Rayner Stephens
HIGH SCHOOL

Curriculum

Intent

for

Maths

At Rayner Stephens High School, we believe that everyone can do maths. The intent of the mathematics curriculum is to provide students with a high-quality and ambitious curriculum which will allow all students to achieve their mathematical potential and prepare them well for everyday life and future employment. Through mathematics lessons, we promote mathematical thinking which will encourage students to develop conceptual understanding, to establish links between the different disciplines within maths and to provide the opportunity to apply this understanding to solve increasingly complex problems. In KS3, students are introduced to topics in mathematics using a concrete, pictorial, abstract approach to allow students to develop their fluency, reasoning and problem-solving skills. Topics are interleaved to allow students to improve their previous learning and allow them to develop application and skill links between the different areas of mathematics. In KS3, students are exploring topics in order to create the building blocks to prepare them for their GCSE studies in Years 10 and 11. Covering the disciplines of number, algebra, geometry, ratio, proportion, data handling and probability, students are given the opportunity to retrieve, affirm and extend their understanding as they progress on their mathematics journey through KS3 and KS4. Students will be encouraged to become fluent in the fundamentals, to be able to reason mathematically, by problem solving and be able to develop an argument or justification using mathematical language.

Rayner Stephens High School

Mathematics Learning Journey Higher Tier

Paper 1 (Non-Calculator)
Paper 2 (Calculator)
Paper 3 (Calculator)

YEAR 11

Revision
Vectors
Algebraic Proof
Transformation of Graphs
Functions
Circle Theorems
Circle Geometry
Velocity Time Graphs
Iteration
Simultaneous Equations
Quadratics
Data Handling and Histograms
Similar Shapes in 2D and 3D
Probability
Coordinate Geometry
Surface Area
Averages
Arcs and Sectors
Angles
Pythagoras' Theorem
Bearings
Trigonometry
Volume
Frequency Diagrams
Compound Measures
Proportion
Simultaneous Equations
Probability
Frequency Diagrams
Similar Shapes
Averages
Surface Area
Data Handling
Volume
Circles
Compound Measures

YEAR 10

Graphs
Angles
Parallel Lines
Changing the Subject
Forming and Solving
Inequalities
Expanding Brackets
Percentages
Fractions
Product of Primes
Error Intervals
Two-way Tables
Constructions
Further Probability
Forming and Solving Equations
Trigonometry
Scale
Measurement
Angles in Polygons
Measuring Angles
Equations in context
Pythagoras' Theorem
Area
Proportional Reasoning
Angle Rules
Fractions and Percentages
Standard Index form
Coordinate Geometry
Bearings
Standard Index Form
Factorising
Solving Equations
Sequences
Index Laws
Ratio
HCF and LCM
Estimation
Frequency Trees

YEAR 9

Indices
Brackets, Equations and Inequalities
Representing data
Multiplying and dividing fractions
Ratio and Scale
Operations and Equations with Directed Number
Addition and Subtraction of Fractions
Multiplicative change
Working in the Cartesian Plane
Tables and Probability
Sequences
Prime Numbers and Proof
Sets and Probability
Addition and Subtraction of Fractions
Fraction and Percentage of Amounts
Solving Problems with Addition and Subtraction
Place Value and Ordering Integers and Decimals
Understand and Use Algebraic Notation

YEAR 7

Developing Geometric Reasoning
Measuring and Using Geometric Notation
Operations and Equations with Directed Number
Solve Problems with Multiplication and Division
Fraction, Decimal and Percentage Equivalence
Equality and Equivalence
Sequences
Welcome

Rayner Stephens High School

Mathematics Learning Journey Foundation Tier

YEAR 11

Revision

Paper 1 (Non-Calculator)
Paper 2 (Calculator)
Paper 3 (Calculator)

Simultaneous Equations

Venn Diagrams

Probability Trees

Probability

Vectors $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$

Congruence and Similar Shapes

Graphs

Frequency Diagrams

Pie Charts

Frequency Diagrams

Volume

Arcs and Sectors

Trigonometry

Bearings

Averages

Data Handling

Surface Area

Volume

Circles

$A = \pi r^2$

Compound Measures

Coordinate Geometry

Transformations

Compound Measures

Coordinate Geometry

Scatter Diagrams

Averages

Surface Area

Circles

Angles

Pythagoras' Theorem

$a^2 + b^2 = c^2$

YEAR 10

Two-way Tables

Error Intervals

Product of Primes

Fractions

Percentages

Expanding Brackets

Inequalities

Forming and Solving

Changing the Subject

Angles Parallel Lines

Graphs

Constructions

Frequency Trees

Estimation

HCF and LCM

Ratio

Index Laws

Sequences

Solving Equations

Factorising

Standard Index Form

Bearings

Further Probability

Forming and Solving Equations

Trigonometry

Scale

Measurement

Angles in Polygons

Measuring Angles

YEAR 9

Equations in context

Pythagoras' Theorem

Area

Proportional Reasoning

Angle Rules

Fractions and Percentages

Standard Index form

Prime Numbers and Proof

Operations and Equations with Directed Number

Ratio and Scale

Multiplying and dividing fractions

Representing data

Brackets, Equations and Inequalities

YEAR 8

Solving problems with Multiplication and Division

Addition and Subtraction of Fractions

Multiplicative change

Working in the Cartesian Plane

Tables and Probability

Sequences

Indices

Sets and Probability

Addition and Subtraction of Fractions

$\frac{6}{10} + 0.3$

Solving Problems with Addition and Subtraction

Fraction and Percentage of Amounts

Place Value and Ordering Integers and Decimals

Understand and Use Algebraic Notation

YEAR 7

Developing Geometric Reasoning

Measuring and Using Geometric Notation

Operations and Equations with Directed Number

Solve Problems with Multiplication and Division

Fraction, Decimal and Percentage Equivalence

Equality and Equivalence

Sequences

welcome

Year 7 - Mathematics						
Curriculum intent	Through mathematics lessons we promote mathematical thinking to allow all students to achieve their mathematical potential and engage in the study of mathematics. Using a mastery style approach to mathematics allows all students to develop their fluency, reasoning and problem solving using the concrete, pictorial, abstract (CPA) approach. As students progress through their learning topics from previous learning with be interleaved into future learning so students develop application and skill links between different areas of mathematics. In year 7, students start their journey with algebraic thinking, students will further develop pattern spotting, and develop a deep understanding of the basic algebraic forms and fundamentals. Much of this work will be developed using physical manipulatives and further their numerical reasoning. Students will then explore further the concepts of equivalence and equality in both algebraic and numerical form, this will link to real life concepts and explore associated topics to apply these skills. As year 7 continues students will explore new areas of mathematics linked to the four operations and fractions allowing students to develop and apply these central concepts to different areas of mathematics, including frequency diagrams, averages and area. Students will develop their application of calculations using formal methods, please refer to our calculation policy for more details. In Term 3 students will build on their KS2 skills in early work in probability and number proof, developing their ability to justify and reason deductively in both number and algebra.					
Term	**Autumn 1**	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Knowledge	• Sequences • Understand and use algebraic notation	• Equality and Equivalence • Place value and ordering integers and decimals	• Fraction, decimal and percentage equivalence • Solve problems with addition and subtraction	• Solve problems with multiplication and division • Fraction and percentage of amounts • Operations and equations with directed number	• Operations and equations with directed number • Addition and subtraction of fractions	• Sets and probability • Prime numbers and proof
Term	**Autumn 1**	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Skills	• Moving between different numerical, graphical and diagrammatic representations	• Simplify & manipulate algebraic expressions to maintain equivalence	• Represent decimals and fractions on a number line • Compare quantities using fractions,	• Use the properties of multiplication and division, including the commutative	• Understand and use multiple representations of directed numbers	• Identify sets and create and represent them on Venn diagrams

	• Make and test conjunctures about patterns • Recognise & generate terms. • Use a calculator to check accuracy • Use algebra to generalise the structure of arithmetic • Formulate mathematical relationships • Recognise and use relationships between operations, including inverse operations • Use and interpret formal algebraic notation • Substitute into expressions • Generate terms of a sequence • Produce graphs of linear functions of one variable	• Use approximation through rounding to estimate answers • Use algebraic methods to solve linear equations with one variable. • Use place value for decimals • Understand and use place value for decimals, measures & integers of any size • Use mathematical symbols for equality and inequality • Compare and order any number up to one billion • Describe, interpret and compare the median & range • Use powers of ten in calculations • Write numbers in standard form	decimals and percentages • Express one quantity as a fraction of another • Use and interpret simple pie charts • Using diagrams to represent any fraction as a diagram, on a number line • Identify and use equivalent fractions • Understanding fractions as division • Convert fluently between simple fractions, decimals and percentages • Understanding fractions greater than a whole • Use the properties of addition and subtraction, including the associative law of arithmetic • Develop mental strategies for addition and subtraction • Use formal written methods for addition and subtraction, applied to positive integers and decimals • Recognise and use the most appropriate method: mental strategies, formal written or calculator	associative laws of arithmetic • Understand and use factors and multiples • Multiply and divide integers and decimals by powers of 10 • Convert between different metric units • Use formal written methods for multiplication and division, applied to positive integers and decimals • Understand and use order of operations • Find fraction and percentage of amounts using mental methods and a calculator • Solve fraction and percentage problems • Understand and use multiple representations of directed numbers	• Perform calculations that cross zero • Complete calculations using all four operators involving direct numbers • Use of a calculator with directed numbers • Evaluate algebraic expressions involving directs numbers • Understand and use two step equations • Explore powers and roots. • Understand representations of fractions • Understand and use equivalent fractions • Convert between mixed numbers and fractions • Add and subtract proper fractions in any form • Add and subtract improper fractions and mixed numbers • Use fractions in algebraic contexts • Use equivalence to add and subtract decimals, percentages and fractions • Add and subtract simple algebraic fractions.	• Understand and use intersection and the union of sets • Know and use the vocabulary of probability • Generate sample spaces for an event • Know the sum of probabilities of all outcomes is 1 • Calculate the probability of single events • Understand and use the probability scale. • Identify and use factors and multiples • Find common factors and multiples including HCF & LCM • Write a number as a product of its prime factors • Make and test conjectures, using counter examples to disprove a conjecture

			• Solve problems involving perimeter, financial maths, timetables, frequency diagrams •			
Assessments	• 2unit assessments	• 2 unit assessments • Term Assessment	• 2 unit assessments	• 3 unit assessments	• 2 unit assessments Term Assessment	• 2 unit assessments
Curiosity	• Work on your IQ and test your pattern spotting skills https://www.intelligencetest.com/questions/pattern-recognition/index.html • Enter the National Cipher Challenge (Oct-Jan) https://www.cipherchallenge.org/ • Research the famous Fibonacci sequence. Can you summarise your research in a poster or factsheet? • Try following sequences to solve the game about (app also available) http://gameaboutsquares.com/	• Try out some of the UKMT Junior Challenge questions – some students get the chance to enter in Feb!) https://www.interactive-maths.com/ukmt-random-question-generator.html • Investigate palindromes – here's a short article to get you started https://nrich.maths.org/2574 • Equivalence pairs – can you get to cards face down Level 5? https://nrich.maths.org/1249	• If you've been selected for the UKMT Junior Challenge questions – get some extra practice in! https://www.interactive-maths.com/ukmt-random-question-generator.html • You're throwing a birthday party for your friend. What will you do and how much will it cost? • In newspapers and magazines find fractions decimals or percentages in them and convert all the values you find.	• Make a how to use your calculator guide! It will come in helpful for future learning • You're planning an epic journey, use Google Earth to figure out where you will travel, and how far in total you will travel. Can you give distances in cm, m and km?	• Can you investigate average temperatures across the work, can you find very cold cities/places and compare them to very warm cities/places, Work out the differences • Try to keep practising your negative number skills! https://www.cimt.org.uk/projects/mepres/book7/bk7i15/bk7_15i1.htm & https://www.cimt.org.uk/projects/mepres/book7/bk7i15/bk7_15i2.htm • Can you design a board game which tests your fraction arithmetic?	• Can you sort shapes based on their properties into a Venn diagram? https://mathsframe.co.uk/en/resources/resource/83/sort-shapes-venn • Can you test the hypotheses? https://nrich.maths.org/6033 • Can you explain why every year must contain at least one Friday the thirteenth? What is the greatest number of Friday the thirteenths that can fall in one year?

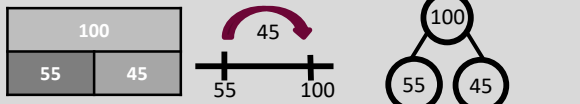
Year 7 Mathematics Knowledge Organiser – Solving Problems with Addition and Subtraction

Key Vocabulary:

1	Addition	To find the total of two or more numbers. Other words to describe addition include: 'add', 'plus', 'sum'.
2	Subtraction	To find the difference between two numbers. To find out how many are left when some are taken away.
3	Commutative	Changing the order of the operations does not change the result. This applies to addition and multiplication.
4	Integer	A whole number that can be positive, negative or zero.
5	Decimal	A number with a decimal point in it. Can be positive or negative.
6	Associative	When you add or multiply you can do so regardless of how the numbers are grouped.
7	Inverse	To perform the opposite operation. For example, the inverse of addition is subtraction.
8	Balance	The amount of money in an account.
9	Credit	Money that goes into an account.
10	Debit	Money that leaves an account.
11	Standard Form	A way to write very big numbers or very small numbers with one number before the decimal point, multiplied by a power of 10. It allows saying and calculating with very big numbers or very small numbers to be easier to handle.

12 Addition and Subtraction

We can use different modelling methods to represent addition and subtraction.



Bar models | Number lines | Part/Whole diagrams

13 Addition is Commutative

Addition and multiplication can be done in any order; these are **commutative** calculations, for example:

6 + 3 = 3 + 6

However when subtracting the order does matter, for example:

9 – 3 = 6 which is not the same as 9 – 6 = 3

14 Formal Written Methods

Column method:

4261 + 3037 + 6422

	4	2	6	1
	3	0	3	7
+	6	4	2	2
1	3	7	2	0
	1		1	1

863 – 75

	7	15	13
	~~8~~	~~6~~	3
–		7	5
	7	8	8

Remember the place value of each column. When adding you may need to include the exchange in the next column. When subtracting you may need to exchange 10 units to the column below in order to be able to subtract.

15 Formal Methods with Decimals

Column method:

Use columns as when adding and subtracting integers. You may find it useful to add a place holder 0 to empty places in the columns. Remember the decimal point acts as a placeholder and aligns the other values.

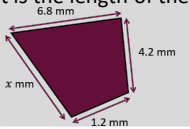
7.83 + 16.6

		7	. 8	3
+	1	6	. 6	0
	2	4	. 4	3
	1	1		

16 Solve Problems with Perimeter

The perimeter is the length around the outside of a shape.

For example, the perimeter of the quadrilateral is 16.7 mm. What is the length of the side marked x?



$$P = 6.8 + 4.2 + 1.2 + x$$
$$16.7 = 12.2 + x$$
$$x = 16.7 - 12.2$$
$$x = 4.5 \text{ mm}$$

17 Solve Problems with Finance

Below is an example of a bank statement.

Date	Description	Credit	Debit	Balance
1 Mar	Opening Balance			254.76
3 Mar	Wages	1,402.11		1,656.87
4 Mar	Phone Bill		34.45	1,622.42

Here we can see the balance is the amount already in the bank account at the beginning of the month. Wages are a credit, as that amount is paid into the account. The phone bill is a debit, so that amount is subtracted from the balance.

18 Tables and Timetables

Distance Tables:

Aberdeen			
490	Cambridge		
355	149	Leeds	
667	343	371	Truro

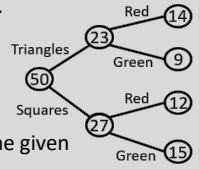
A distance table shows the distance between two places.

To find the distance between Aberdeen and Leeds follow the arrows to where their row and column intersect to find the distance.

19 Frequency Trees

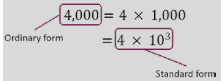
A frequency tree is made up from part-whole models. One piece of information leads to another.

For example: There are 50 plastic triangles and squares in a bag. All of the shapes are red or green.
There are 23 triangles.
12 of the squares are red.
There are 24 green shapes.
To use this information to complete the frequency tree, start by filling in the given information and then fill in the gaps!



19 Standard Form

Writing large numbers in standard form.



Adding numbers in standard form.

For example:

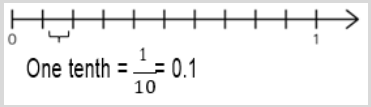
$$3 \times 10^4 + 4 \times 10^4$$
$$= 30{,}000 + 40{,}000$$
$$= 70{,}000$$
$$= 7 \times 10^4$$

Year 7 Key Stage 3 Knowledge Organiser Fraction, decimal and percentage equivalence.

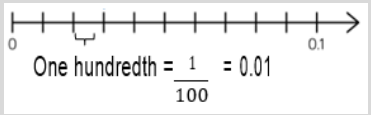
Key Vocabulary:

1	Fraction	A number that compares equal parts of a whole. Each part of the whole is a fraction.
2	Numerator	The top number in a fraction. This tells us how many of the equal parts are required.
3	Denominator	The bottom number in a fraction. It tells us how many equal parts the whole has been split into.
4	Per cent	Parts per hundred
5	Equivalent	Equal in value. E.g. 2+5 is equivalent to 4+1
6	Quotient	The result of a division.
7	Convert	To change from one form to another. E.g. to convert from a fraction to a percentage.
8	Pie chart	A graph in which a circle is divided into sectors that each represent a proportion of the whole.
9	Sector	A part of a circle formed by two radii and a fraction of the circumference.

10 Tenths and hundredths on a number line

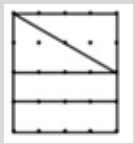


One whole split into 10 equal parts



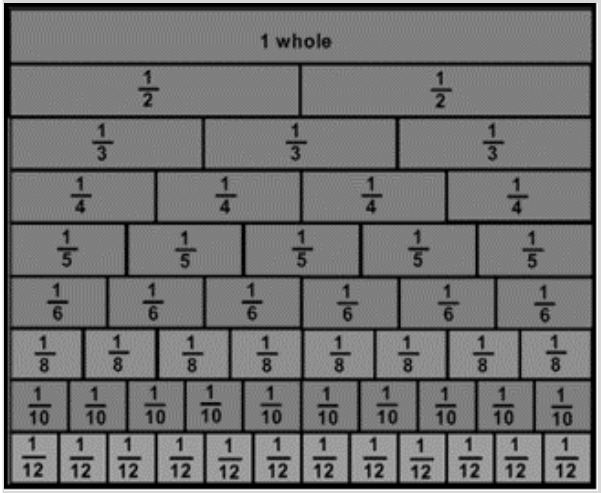
One whole split into 100 equal parts

11 Fractions on a diagram



The denominator is represented by equally sized parts – this shape is split into quarters

12 Equivalent Fractions



For Example

$$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{5}{10}$$

13 Fractions on a number line

One whole split into 18 equal parts.
18 is the denominator

This point is the 6th part.
6 is the numerator

$$\frac{6}{18} = \frac{3}{9} = \frac{1}{3}$$

14 Convert fractions. Decimals and Percentages

$\frac{70}{100}$ → This also means 70÷100 → 70 hundredths = 70%

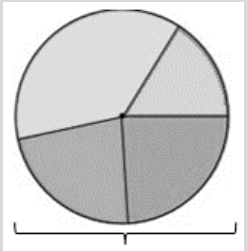
Using a calculator

■/□ → S⇔D *Convert to decimal*

This will give you the answer in the simplest form

X 10 converts to percentage

15 Simple Pie Charts



Split into 10 parts
10% = 36 °

Split into 2 parts
50% = 180 °

Split into 5 parts
20% = 72 °

A pie chart has 360° so all FDP calculations are out of 360.

Year 7 - Spring Term Knowledge Organiser - Solving Problems with Multiplication and Division

Key Vocabulary:

1	Multiply	The result of multiplying a number by an integer. The times tables of a number
2	Product	The result of a multiplication calculation.
3	Multiples:	Found by multiplying any number by positive integers
4	Factor	Integers that multiply together to get another number.
5	Quotient	The result of a division
6	Divisor	The number we divide by
7	Mean	The average of the all values, whereby all of the values are added together and then divided by the number of values.
8	Equivalent	Something that is essentially the same or equal to something else

9 Factors

A number that divides exactly into another number without a remainder. It is useful to write factors in pairs

Factors of 10
1, 2, 5, 10

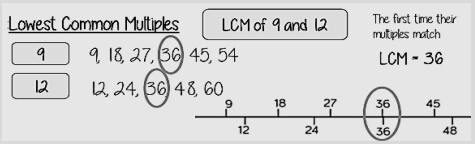
The number itself is always a factor

Factors of 4
1, 2, 4

Factors of 36
1, 2, 3, 4, 6, 9, 12, 18, 36

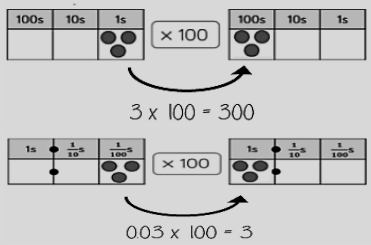
10 Multiples

The result of multiplying a number by an integer. The times tables of a number



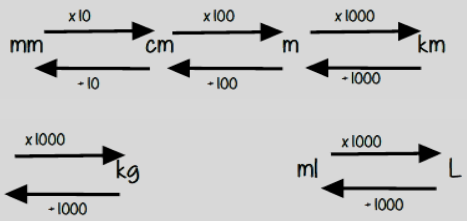
11 Multiply and divide integers and decimals by powers of 10

A number that divides exactly into another number without a remainder. It is useful to write factors in pairs



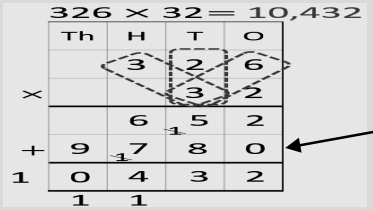
12 Convert metric units

When we convert from big unit to small unit we multiply and if we convert from small unit to big unit we divide.



13 Use formal methods to multiply integers

Long multiplication column



Make the unit 0 then carry on multiplying

14 Use formal methods to multiply decimals

Multiply 0.03 by 1.1= 0.033

Multiply 0.03 by 1.1= 0.033

the answer should have the same number of decimal places as are in both the numbers you are multiplying.

Multiply without decimal points: 3 × 11 = 33

0.03 has 2 decimal places, and 1.1 has 1 decimal place, so the answer has 3 decimal places: 0.033

15 Use formal methods to divide integers and decimals.

3584 ÷ 7 = 512

Short division

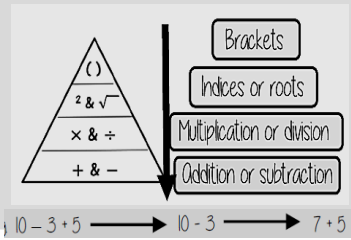
Division with decimals

The placeholder in division methods is essential –the decimal lines up on the dividend and the quotient

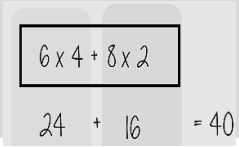
24 ÷ 0.02 → 24 ÷ 0.2 → 240 ÷2

All give the same solution as represent the same proportion .Multiply the values in proportion until the divisor becomes an integer.

16 Order of operations



Break down the calculation using the order of operations.



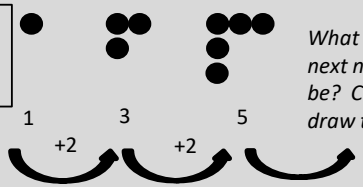
Year 7 - Sequences - Knowledge Organiser- Autumn Term

Key Vocabulary:

1	Sequence	A number or picture pattern with a specific rule.
2	Pattern	A systematic arrangement of numbers, shapes or other elements according to a rule
3	Term:	Each value in a sequence is called a term.
4	Linear / arithmetic sequence	Increase by addition or subtractions and the same amount each time. Produces a straight line when represented as a graph
5	Non-linear sequence	Do not increase by a constant amount – quadratic, geometric and Fibonacci. - Do not plot as straight lines on a graph. - The differences between terms can be found by addition, subtraction, multiplication ordivision.
6	Numerical	Written or shown as numbers.
7	Arithmetic sequence	A sequence that increases or decreases by the same number between each term.
8	Difference	The common difference of an arithmetic sequence is the difference between two consecutive terms.
9	Graphical	Represented as a graph.

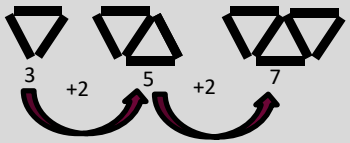
8 Describe and continue a sequence given diagrammatically.

Count the number of circles or lines in each image



What will the next number be? Can you draw this?

9 Predict and check the next term(s) of a sequence

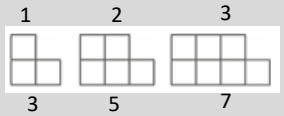


Predictions:
Look at your pattern and consider how it will increase.

E.g.: How many lines in pattern 6?
Prediction – 13
If it is increasing by 2 each time – in 3 patterns there will be 6 more lines.

10 Represent sequences in tabular and graphical forms

Position the place in the sequence



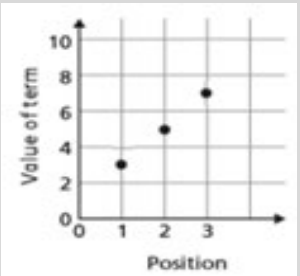
"The term in position 3 has 7 squares."

In a table:

Position	1	2	3
Term	3	5	7

+2 +2

Graphically:

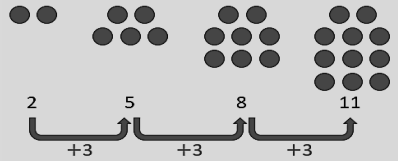


Because the terms increase by the same addition each time this is linear – as seen in the graph

11 Recognise the difference between linear and non-linear sequences..

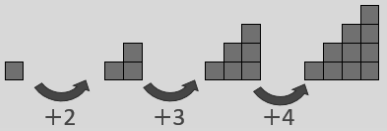
A linear sequence has a constant difference between each term.

Example:



A non linear sequence has not a constant difference between each term.

Example:



12 Continue non-linear sequences

1, 2, 4, 8, 16…

How do I know this is a non-linear sequence?
It <u>increases by multiplying</u> the previous term by <u>2</u> – this is a geometric sequence because the constant is <u>multiply by 2.</u>

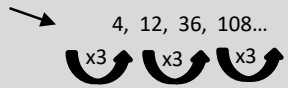
You need at least 4 terms to find the constant

How do I continue the sequence?
You continue to repeat the same difference through the next positions in the sequence.

13 Explain the term-to-term rule

Try to explain this in full sentences, not just with mathematical notation.
Use key maths language – doubles, halves, multiply by two, add four to the previous term etc.

Must say which number the sequence begins with



The next term is found by tripling the previous term. The sequence begins at 4

Year 7 Mathematics Knowledge Organiser – Algebraic Notation

Key Vocabulary:

1	Operation	A mathematical process. The most common operations are add, subtract, multiply and divide (+, −, ×, ÷) but there are many more, such as square, square root, etc.
2	Inverse Operation	The operation that reverses the effect of another operation. Addition and subtraction are inverse operations. Multiplication and division are inverse operations.
3	Commutative	A calculation is commutative when we get the same answer no matter which order we put the numbers in. Addition and multiplication are commutative.
4	Expression	Numbers, symbols and operators (such as + and ×) grouped together that show the value of something.
5	Variable	A symbol for a value we do not know yet, usually a letter like x or y (but can be others). A variable could be a single value or it could have many values.
6	Substitute	To replace letters with numerical values.
7	Evaluate	To calculate the numerical value of something.

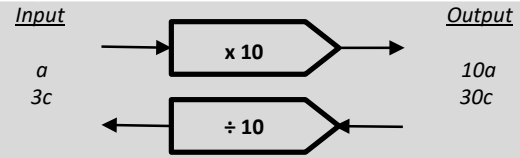
8 Single Function Machines

We can use function machines to find the input and/or the output, using **inverse operations**.

9 Using Letters to Represent Numbers

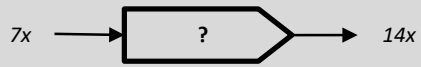
- Addition and multiplication can be done in any order; these are **commutative** calculations, for example:
  5 + 5 + 5
  3 x 5
  5 x 3
- We can represent 4 lots of y in the following ways:
  y + y + y + y
  y x 4
  4 x y
  4y
- We can represent 20 shared into h number of groups:
  20 ÷ h
  $\frac{20}{h}$

10 Single Function Machines (Algebra)



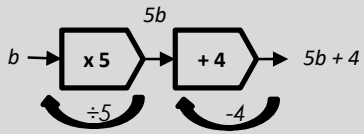
11 Finding Functions from Expressions

We can use function machines to find the relationship between the input and output.
Sometimes there could be a number of possible functions…



…possible functions could be + 7x or x 2!

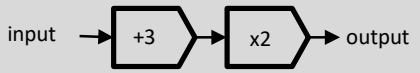
12 Two Step Function Machines



13 Substituting into Expressions

If y = 7…
4y means 4 lots of y, so the expression is asking for 4 lots of 7
4 x 7 OR 7 + 7 + 7 + 7 OR 7 x 4 = 28
y – 2 means y subtract 2, so 7 – 2 = 5

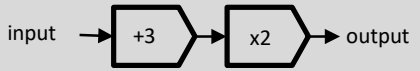
If x = 10…
2(x+3) means take the input, add 3, then multiply by 2



10 + 3 = 13 13 x 2 = 26

14 Representing Functions Graphically

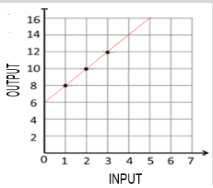
Using the function *2(x + 3)*



To represent graphically, the input becomes x coordinates and the output becomes y coordinates.
y = 2(x + 3)

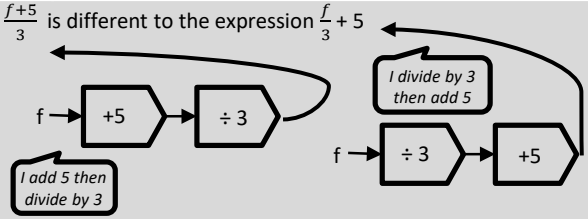
INPUT (x)	1	2	3
OUTPUT (y)	8	10	12

This becomes a coordinate pair.



15 Finding Functions from Expressions

$\frac{f+5}{3}$ is different to the expression $\frac{f}{3} + 5$



Sometimes it helps to explain the expression in words first!

16 Forming a Sequence

The term that we want to find in the sequence is the input value.
The answer we get when we substitute the input value gives us the output values, which become our sequence.

INPUT	1	2	3
OUTPUT	8	10	12

This is the sequence.

Year 7 - Summer Term Knowledge Organiser - Solving Problems with Multiplication and Division

Key Vocabulary:

1	Multiply	The result of multiplying a number by an integer. The times tables of a number
2	Product	The result of a multiplication calculation.
3	Multiples:	Found by multiplying any number by positive integers
4	Factor	Integers that multiply together to get another number.
5	Quotient	The result of a division
6	Divisor	The number we divide by
7	Mean	The average of the all values, whereby all of the values are added together and then divided by the number of values.
8	Equivalent	Something that is essentially the same or equal to something else

9 Factors

A number that divides exactly into another number without a remainder. It is useful to write factors in pairs

Factors of 10
1, 2, 5, 10

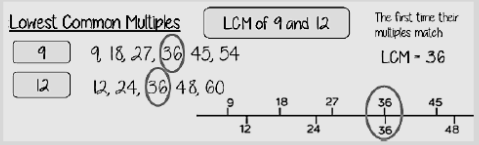
The number itself is always a factor

Factors of 4
1, 2, 4

Factors of 36
1, 2, 3, 4, 6, 9, 12, 18, 36

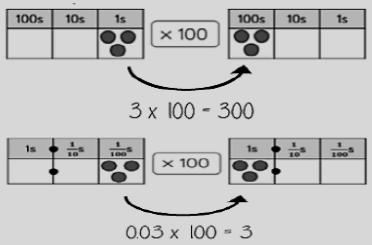
10 Multiples

The result of multiplying a number by an integer. The times tables of a number



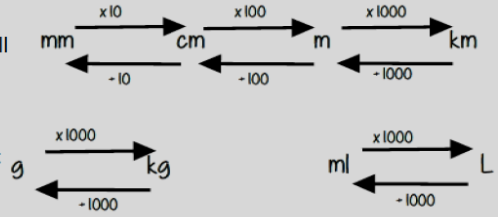
11 Multiply and divide integers and decimals by powers of 10

A number that divides exactly into another number without a remainder. It is useful to write factors in pairs



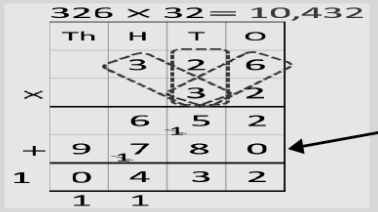
12 Convert metric units

When we convert from big unit to small unit we multiply and if we convert from small unit to big unit we divide.



13 Use formal methods to multiply integers

Long multiplication column



Make the unit 0 then carry on multiplying

14 Use formal methods to multiply decimals

Multiply 0.03 by 1.1= 0.033

Multiply 0.03 by 1.1= 0.033

the answer should have the same number of decimal places as are in both the numbers you are multiplying.

Multiply without decimal points: 3 × 11 = 33

0.03 has 2 decimal places, and 1.1 has 1 decimal place, so the answer has 3 decimal places: 0.033

15 Use formal methods to divide integers and decimals.

3584 ÷ 7 = 512

Short division

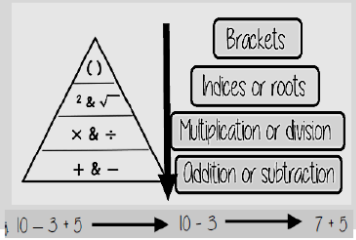
Division with decimals

The placeholder in division methods is essential –the decimal lines up on the dividend and the quotient

24 ÷ 0.02 → 24 ÷ 0.2 → 240 ÷ 2

All give the same solution as represent the same proportion .Multiply the values in proportion until the divisor becomes an integer.

16 Order of operations



Break down the calculation using the order of operations.