

Area of study

Your child will ... (Knowledge)

Your child will be able to... (Skills)

## Autumn Term

Properties of number

- Revisit the vocabulary of factors, multiples, product, reciprocal etc
- Apply knowledge of how to find highest common factor and lowest common multiple to larger numbers and look at alternative methods for calculating.
- Investigate that any number can be written as a unique product of prime factors
- Use the product of prime factors
- Advance understanding of indices, starting with squares and cubes and progressing to look at higher powers and their associated roots
- Understand the connection between negative powers and reciprocals
- Relate knowledge of indices to help learn index rules relating to multiplying and dividing
- Recognising equivalence in indices

- Calculate the highest common factor and lowest common multiple of a number using the product of prime factors where appropriate
- Apply the laws of indices to numbers with the same base
- Start to investigate problems involving more than 2 numbers and how to identify the highest common factor and lowest common multiple

Properties of shape

- Revisit the different types of triangles, including their names and properties
- Know what key terms like horizontal, vertical, parallel, perpendicular, similar and congruent mean
- Know the total of the interior angles in triangles and quadrilaterals, and use this to find missing angles. Learn to calculate interior and exterior angles of polygons.
- Know the names of a variety of different types of quadrilaterals and other polygons
- recognise properties of shape that provide reflective and rotational symmetry
- Learn about right angled triangles and how to calculate missing lengths using Pythagoras's theorem

- Learn to use properties of parallel and intersecting lines to find missing angles (angles about a point, angles on a straight line, vertically opposite angles)
- Work with polygons to calculate the total of their interior angles
- Begin to understand interior and exterior angles in regular polygons
- Apply Pythagoras to problems to calculate the hypotenuse and shorter sides as well as worded questions
- Start to look at the use of trigonometry and how to apply SOH, CAH, TOA

## Area of study

## Your child will ... (Knowledge)

## Your child will be able to... (Skills)

### Autumn Term

Fractions, Decimals and percentages

- Recognise when a fraction has been simplified fully by cancelling
- Convert between mixed numbers and improper fractions
- Multiply fractions by both integers, proper and improper fractions
- Recognise that dividing fractions is the same as multiplying by the reciprocal
- Define percentage as a number of parts per hundred
- Express one quantity as a percentage of another
- Revisit percentages of amounts and look at calculating percentage change and reverse percentages
- Revisit converting between fractions, decimals and percentages
- Apply knowledge of multiplying and dividing to decimals and link to work on place value
- Key language to include reciprocal, interest, depreciation

- Learn to put fractions in order from largest to smallest
- Calculate a fraction of an integer
- Be able to find a percentage of a total amount including with percentages greater than 100%
- Solve problems involving percentages including percentage change and reverse percentages
- 
- 

Probability

- Know that probabilities are ordered from 0 to 1
- Use the language of probability, using terms including randomness, fairness, equally and unequally likely and assigning these approximate values
- Know the probability of a single, simple event, as a fraction or decimal
- Start to discuss the concept of bias and how this can affect results
- List all outcomes of two independent events, and use this to find the probability of a particular pair of events occurring including the use of sample space diagrams
- Begin to be able to recognise when events are mutually exclusive
- 

- Use the fact that probabilities for all outcomes add to 1 to find missing probabilities
- To be able to calculate the probability of two independent events occurring
- Select appropriate diagrams to assist in calculating probabilities and start to use frequency trees with integers and tree diagrams with both fractions and decimals
- 
- 

### Spring Term

Algebra

- Revisit simplifying expressions
- Explore calculations with letters and numbers to including multiplying and dividing and understand how these can be written algebraically
- Introduce the use of brackets and that these represent multiplication
- Look at the differences between two sets of linear expressions being added and a quadratic expression
- Investigate factorising as the inverse of expanding. Linking to the term factor as we are finding common factors within terms
- Recognise that numerical values can be substituted into equations and formula to find solutions
- 
- 

- Expand single brackets
- Expand double brackets
- Factorise linear expressions
- Substitute values into equations and formula including key formula used in other subjects such as science
- Apply our knowledge of equations to look at how to change the subject by rearranging

Area of study

Your child will ... (Knowledge)

Your child will be able to... (Skills)

## Spring Term

Place value and calculations

- Use understanding of place value to multiply and divide integers and decimals by 10, 100, 1000
- Recall of work on negative numbers and the ordering of negative values to include decimals
- Use place value to make approximations
- Use understanding of place value to multiply and divide integers and decimals by 0.1, 0.01, 0.001 and explain the effect
- Revisit rules of rounding with nearest 100, 10, integer
- Understand the vocabulary of significant figures and identifying which numbers are most significant within integers and decimals
- 
- 

- Round decimal numbers to the nearest decimal place
- Round integers and decimals to a stated number of significant figures
- Apply knowledge of rounding to calculating the bounds of numbers

Graphs

- Revisit the plotting of linear graphs and extend with the use of plotting on a calculator. Check understanding of  $y =$  and  $x =$  graphs
- Substitute values into linear and quadratic expressions and see how these can be used to then draw the graph
- Understand that gradient represents the steepness of the graph and can be calculated by determining the difference in  $y$  values for an increase of one in  $x$
- Use a table of values to construct quadratic graphs
- Plot more than one graph on the same set of axes and investigate the relationship between the points of intersection
- Start to recognise graphs of different functions such as exponential and reciprocal

- Plot linear graphs of the form  $y=mx+c$
- Recognise and calculate the  $y$  intercept within linear graphs
- Recognise and calculate the gradient of linear graphs
- Recognise and sketch quadratic graphs including starting to identify key values including roots and points of intersection
- Start to use graphs to estimate solutions to simultaneous equations
-

## Area of study

## Your child will ... (Knowledge)

## Your child will be able to... (Skills)

### Spring Term

#### Sequences

- Recognise how to continue sequences and fill in gaps in sequences - including arithmetic, geometric and Fibonacci style sequences
- Identify patterns in sequences as a more efficient method to determine whether larger values are a term of the sequence or not
- Generate sequences from term to term rules
- Be familiar with the use of  $n$  as a variable to denote the position of a term in a sequence
- Generate sequences from position to term rules

- Find the  $n$ th term of a linear sequence
- Use the  $n$ th term to find a specific term later in the sequence
- Recognise that  $n$  must be an integer. Begin to use this to determine whether a particular value is a term in a sequence
- Continue quadratic sequences

### Summer Term

#### Ratio and proportion

- - Convert worded expressions to ratios using  $:$  notation
  - Simplify ratios, and know whether a ratio is fully simplified
  - Share amounts into a ratio using bar models
  - Revisit converting a ratio to the form  $1:n$
  - Recognise the relationship between ratios and fractions and how to convert between the two
  - Use the lowest common multiple where needing to compare two or more different sets of ratios to one another
  - Understand what proportional means
  - Recognise whether something is directly proportional or inversely proportional
  - Link proportional relationships to graphical representations and use graphs to solve direct proportion problems

- Start to solve problems with ratios, including
  - Finding totals from one part of the ratio
  - Finding totals from differences between parts of a ratio
- Use unitary method to solve direct proportion questions
- Solve problems that relate ratio to other areas of maths
- Determine the best value between different prices and amounts of products

Area of study

Your child will ... (Knowledge)

Your child will be able to... (Skills)

## Summer Term

Averages

- Revisit how to calculate the mean, median and mode of data
- Have some knowledge of the advantages and disadvantages of each type of average
- Revisit how to calculate the range
- Understand that the range is a measure of spread, not an average
- Can calculate all averages from a frequency table
- Some understanding of how to compare two data sets using averages and the range
- Recognise that not all data will follow general trends and describe outliers
- 

- Can estimate the mean from a grouped frequency table
- Can find missing values from lists of data given averages and the range
- Can begin to calculate averages of decimals, fractions and algebraic terms
- Can draw a cumulative frequency graph
- Knows how to find quartiles from data
- 
- 

Collecting and representing data

- - Able to effectively read tables of data
  - Construct simple graphs, such as pictograms and bar charts
  - Organise data using tally charts
  - Organise data by putting it into frequency tables, including when appropriate to use data in grouped tables
  - Recognise the difference between discrete and continuous data
  -
- 

- Can construct line graphs
- Can draw a scatter graph
- Can calculate angles for pie charts
- Can construct and read pictograms
- Can complete and read stem and leaf diagrams
- Some students may move on to other graphs and charts for representing data
- 
-