63×99?</p> <p>Why is $36 \times 24 \neq 30 \times 20 + 6 \times 4$?</p>	<p>How do you estimate the answer to a decimal multiplication?</p> <p>Explain why $6.4 \times 24 = 2.4 \times 64$. Tell me three more multiplications using these digits that have the same answer.</p>	<p>How do you know $341 \div 2$ will not have an integer answer?</p> <p>Explain why 341 is the same as 341.0 or 341.00</p> <p>What type of equations are solved using division? Tell me three examples.</p>
<p>Why is multiplication done before addition?</p> <p>Why do multiplication and division have equal priority?</p> <p>Explain how this diagram helps you remember which operations come before others.</p>  <p>The diagram is a triangle divided into four horizontal sections. From top to bottom, the sections contain: 1. Brackets: () 2. Indices and roots: ² & √ 3. Multiplication and division: × & ÷ 4. Addition and subtraction: + & -</p>	<p>What is the same? What's different about finding the area of a rectangle and parallelogram?</p> <p>Draw a rectangle with an area of 20 cm^2. Draw a parallelogram with an area of 20 cm^2. Now draw more. What do you notice?</p> <p>"If the area of the two rectangles are equal, then the perimeters are equal." Always, never or sometimes true?</p>	<p>Explain/show why you need to divide by 2 to find the area of triangle.</p> <p>What is meant by the perpendicular height?</p> <p>How do you work out the area of a triangle when the units are different?</p> <p>How can you show any triangle is half of a parallelogram?</p>
<p>What is a trapezium? What are the properties? How many different types of trapezia can you draw/make?</p> <p>How could you find the area of this trapezium? Can you prove that the area of a trapezium is always $\frac{1}{2}(a + b)h$?</p> <p>Why is it more efficient to use the formula for find the area rather than dividing it into other shapes?</p>	<p>Can you show visually what happens when you find the mean of a set of numbers?</p> <p>Do you know any other measures of average?</p> <p>When might you use the mean over the median? When might it be better to use the median rather than the mean?</p> <p>If you know the mean of a set of numbers, how do you find their total?</p>	<p>Why is it possible to simplify $2a \times 3b$ but not $2a + 3b$?</p> <p>The area of a rectangle is $6xy$. What might the lengths of the sides be?</p> <p>Why do we write $a \times 2$ as $2a$ instead of $a2$?</p>