

## What are we learning about?

In this term we will be increasing our number skills and working and learning about how to write large and small numbers in a standard way. We will increase our knowledge of percentages and learn about different types of interest. We will also look at working backwards with percentages. We will also look at what the biggest and smallest a number could be.



## How does this build on the SKILLS I already have?

You are already able to select and use appropriate calculation strategies to solve some complex problems. You are able to move freely between fractions, decimals and percentages and apply this to different situations. You started to interpret when the structure of a numerical problem requires additive or multiplicative reasoning.



## Stage 9 Term 1a: Number

### Why are we learning about it?

It is important to have the confidence and skill to use numbers and mathematical approaches in all aspects of life. We use numbers every day in all areas of our lives. Our confidence and ability with numbers impacts us financially, socially, and professionally. It even affects our health and wellbeing.



### What new SKILLS will I develop?

You will develop your skills to select and use appropriate calculation strategies to solve complex problems. You will also start to interpret when the structure of a numerical problem requires additive or multiplicative reasoning. You will develop your use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics



### What new KNOWLEDGE will I gain?

You will learn how to convert between ordinary and standard form and why we use standard form. We will learn the difference between simple and compound interest and solve problems involving these and repeated change. You will also be able to work out what number you started with after a percentage change given the answer. You will also learn that every number has an error range and how to write this.



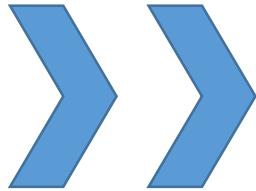
### How does this build on the KNOWLEDGE I already have?

You learnt how to increase an amount by a percentage using a multiplier is a more efficient method. You will also learn how to work out the original amount before a percentage change. You learnt how to round using decimal places, significant figures, nearest 10, 100, 1000, etc and estimate calculations. You will also know how to multiply and divide by 10, 100, 1000, ...

## Stage 9 Term 1b: Number and Algebra

What are we learning about?

In this term we will be studying more advanced skills on Algebra techniques that involve linear and quadratic algebraic techniques.



How does this build on the **SKILLS** I already have?

You can already substitute values in expressions, rearrange and simplify expressions, and solve equations.



Why are we learning about it?

Learning **algebra** helps to develop your critical thinking skills. That includes problem solving, logic, patterns, and reasoning. You **need** to know **algebra** for many professions, especially those in science and maths. ... When you solve that equation, you have **algebra** to thank!



What new **KNOWLEDGE** will I gain?

We will learn how to solve a quadratic equation by factorising. We will also increase our knowledge on solving linear equations that include fractions and learn how to solve inequalities. We will also learn how to solve two equations at once by using graphs and algebra.



What new **SKILLS** will I develop?

You will be able to make connections between number relationships, and their algebraic and graphical representations.



How does this build on the **KNOWLEDGE** I already have?

We know how to form and solve linear equations already and we know how to substitute into expressions. We have used inequalities to compare the size of different numbers.

## What are we learning about?

In this term we will learn to use more advanced techniques with some of the topics we have met before including Venn diagrams. We will also learn how to present and calculate the probability of 2 or more events.



## How does this build on the SKILLS I already have?

You reasoned mathematically by exploring what can and cannot be inferred in statistical and probabilistic settings, and began to express your arguments formally. You started to use language and properties precisely to analyse probability and statistics.



## Stage 9 Term 2a: Statistics and Probability

### Why are we learning about it?

**Statistics** is the science and, arguably, also the art of **learning** from data. As a subject it is concerned with the collection, analysis, and interpretation of data, as well as the effective communication and presentation of results relying on data. Probability is vitally important so that we can understand the chance of nature and the relative risk.



## What new KNOWLEDGE will I gain?

We will learn the different symbols used for Venn diagrams and how to calculate probability from a Venn diagram. We will also look at how to complete a Venn diagram given some facts. We will see how you can present and calculate the probability when two or more events happen together. We will look at how you can work out an estimate of numbers for a population by only taking and using a sample.



### What new SKILLS will I develop?

You will explore what can and cannot be inferred in statistical and probabilistic settings, and to express your arguments formally. You will regularly use language and properties precisely to analyse probability and statistics. You will model situations mathematically and express the results using a range of formal mathematical representations.



## How does this build on the KNOWLEDGE I already have?

We learnt how to calculate probability from previous events and also when two events happen together. We have also met Venn diagrams previously to sort types of numbers or shapes. We have also covered drawing and reading from line graphs before.

## What are we learning about?

You will learn how to draw constructions to scale & use constructions to plot loci and find places on a diagram that satisfy a set of loci. You will also learn how to solve multistage problems involving perimeter and area of circles and parts of circles. We will also look at what makes shapes congruent or similar. Finally, we will learn about how we can use and apply Pythagoras Theorem.



## TOPIC: Stage 9 2b

### Geometry & measures

#### Why are we learning about it?

The study of **shapes and space** is called “Geometry”. This word comes from the ancient Greek and means “measuring the Earth”. ... At school you start learning about simple **shapes**, like triangles, quadrilaterals and circles, and the way they relate to each other and the **space** in and around them.

The knowledge and skills that are gained throughout this topic will help us to solve a range of real life problems.



#### How does this build on the SKILLS I already have?

You have used language and properties to look at 2-D and 3-D shapes.

You started to develop your mathematical knowledge, in part through solving simple problems.



#### What new SKILLS will I develop?

You will use language and properties precisely to analyse 2-D and 3-D shapes and angles.

You will develop and use your mathematical knowledge to solve problems and evaluating the outcomes, including multi-step problems. You will start to reason deductively in geometry, number and algebra, including using geometrical constructions.



#### What new KNOWLEDGE will I gain?

You will learn how to draw different types of constructions and loci and find places on a diagram that satisfy a set of loci. You will also learn how to solve multistage problems involving perimeter and area of circles and parts of circles joined to other shapes. We will also learn about the conditions that make shapes congruent or similar. Finally, we will learn about how we can use and apply Pythagoras Theorem to problems in working out missing lengths.



#### How does this build on the KNOWLEDGE I already have?

You learnt how to calculate the circumference & area of circles and parts of circles. You know how to work out the volume of other prisms and the surface area of triangular prisms. You learnt how to draw and use scale diagrams and use bearings to plot and find places on a diagram in relation to other places.

## What are we learning about?

You will learn about how to recognise the difference between the two types of proportion – direct and inverse proportion.

You will learn about how to calculate the average speed for a many stage journey. You will also be learning about density and how to calculate the density after different liquids are mixed.

You will learn how to solve problems that involve side lengths and angles in right angled triangles using a calculator and using exact values.

## How does this build on the SKILLS I already have?

You were able to select and use appropriate calculation strategies to solve complex problems. You extended and formalised your knowledge of ratio and proportion in working with measures and geometry. You were able to interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning. You were able to develop your mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems.



## TOPIC: Stage 9 3a

### Ratio, rate and proportion

#### Why are we learning about it?

**Ratios** are used to compare values. They tell us how much of one thing there is compared to another. For example, **ratios** can be used to compare the number of girl puppies to boy puppies that were born.

A **proportion** is simply a statement that two ratios are equal. **Ratios** allow us to measure and express quantities by making them easier to understand. You will learn about different methods to solve everyday proportion problems.



#### What new KNOWLEDGE will I gain?

You will learn how to solve number problems that involve direct and inverse proportion and be able to work out if two variables are connected by direct or inverse proportion.

You will learn how to solve complicated multistage problems on speed, density and pressure. Using trigonometry, you will be able to calculate side lengths and angles in right angled triangles. You will also know that certain angles have exact values and you will be able to recall how these are worked out.



## How does this build on the KNOWLEDGE I already have?

You learnt how to solve a range of multistage problems that involve sharing in a ratio. The problems related to other areas of Maths and everyday life.

You also learnt how to use proportion to solve problems involving best buy, converting currencies, changing recipes and calculating speed.

## What are we learning about?

You will learn to be able to work out the gradient and intercept from an equation, that may need rearranging.

You will also learn to plot graphs of linear using gradient and the intercept from the equation. You will learn how to write formula for everyday life linear graphs.

You will also learn to draw more complicated quadratic graphs and the key features of a quadratic graph.

You will also learn how to calculate with vectors and what this calculation looks like as a diagram.

## How does this build on the SKILLS I already have?

You learnt how to move between different numerical, algebraic, graphical and diagrammatic representations.

You extended your understanding of the number system; make connections between number relationships, and their algebraic and graphical representations.

## TOPIC: Stage 9 3b

### Algebra: Graphs

#### Why are we learning about it?

Learning about graphs will help you spot patterns in other areas in everyday life and will mean you can start to predict what will come or happen next.

Lots of everyday relationships can be represented by a linear, quadratic, cubic or reciprocal graph.



#### What new KNOWLEDGE will I gain?

You will be able to work out the gradient and intercept from an equation, that may need rearranging first into the form  $y =$ .

You will learn about the turning point and roots of a quadratic graph.

You will also be able to draw cubic and reciprocal graphs.

You will also learn how to draw a vector, calculate with vectors and use appropriate notation.



## How does this build on the SKILLS I already have?



#### What new SKILLS will I develop?

You will develop algebraic and graphical fluency, including understanding linear and simple quadratic functions. You will identify variables and express relations between variables algebraically and graphically. You will begin to model situations mathematically and express the results using a range of formal mathematical representations.



## How does this build on the KNOWLEDGE I already have?

You learnt how to work out the relationship between the position of a term in a sequence and its value. You also saw how sequences are linked to linear graphs given in the form  $y = 2x + 1$ . You also learnt how to plot quadratic graphs.

You used column vectors to translate a shape and describe a movement.