National Numeracy Progression Framework

This resource has been produced to support staff to have deeper understanding of progression within the experiences and outcomes. It identifies within each organiser the key milestones and building blocks that learners should know before moving on to the next stage of learning. Numeracy organisers are not learnt and taught in isolation from each other and knowledge in one organiser may be required to progress in other organisers.

This resource is going to be released in stages to allow for full engagement by staff with each stage allowing staff to build a deep knowledge and understanding of progression in numeracy. This first stage shows the progression milestones and building blocks in the numeracy experiences and outcomes. Later stages will have key milestones and building block in mathematics, exemplification of building blocks showing good practice in these areas, previous knowledge required from other organisers, connections between the organisers and to support staff to identify which building blocks identified learners within their class are having difficulty with.

The full resource will support staff understand progression in numeracy, to plan confidently the next stage for learners, identify where there are gaps in learners knowledge and understanding, exemplify good learning and teaching activities and provide research on progression with in different organisers. It will allow staff to plan learning suited to the needs of the learner and ensure that the learner has the knowledge and understanding required to tackle the next stage of learning.

Staffs are invited to engage in career long professional learning activities using the suggested activities provided on the key milestones and building blocks. These activities will promote professional dialogue about progression in numeracy and challenge some pre-existing concept about progression.
Estimation and rounding

Awareness of size and amount
Concept of estimation
Concept of rounding
Accuracy within rounding
Tolerance
Estimation and rounding

Awareness of size and amount

Why is it important?

Comparing size and amount supports the development of appropriate language relating to quantities. This also supports an understanding of where numbers sit on a number line.
Estimation and rounding

Awareness of size and amount

- Comparing different sizes and amounts (quantities) using appropriate vocabulary to describe them in relation to each other.

Why is it important?

Comparing size and amount supports the development of appropriate language relating to quantities. This also supports an understanding of where numbers sit on a number line.
Estimation and rounding

Concept of estimation

Why is it important?
Early estimation skills allow for more refined comparisons and for approximations to be made. Estimating is the interpretation of relative size and quantities.
Estimation and rounding

Concept of estimation

As this skill becomes more refined, learners will be able to predict solutions and check the accuracy of calculations.

Why is it important?

Early estimation skills allow for more refined comparisons and for approximations to be made. Estimating is the interpretation of relative size and quantities.
Estimation and rounding

Concept of rounding

Why is it important?

The ability to round supports the development of mental agility. It also allows for quick estimations to be made in calculations and to check the reasonableness of a solution.
Estimation and rounding

**Concept of rounding**

The concept of rounding is the application of understanding of place value and knowing what is the most appropriate whole number (or decimal fraction) to round it to, within a given context.

The ability to round supports the development of mental agility. It also allows for quick estimations to be made in calculations and to check the reasonableness of a solution.
Estimation and rounding

Accuracy within rounding

Why is it important?
Rounding accurately is an essential component of determining the reasonableness of a solution. In different contexts there will be different degrees of accuracy required.

Accuracy with rounding
Estimation and rounding

Accuracy within rounding

As this skill becomes more refined, learners will be able to predict solutions and check the accuracy of calculations.

Why is it important?

Rounding accurately is an essential component of determining the reasonableness of a solution. In different contexts, there will be different degrees of accuracy required.

As this skill becomes more refined, learners will be able to predict solutions and check the accuracy of calculations.
Estimation and rounding

Tolerance

Why is it important?
To understand that there are acceptable degrees of accuracy required in calculations, including with measurement and real-life contexts.
Estimation and rounding

Tolerance

Tolerance intervals are the differences between the greatest and least acceptable values of the measurement. Tolerance is the maximum range of variation allowed within particular situations and contexts and supports the understanding of inaccuracy.

Why is it important?
To understand that there are acceptable degrees of accuracy required in calculations, including with measurement and real-life contexts.
Number and number processes
Number and number processes

Awareness of number

Why is it important?

Numbers are all around us and they are used in many different ways. Developing an understanding of numbers and their role in the description of quantities is fundamental to forming the connections needed to describe a group of objects. To be confident and comfortable with numbers, it is necessary to understand how the number system works and how numbers relate to each other. It is important to understand numbers can be classified into sets called number systems e.g. natural numbers and real numbers. All numbers can be expressed using the digits; 0,1,2,3,4,5,6,7,8 and 9.
Areaware of number

Why is it important?
Numbers are used in many different contexts of numbers and their role is fundamental to forming the description of a group of objects. To be confident and comfortable with numbers, it is necessary to understand how numbers relate to each other.

Numbers can be classified into sets of natural numbers and real numbers. All the digits; 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9.

Awareness of numbers
Learners need to have an awareness of what numbers are through understanding and application of:
• the meaning of numbers
• the relationship between numbers
• comparison and contrast between the relative size (magnitude of numbers).
Number and number processes

Numerals

Why is it important?
Developing an understanding that we have both words and symbols for all the numbers we use needs to be understood. This ensures the ability to count accurately and understand one to one correspondence.
Number and number processes

Numerals
A numeral is a symbol that represents a number. The move from the real object to the symbols of numbers is one of the first and most abstract concept that learners meet. Digits make up numbers.
Number and number processes

Counting

Why is it important?
Develop the ability to count with understanding of one to one correspondence is crucial to develop future ability to carry out the four operations quickly and efficiently.
Number and number processes

**Counting**

Counting is more than reciting numbers in order. It involves understanding of the number system and being able to apply this knowledge. Using a one-to-one correspondence to link numbers to their amounts or quantities enables the development of counting with understanding. Zero should be included when learning about numbers, to build understanding for future work in developing understanding of place value and decimal fractions.

**Why is it important?**

Develop the ability to count with understanding of one to one correspondence is crucial to develop future ability to carry out the four operations quickly and efficiently.

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Number and number processes

**Counting**

Why is it important?
Developing counting skills is crucial as it is one of the fundamental skills required to carry out the four operations quickly and efficiently. Counting forwards and backwards is also essential as it helps learners understand the importance of zero.

The importance of zero
Learners should be confident in counting from zero and understanding the importance of zero as a quantity and numeral digit used to represent that number (0). Learners should also understand the value of zero.

One-to-one correspondence
Learners should have a clear understanding of the concept of one-to-one correspondence to develop their counting skills.

Mental agility
Developing mental agility is essential to be able to carry out calculations quickly and efficiently.

Counting quantities
Understanding the concept of counting quantities and how they relate to the four operations is crucial.

Applying across contexts
Learners should be able to apply their counting skills across different contexts to ensure they can carry out calculations accurately.

Numerals
Learning the numerals is essential to be able to read and write numbers correctly.

Order of operations
Understanding the order of operations is crucial to perform calculations accurately.

Place value
Understanding place value is essential to carry out calculations involving negative numbers and decimals.

Add/Subtract
Understanding addition and subtraction is crucial to carry out calculations accurately.

Negative numbers
Learners should be able to add and subtract negative numbers accurately.

Multiplying/Dividing
Understanding multiplication and division is essential to carry out calculations accurately.

Fractions, decimals, and percentages
Learners should be able to add, subtract, multiply, and divide fractions, decimals, and percentages accurately.

Language
Understanding the language of mathematics is essential to be able to read and write mathematical expressions clearly.
Number and number processes

Counting

Why is it important?
Develop the ability to count with understanding of one to one correspondence is crucial to develop future ability to carry out the four operations quickly and efficiently.

One-to-one correspondence
Learners need to understand that each object must be counted only once and as the number name is identified by the learner.

Counting
The importance of zero
One-to-one correspondence
Developing counting skills
Language
Counting forwards and backwards
Developing counting skills

When counting a group of items, and then re-counting the same group starting with a different item, the total remains unchanged. This concept is the conservation of number—the arrangement of a group of items does not affect the total. The last number said in a count indicates how many items there are in a group; it does not describe the last item counted. As counting develops, within a known range of numbers and beyond, other techniques can be learned e.g. counting in jumps e.g. 2,4,6,8 or 5,10,15,20 etc.
Number and number processes

Counting

Why is it important?

Develop the ability to count with understanding of one to one correspondence, is crucial to develop future ability to carry out the four operations quickly and efficiently.

Language

Language should be developed in order to compare size and quantity.

Developing counting skills

Language

Counting forwards and backwards
Counting

Why is it important?

Develop the ability to count with understanding of one to one correspondence is crucial to develop future ability to carry out the four operations quickly and efficiently.

Counting forwards and backwards

This enables learners to use the counting system to count forwards or backwards from any number (including zero).
Number and number processes

Quantity

Why is it important?
The concept of quantity enables the communication of value, amount, size and number of objects.
Number and number processes

Quantity

An amount.

Why is it important?

The concept of quantity enables the communication of value, amount, size and number of objects.
Number and number processes

Quantity

Why is it important?
The concept of quantity enables the communication of value, amount, size and number of objects.

Subitising
Recognising a quantity without counting, simply by looking.

Groupings

Array

Counting

Quantities

Mental agility

Numerals

Place value

Order of operations

Applying across contexts

Add/Subtract

Negative numbers

Multiply/Divide

Fractions, decimal fractions and percentages
Number and number processes

Quantity

Why is it important?
The concept of quantity enables the communication of value, amount, size and number of objects.

Arrays
Identify quantities and patterns to make quick estimates.

Groupings

Subitising
Number and number processes

Why is it important?

Quantity

Groupings

Recognise the amount of objects in a group and use this information to estimate the amount of objects in a larger group.
Number and number processes

Why is it important?

Being able to visualise, hold and manipulate number helps to demonstrate an understanding of the number system and how it works.
Number and number processes

Mental agility
Mental agility is developed through understanding how to use and select appropriate strategies. The preferred method is often selected until the learner has developed confidence in identifying the most efficient method.

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Being able to visualise, hold and manipulate number helps to demonstrate an understanding of the number system and how it works.

Mental agility is developed through understanding how to use and select appropriate strategies. The preferred method is often selected until the learner has developed confidence in identifying the most efficient method.
Number and number processes

Place value

Why is it important?

The language to be used in place value is important for communicating the value of a digit and its place within the number system.
Number and number processes

Place value

It is understanding how a number is composed and knowing its relationship to other numbers. It is the place of each of the digit or digits which makes a difference to the value of the number both in whole numbers and decimal fractions.
Number and number processes

Place value

Why is it important?
The language to be used in place value is important for communicating the value of a digit and its place within the number system.

Zero as a place holder
The position of a digit gives its value and zero acts as a place holder and effects the value of the number.
**Number and number processes**

**Place value**

**Why is it important?**

The language to be used in place value is important for communicating the value of the number system.

**Language of place value**

It is the place of the digit or digits which indicates the value of the number, whether a whole number or a decimal fraction. Learners need to be able to work with ones, tens, hundreds etc and tenths, hundredths and thousandths etc.

- **Place value**
- **Zero as a place holder**
- **Language of place value**
- **Grouping and partitioning**
- **Working with decimal fractions**
- **Mental agility**
Number and number processes

Place value

Why is it important?

The language to be used in place value is important for communicating the value of a digit and its place within the number system.

Grouping and partitioning

Use standard place value partitioning (e.g. 76=70+6) and non-standard place value partitioning (e.g. 76 can be 20+56 or 40+36 etc.) This methodology can be used to assess the efficiency of mental calculations.

Mental agility

Grouping and partitioning

Working with decimal fractions

Language of place value

Applying across contexts

Awareness of number

Numerals

Counting

Quantities

Add/Subtract

Negative numbers

Multiply/Divide

Fractions, decimal fractions and percentages

Place value

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Number and number processes

Awareness of number
- Numerals
- Counting
- Quantities
- Mental agility

Place value
- Why is it important?
  The language to be used in place value is important for communicating the value of a digit and its place within the number system.

Place value
- Grouping and partitioning
- Working with decimal fractions
  It is the place of a digit or digits which indicates the value of the number, whether a whole number or decimal fraction. Place of a zero within a decimal fraction acts as a place holder. The decimal point acts as a place holder and indicated values greater than or less than one. The decimal point should not move.
- Mental agility
Number and number processes

Place value

Why is it important?

The language to be used in place value is important for communicating the value of a digit and its place within the number system.

Mental agility

Developing the ability to use efficient methods to calculate mentally and confidently using knowledge of place value within their mental calculations.

Grouping and partitioning

Working with decimal fractions

Mental agility
Number and number processes

Addition and subtraction

Why is it important?
Being able to add and subtract mentally and on paper is a key life skill and provides the foundation for the understanding of multiplication and division.
Number and number processes

**Addition and subtraction**

These are inverse operations and must be taught together. Addition is the process of combining two or more quantities to calculate their sum or total. Subtraction is the difference between two quantities. Carry out calculations to solve real life problems in familiar practical contexts and become increasingly fluent in deriving number facts.

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Number and number processes

Awareness of number

Counting

Quantities

Mental arithmetic

Number and number processes

Why is it important?

Being able to add and subtract mentally and on paper is a key life skill and provides the foundation for the understanding of multiplication and division.

Addition and subtraction

Relationship between addition and subtraction

Exploring the relationship between addition and subtraction. Addition and subtraction need to be taught together e.g. highlighting that subtraction can be calculated by adding on. Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Addition and subtraction

Relationship between addition and subtraction

Algorithms
Number and number processes

**Addition and subtraction**

*Why is it important?*

Being able to add and subtract is a key life skill and provides the foundation for the understanding of multiplication and division.

**Algorithms**

Algorithms should be introduced after practical experiences and understanding the concepts of addition and subtraction. Reading, writing and interrogating mathematical statements involving +, -, = signs. This includes working out the missing number in a mathematical statement. Written methods support place value and working with larger numbers.
Number and number processes

Multiplication and division

Why is it important?

Being able to multiply and divide mentally and on paper is a key life skill. Learners should understand the relationship between multiplication and division to be able to carry out calculations efficiently including work with fractions. It is important that children are taught to appreciate and make use of this mathematical relationship when developing and using mental calculation strategies.
Number and number processes

Multiplication and division

Grouping and share small quantities to develop understanding of multiplication and division. Double number quantities and find simple fractions of objects, numbers and quantities. Multiplication and division are inverse operations which should be taught together. Multiplication and division is linked initially with repeated addition approaches involving increasing sets or amounts. Division is initially linked to repeated subtraction and involves decreasing quantities by set amounts or sharing equally. Symbols are used to represent multiplication and division (x, ÷).

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Number and number processes

**Multiplication and division**

**Why is it important?**

Being able to multiply and divide mentally and on paper is a key life skill. Learners should understand the relationship between multiplication and division to be able to carry out calculations efficiently, including work with fractions. It is important that children are taught to appreciate and make use of this mathematical relationship when developing and using mental calculation strategies.

**Relationship between multiplication and division**

Knowing the related number facts (tables) and the inverse and being able to recall and manipulate the numbers facts mentally, accurately and confidently. Multiplication and division are related to fractions e.g. $\frac{1}{2}$ of 40. Relationships between multiplying and dividing by 10, 100, 1000 etc should be highlighted. Being able to recall a particular multiplication fact and being able to use this to solve related multiplication and division tasks. The set of related facts is known as a fact family.
Order of operations

Why is it important?
An understanding of commutative, distributive and associative properties enables the development of more efficient calculations. Rules established to support carrying out calculations that involve more than one operation.

Order of operations
Understanding and application of the order of operations
Commutative, distributive and associative properties
Number and number processes

Order of operations

There is a set order of operations used within calculations involving more than one operation e.g. + and x.
Order of operations

Why is it important?
An understanding of commutative, distributive and associative properties enables the development of more efficient calculations. Rules established to support carrying out calculations that involve more than one operation.

Understanding and application of the order of operations

At the introductory stage the order of operations applies to the four basic operations, where multiplication and division have equal priority and addition and subtraction have equal priority. This can then be extended to include brackets and indices. The use of mnemonics such as BODMAS, BIDMAS and BOMDAS are often used when deciding on the order of operations.

Commutative, distributive and associative properties
Number and number processes

Order of operations

Why is it important?
An understanding of commutative, distributive and associative properties enables the development of more efficient calculations. Rules established to support carrying out calculations that involve more than one operation.

Commutative, distributive and associative properties
The commutative law states that you can swap numbers around (within a calculation) and still get the correct answer. The commutative law and inverse relationship develops multiplicative reasoning. The distributive law states that multiplying a number by a group of numbers added together is the same as doing each multiplication separately.

The associative law states:
• It doesn’t matter how you group the numbers when you add.
• It doesn’t matter how you group the numbers when you multiply.
Number and number processes

**Negative numbers**

**Why is it important?**

Understanding negative numbers is important for real life applications such as temperature measurements, graphs and charts and budgeting.

- **Negative numbers**
- **Integers**
- **Ordering**
- **Calculations**
- **Application in real life contexts**

Why is it important?

Understanding negative numbers is important for real life applications such as temperature measurements, graphs and charts and budgeting.
Number and number processes

Negative numbers

Why is it important?

Understanding negative numbers is important for real life applications such as temperature measurements, graphs and charts and budgeting.

Negative numbers

Numbers which are less than zero.
Number and number processes

Awareness of number
Numerals
Counting
Quantities
Mental agility

Order of operations
Applying across contexts

Why is it important?
Understanding negative numbers is important for real life applications such as temperature measurements, graphs and charts, and budgeting.

Integers
The term integer is used when working with positive and negative whole numbers. Integer calculations set in a context involve an understanding of how to deal with negative numbers within the 4 operations.

Negative numbers
Integers
Ordering
Calculations
Application in real life contexts
Negative numbers

Why is it important?
Understanding negative numbers is important for real-life applications such as temperature measurements, graphs and charts, and budgeting.

Ordering
Recognising the position of negative numbers on a number line or measuring device.
Negative numbers

Why is it important?

Calculations
Effect of negative numbers within calculations involving the 4 operations e.g. double negatives.
Number and number processes

Negative numbers

Why is it important?
Understanding negative numbers is important for real life applications such as temperature measurements, graphs and charts and budgeting.

Application in real life contexts
Applying knowledge and understanding of negative numbers within real life contexts.
Number and number processes

Fractions, decimal fractions and percentages

Why is it important?

The ability to see fractions, decimal fraction and percentages as operators rather than just a number. The ability to solve problems involving fractions, decimal fractions and percentages using a wide variety of methods is an important life skill.
Number and number processes

- Awareness of number
- Place value
- Order of operations
- Applying across contexts
- Numerals
- Counting
- Quantities
- Add/Subtract Negative numbers
- Mental agility
- Multiply/Divide Fractions, decimal fractions and percentages
- Why is it important?
  The ability to see fractions, decimal fractions and percentages as operators rather than just a number. The ability to solve problems involving fractions, decimal fractions and percentages using a wide variety of methods is an important life skill.

Fractions, decimal fractions and percentages

Working with fractions involves using times tables skills and the links between multiplication and division facts. Understanding of place value is crucial.
Number and number processes

Fractions, decimal fractions and percentages

Why is it important?
The ability to see fractions, decimal fractions and percentages as operators rather than just a number. The ability to solve problems involving fractions, decimal fractions and percentages using a wide variety of methods is an important life skill.

Interrelationships
Being able to express and understand the interrelationship between fractions, decimal fractions and percentages. Knowing that numbers can be expressed in different forms and how convert from one form to another.
Applying across contexts

Why is it important?

Being able to apply numeracy skills across a variety of real life contexts leads to being numerate and being able to function responsibly in everyday life, contribute effectively to society and increase our opportunities within the world of work.
Number and number processes

- Awareness of number
- Place value
- Order of operations
- Applying across contexts
- Numerals
- Counting
- Quantities
- Add/Subtract negative numbers
- Mental agility
- Multiply/Divide fractions, decimal fractions and percentages
- Applying across contexts

Why is it important?
Being able to apply numeracy skills across a variety of real life contexts leads to being numerate and being able to function responsibly in everyday life, contribute effectively to society and increase our opportunities within the world.
Fractions, decimal fractions and percentages

- Concept of a whole and parts
- Concept of a fraction
- Fractional notation and vocabulary
- Relationship between fractions, multiplication and division
- Decimal fractions and place values
- Fractions
- Equivalent forms
- Relationships that link fractions, decimal fractions and percentages
- Applying across contexts
- Percentages
Concept of a whole and parts

Why is it important?
To develop an understanding of fractions learners must have knowledge and understanding of what is meant by a whole or a part.
Fractions, decimal fractions and percentages

Concept of a whole and parts

- Concept of a whole or a part
  A whole can represent one item or a group of items.

- One object, shape or quantity can be shared into parts
- A group of items can be shared out
- Equal parts

Why is it important?

To develop an understanding of fractions learners must have knowledge and understanding of what is meant by a whole.
Fractions, decimal fractions, and percentages

Concept of a whole or a part

One object, shape or quantity can be shared into equal parts

When an object, shape or quantity is split into two equal parts then each part is one half. When an item is split into two unequal parts then these two parts are not halves. This principle applies to all unitary fractions e.g. splitting into tenths and each part is an equal 10th.

A group of items can be shared out

Equal parts

Concept of a whole or a part

One object, shape or quantity can be shared into parts

Concept of a whole and parts
Fractions, decimal fractions, and percentages

**Concept of a whole and parts**

Why is it important?
To develop an understanding, knowledge and understanding of what is meant by a whole or a part.

A group of items can be shared out
Sharing a collection of items into equal groups and into groups which are not equal.

- Concept of a whole or a part
- One object, shape or quantity can be shared into parts
- A group of items can be shared out
- Equal parts
Concept of a whole and parts

Why is it important?
To develop an understanding of fractions learners must have knowledge and understanding of what is meant by a whole or a part.

Equal parts
Equal parts can form a whole.

Concept of a whole and parts
Fractional notation and vocabulary
Applying across contexts
Relationships that link fractions, decimal fractions and percentages
Applying across contexts
Concept of a fraction

Why is it important?

Understanding this concept is needed to appreciate the notation of fractions. When working with a fraction it is essential to understand that the denominator denotes the number of equal parts.
Concept of a fraction

That a whole can be separated into equal parts. These parts are called fractions.

Understanding this concept is needed to appreciate the notation of fractions. When working with a fraction it is essential to understand that the denominator denotes the number of equal parts.
Fractions, decimal fractions, and percentages

Concept of a fraction

Why is it important?
Understanding this concept is needed to appreciate the notation of fractions. When working with a fraction, it is essential to understand that the denominator denotes the number of equal parts.

Fractions with equal parts
Understanding that fractions of a whole are equal parts.
Fractions, decimal fractions and percentages

Concept of a fraction

Why is it important?
Understanding this concept is needed to appreciate the notation of fractions. When working with a fraction it is essential to understand that the denominator denotes the number of equal parts.

Sharing with no remainder
Awareness that any sized group of items can be shared equally.
Fractions, decimal fractions, and percentages

Concept of a fraction

Why is it important?
Understanding this concept is needed to appreciate the notation of fractions. When working with a fraction it is essential to understand that the denominator denotes the number of equal parts.

Equal sharing
Splitting a group of items equally into a number of smaller groups. This underpins the concept of fractions.
Fractions, decimal fractions and percentages

**Fractional notation and vocabulary**

Why is it important?
Understanding fractional notation aids communication, reinforces the concept of equal sharing and can be developed further to investigate equivalent fractions. Understanding what the two numbers that make up a fraction represent, allows for calculations to be made.

Fractional notation and vocabulary
Numerator and denominator
Fractions, decimal fractions and percentages

Fractional notation and vocabulary

Why is it important?

Fractional notation aids communication, reinforcing the concept of equal sharing and can be developed further to investigate equivalent fractions. Understanding what the two numbers that make up a fraction represent, allows for calculations to be made.

Fractional notation is used to find, name and write fractions of a length, shape, object or quantity.

Numerator and denominator

Fractions, decimal fractions and percentages

Concept of a whole and parts

Concept of a fraction

Relationships that link fractions, decimal fractions and percentages

Applying across contexts
Fractions, decimal fractions and percentages

Fractional notation and vocabulary

Why is it important?
Understanding fractional notation aids communication, reinforces the concept of equal sharing and can be developed further to investigate equivalent fractions. Understanding what the two numbers that make up a fraction represent, allows for calculations.

Numerator and denominator
Numerator indicates the number of equal parts. Denominator indicates the number of equal parts the unit is divided into. The greater the numerator the more parts there are. The greater the denominator the more parts the whole has been divided into.
Fractions, decimal fractions and percentages

Relationship between fractions, multiplication and division

Why is it important?
Understanding the link between fractions and multiplication leads to an understanding of percentages and the application of multiplication and division in calculations such as those involving ratio.
Fractions, decimal fractions and percentages

Relationship between fractions, multiplication and division

There is a direct link between finding a fraction of an object or a quantity and multiplication and division.

Relationship between fractions, multiplication and division
Fractions, decimal fractions and percentages

Decimal fractions and place value

Why is it important?
Understanding decimal fractions is important for conversion in measurement and understanding what proportion of a whole is represented. It is also important relative to interpreting answers generated through the use of calculators.

- Decimal fractions and place value
- The decimal point
Decimal fractions and place value

Learning and teaching about decimal fractions is an extension of learners’ understanding of place value. There is a multiplicative relationship between the decimal places and the values of the positions increasing in powers of 10 from right to left. Moving left from the decimal point the powers of 10 increase and moving right from the decimal point the powers of 10 decrease.

There are many contexts for learning about decimal fractions e.g. money and measurement.
Why is it important?

Understanding decimal fractions is important for conversion in measurement and understanding what proportion of a whole is represented. It is also important relative to interpreting answers generated through the use of calculators.

**Decimal fractions and place value**

A divide between the whole number and the fractional number parts. Fundamental to the understanding of decimal fractions is that the digits that come after the decimal point represent tenths, hundredths, thousandths etc. The decimal point should not move.
Fractions, decimal fractions and percentages

Fractions

Why is it important?
Working with fractions is an important skill in the world of work and daily life.
Fractions

A proper fraction is when the numerator is less than the denominator e.g. $\frac{1}{2}$. An improper fraction is when the numerator is more than the denominator e.g. $\frac{3}{2}$ A fraction expresses a part of a whole. When carrying out calculations, the most appropriate form of a fraction should be used e.g. $\frac{6}{100}$ of 500 (calculate $\frac{1}{100}$ then multiply by 6, rather than $\frac{3}{50}$ which is the fraction in its simplest form.) A fraction can only have a whole number in both the numerator and the denominator.
Fractions, decimal fractions and percentages

Percentages

Why is it important?
Percentages are used in a wide variety of contexts, many of which are used in everyday life. Understanding that percentages are a specific way of representing fractions with a denominator of 100 can support understanding of the relationships between fractions, decimal fractions.
Fractions, decimal fractions and percentages

**Percentages**

**Why is it important?**

Percent means out of 100 therefore 100% is equivalent to one whole.
Equivalent forms

Why is it important?
Understanding that fractions expressed in different ways can be equal in value. This understanding leads to confidence when using fractions in calculations and in relation to decimal fractions and percentages. Knowledge and understanding of equivalences can help to make calculations simpler when carrying out calculations in relation to fractions, decimal fractions and percentages.
Fractions, decimal fractions and percentages

Equivalent forms

Fractions which have the same value, even though they may look different. E.g. 1/2 and 2/4 are equivalent, because they are both “half”. The simplest form of a fraction can be used for efficient calculations.

Why is it important?

Understanding that fractions expressed in different ways can be equal in value. This understanding leads to confidence when using fractions in calculations and in relation to decimal fractions and percentages. Knowledge and understanding of equivalences can help to make calculations simpler when carrying out calculations in relation to fractions, decimal fractions and percentages.
Fractions, decimal fractions, and percentages

Why is it important?

The ability to interchange between a fraction, decimal fraction and percentage is a skill that allows for different ways to solve problems efficiently, including mental calculations.
Fractions, decimal fractions and percentages

Relationship that links fractions, decimal fractions and percentages
Understand the relationship between fractions, decimal fractions and percentages. Ability to change between the different forms for the most efficient ways of carrying out calculations, in different contexts.

Relationships that link fractions, decimal fractions and percentages
Comparisons between fractions, decimal fractions and percentages

Why is it important?
The ability to interchange between a fraction, decimal fraction and percentage is a skill that allows for different ways to solve problems efficiently, including mental calculations.
Fractions, decimal fractions and percentages

**Relationships that link fractions, decimal fractions and percentages**

**Why is it important?**

The ability to interchange between a fraction, decimal fraction and percentage is a skill that allows for different ways to solve problems efficiently, including mental calculations.

**Comparisons between fractions, decimal fractions and percentages**

Being able to place different forms in order on a number line and know the relative value of each one.

- Relationships that link fractions, decimal fractions and percentages
- Comparisons between fractions, decimal fractions and percentages

**Concept of a whole and parts**

**Fractional notation and vocabulary**

**Applying across contexts**

**Relationships between fractions, multiplication and division**

**Relationships that link fractions, decimal fractions and percentages**

**Comparisons between fractions, decimal fractions and percentages**

- Relationships that link fractions, decimal fractions and percentages
- Comparisons between fractions, decimal fractions and percentages

**Fractions, decimal fractions and percentages**

**Equivalent forms**

**Concept of a fraction**

**Percentages**

**Comparisons between fractions, decimal fractions and percentages**

- Relationships that link fractions, decimal fractions and percentages
- Comparisons between fractions, decimal fractions and percentages

**Being able to place different forms in order on a number line and know the relative value of each one.**
Fractions, decimal fractions and percentages

Why is it important?

Being able to carry out calculations and move between different forms is an important skill. Choosing the most important form to display the answer depends on context.
Fractions, decimal fractions and percentages

Applying across contexts
Being able to carry out calculations and move between different forms is an important skill. Choosing the most important form to display the answer depends on context.

Why is it important?
Choosing the most important form to display the answer depends on context.
Fractions, decimal fractions and percentages

Applying across contexts

Why is it important?

Being able to carry out calculations and move between different forms is an important skill. Choosing the most important form to display the answer depends on context.

Linking fractions and ratios

Understanding how ratio links to fractions. Numbers in a given ratio can be expressed in fractional form. In its fractional form it is easier to make comparisons and carry out calculations.
Fractions, decimal fractions and percentages

Applying across contexts

Why is it important?

Being able to carry out calculations and move between different forms is an important skill. Choosing the most important form to display the answer depends on context.

Proportion

Two variables are proportional if a change in one is always accompanied by a change in the other. As one quantity increases or decreases another quantity increases or decreases.
Money
Money

Awareness of money

Why is it important?
An early appreciation of the contexts in which money is used and how to use it in a range of situations prepares learners for understanding the value and use of money.
Money

Awareness of money

Working with money is the application of numbers in a specific context. Understanding that a transaction occurs when exchanging money for goods.

Why is it important?

An early appreciation of the contexts in which money is used and how to use it in a range of situations prepares learners for understanding the value and use of money.
Money

Coins and notes

Why is it important?

The development of skills with money, including using coins and notes in transactions and knowing that the change given is correct is an important every-day life skill.

- Coins and notes
- Using coins and notes
- Real life contexts
- The inter-relationship between different sets of coins and notes
Money

Coins and notes

Coins and notes have monetary value and are used to buy products and services.

Why is it important?
The development of skills with money, including using coins and notes in transactions and knowing that the change given is correct is an important every-day life skill.

The inter-relationship between different sets of coins and notes

Real life contexts

Using coins and notes

Awareness of money

Coins and notes

Financial capability

Personal finance management
Money

Coins and notes

Why is it important?

The development of skills with money, including using coins and notes in transactions and knowing that the change given is correct is an important every-day life skill.

Using coins and notes

Recognise and know the value of coins and notes used in daily life.

The ability to exchange an appropriate amount of money for goods or services and estimate/calculate the change due. The relationship between the value of coins and the cost of the goods that are exchanged leads to understanding that different coins and notes have different values.

Real life contexts

Recognise and know the value of coins and notes used in daily life.

The ability to exchange an appropriate amount of money for goods or services and estimate/calculate the change due. The relationship between the value of coins and the cost of the goods that are exchanged leads to understanding that different coins and notes have different values.
Money

Coins and notes

Why is it important?
The development of skills with money, including using coins and notes in transactions and knowing that the change given is correct, is an important every-day life skill.

Real life contexts
Apply the knowledge of coins in play and real life situations.

The inter-relationship between different sets of coins and notes
Money

Coins and notes

The inter-relationship between different sets of coins and notes

Understanding that different combinations of coins create a total amount e.g. five twenty pence coins has the same value as one pound, two fifty pence coins make a pound, two £10 notes have the same value as one £20 note etc.

Why is it important?

The development of skills with money, including using coins and notes in transactions and knowing that the change given is correct is an important everyday life skill.

Real life contexts

The inter-relationship between different sets of coins and notes
Money

Exchange money for goods

**Why is it important?**

Understanding that, in order to purchase goods or services, money has to be paid, helps develop an understanding of budgeting.
Money

Understanding that, in order to purchase goods or services, money has to be paid, helps develop an understanding of budgeting.

Exchange money for goods

Knowing how much money is available and what can be purchased.

Application in everyday life

Knowing how much money is available and what can be purchased.
Money

Exchange money for goods

Why is it important? Understanding that, in order to purchase goods or services, money has to be paid, helps develop an understanding of budgeting.

Application in everyday life
The ability to solve contextualised and abstract problems, where the amount of money to be paid needs to be determined and the due change calculated.
Money calculations

Why is it important?
Developing confidence in mental and written calculations involving money is an important step in moving towards effective money management.

Money calculations
Applying the four operations in calculations involving money
Money calculations
Money calculations are any calculation involving addition, subtraction, multiplication or division (or a combination of these). Mental calculations can involve rounding. Written calculations involve working with decimal fractions.
Money

Why is it important?
Developing confidence in mental and written calculations involving money is an important step in moving towards effective money management.

Applying the four operations in calculations involving money
Application of number skills within the context of money. Estimating or calculating total cost or change for a single good or goods being purchased.

Money calculations

Applying the four operations in calculations involving money

Financial capability

Personal finance management

Coins and notes

Awareness of money
Money

Managing money

Why is it important?
Being able to use money effectively for individual situations ensures that best value is understood and debt is avoided or minimised.
Money

Managing money
Managing money is appreciation of the contexts in which money is used and how to use it responsibly in a range of situations.

- Managing money
- Profit and loss
- Best value
- Making informed financial decisions
- Bank cards

Why is it important?
Being able to use money effectively for individual situations ensures that best value is understood and debt is avoided or minimised.

Managing money is appreciation of the contexts in which money is used and how to use it responsibly in a range of situations.
Money

Managing money

Why is it important?
Being able to use money effectively for individual situations ensures that best value is understood and debt is avoided or minimised.

Profit and loss
Terms used to reflect results of conducting transactions.

Managing money
Profit and loss
Best value
Making informed financial decisions
Bank cards

Awareness of money
Coins and notes
Personal finance management
Financial capability
Money

Managing money

**Why is it important?**
Being able to use money effectively ensures that best value is understood and debt is avoided or minimised.

**Best value**
Using a range of information to make informed decisions about what is best value depending on personal circumstances and contexts.
Money

Managing money

Why is it important?

Making informed financial decisions
Use information to make informed choices on what can be afforded, balancing the worth of an item against its cost and prioritising when buying and spending.

Best value

Bank cards

Financial capability

Awareness of money
Managing money

Why is it important?
Being able to use money effectively for individual situations ensures that best value is understood and debt is avoided or minimised.

Bank cards
Understanding the use of bank cards as a form of money and that this could incur additional charges and fees.

Making informed financial decisions

Bank cards
Money

Budgeting

Why is it important?
Learners need to know how to manage income and expenditure to know what is available to spend and save.
Budgeting
Understanding the difference between saving and borrowing.
Budgeting is effective money management and financial awareness. Short term budgeting involves considering monthly salary, fluctuating house expenses and unforeseen bills. Net income, is used to plan for lifestyle choices. An understanding of A.P.R. of financial products and the potential impact on what can be afforded.

Longer term budgeting develops a deeper understanding of cash flow and is an important feature of responsible financial management and capability. This includes savings, investments, interest rates and credit rating. Knowing how the economy of the country affects the individual.
Money

Budgeting

Why is it important?
Learners need to know how to manage income and expenditure to know what is available to spend and save.

Debt

Recognising that a debt is a repayment. Awareness and understanding of the implications of debt in terms of leading a responsible lifestyle. The cost of living depends on a variety of factors including geographical and economic and these can affect the individual in different ways.

- Budgeting
- Debt
- Income
- Deductions
- Borrowing
- Salaries and pensions
Money

Budgeting

Why is it important?
Learners need to know how to manage income and expenditure to know what is available to spend and save.

Income
Income levels are part of the discussion around career choices, along with associated lifestyles in relation to personal qualities and interests (including unpaid or voluntary work).
Money

Budgeting

Why is it important?

Knowledge of what the main deductions from any gross income are and understanding what these deductions are for and how they are calculated.
Money

Budgeting

Why is it important?
Learners need to know how to manage income and expenditure to know what is available to spend and save.

Borrowing
An understanding of the personal and social risks involved in borrowing money. Knowing the costs of different ways to borrow and appreciating the risks involved. Awareness of organisations who can facilitate saving, borrowing and lending.

Deductions

Salaries and pensions

Personal finance management

Financial capability
Money

Budgeting

Why is it important?
Learners need to know how to manage income and expenditure to know what is available to spend and save.

Salaries and pensions
Awareness of salary levels of particular jobs and occupations available nationally and internationally. Awareness of the options around pension planning.
Money

Personal financial management

Why is it important?
Managing personal finances is important in order to have sufficient funds to plan and save. The ability to determine the pros and cons is an essential life skill required when making informed decisions when purchasing goods and services.
Money

Personal financial management

Why is it important?

Personal financial management
Ensuring that income and expenditure are balanced.

Why is personal financial management important?

Managing personal finances is important in order to have sufficient funds to plan and save. The ability to determine the pros and cons is an essential life skill required when making informed decisions when purchasing goods and services.

Making informed financial decisions

Ensuring that income and expenditure are balanced.
Money

Why is it important to manage personal finances?

Managing personal finances is important in order to have sufficient funds to plan and save. The ability to determine the pros and cons is an essential life skill required when making informed decisions when purchasing goods and services.

Making informed financial decisions

Investigating and understanding the pros and cons of financial decisions on lifestyle. Recognising that best value does not always mean that cheapest is best and that personal circumstances and the attributes associated with the bought item also need to be considered.

Personal financial management

Making informed financial decisions
Money

Financial capability

Why is it important?
Lifelong financial planning, including savings and pension planning and being able to assess the risks involved is a key life skill.

Financial capability
Financial capability

The motivation to independently and efficiently manage finances and effect change.

The day-to-day management of finances, for example, effective budgeting and use of a bank account.

Planning ahead for retirement, other life transitions and unexpected events, for example, by saving.

Efficient selection of financial products and the ability to understand these products, for example, by comparing repayment costs before taking a loan.

Knowing where, and how, to seek appropriate financial advice.
Time

- Concept of time
- Units of time
- Telling the time
- Duration of time
- Calendars
- Recording and displaying
- Converting units of time
- Time, calculations including more complex durations
- Using appropriate units of time
- Time/speed/distance
- Time management
Concept of time

Why is it important?
Developing an understanding of time and the passing of time supports the skills necessary for calculating durations and recording time.
Why is it important? Developing an understanding of time and the passing of time supports the skills necessary for calculating durations and recording time.

Concept of time
Awareness of patterns of time and the passing of time in relation to years, seasons, months, weeks, days, hours, minutes and seconds.
Recording and displaying time

Why is it important?
Recording and displaying the time is an essential life skill that allows organisation of events and activities.
Recording and displaying time

Recording time involves expressing time using numbers and words. Displaying time is representing the time on a clock face or on a digital display.
Units of time

Why is it important?
Use of units of time allows communication using a common language and understanding.
Time

Units of time

The ways in which we record time using the appropriate vocabulary. Knowledge of the relationship between different units of time.

Why is it important?
Use of units of time allows communication using a common language and understanding.

Recording and displaying the time

Telling the time

Time, calculations including more complex durations

Duration of time

Using appropriate units of time

Calendars
Time

Units of time

Why is it important?
Use of units of time allows communication using a common language.

Relationships
The relationship between different units of time e.g. number of days in a year, hours in a minute.
Units of time

Why is it important?
Use of units of time allows communication using a common language and understanding.

Appropriate use
Using the appropriate unit of time depending on the context and situation.
Telling the time

Why is it important?
Supports the development of skills in effective time management.

- Telling the time
- Analogue and digital

Concept of time
Recording and displaying
Units of time
Converting units of time
Recording and displaying
Telling the time

Time, calculations including more complex durations
Duration of time
Using appropriate units of time
Calendars

Time management
Telling the time
Understanding time displays of various types and being able to express this using the correct vocabulary and in relation to specific times of the day e.g. morning or afternoon.
Why is it important?
Supports the development of skills in effective time management.

Telling the time

Analogue and digital
Understand the position of and relationship between the hour and minutes hands. Familiarisation with the position of the hands and the vocabulary of half past and quarter to/past. Understanding the link between analogue and the 24 hour digital clock.
**Duration of time**

**Why is it important?**

Understanding duration of time helps to plan and organise events and activities effectively. Understanding the duration of time introduces start and finish times and leads to being able to work out how long events last. The ability to calculate the length of time taken is essential for planning and organising events in daily life. Using timetables helps to develop mental agility in relation to time calculations and develops skills in estimation and in rounding.
Why is it important?
Understanding duration of time helps to plan and organise events and activities effectively. Understanding the duration of time introduces start and finish times and leads to being able to work out how long events last. The ability to estimate duration is essential for planning and organisng timetables helps to develop mental agility in relation to time calculations and in rounding.

Duration of time
The length of time between the start and finish point.

Duration of time
Timing of tasks
Simple timetables
Estimating duration
Duration of time

Why is it important?
Understanding duration of time helps to plan and organise events and activities effectively. Understanding the duration of time introduces start and finish times and leads to being able to calculate more complex durations and organise events and activities. It leads to being able to develop timetables and develop mental agility in relation to time calculations and develop skills in estimation and in rounding.

Timing of tasks
Linking the chosen unit of time to the most appropriate timing device. Degree of accuracy is dependent on the situation.
Duration of time

Why is it important?
Understanding duration of time helps to plan and organise events and activities effectively. This concept introduces the start and finish times and the ability to calculate the length of time and prepare for events. It also helps in developing mental agility in relation to time calculations and estimation, which is essential for daily life. Timetables and schedules provide information including start and finish times for journeys and can be used to plan events and demonstrate the importance of 24-hour time.

Simple timetables
Timetables and schedules provide information including start and finish times for journeys. They can be used to plan events and demonstrate the importance of 24-hour time.
Duration of time

**Why is it important?**
Understanding duration of time helps to plan and organise events and activities effectively. Understanding the duration of time introduces start and finish times and leads to being able to work out how long events last. The ability to calculate the length of time taken is essential for planning using timetables helps to develop mental agility in relation to time calculations and develops skills in estimation and in rounding.

**Estimating duration**
The ability to estimate how long an event took or will take, using non-standard or standard units of time. Developing a sense of how long a task will take, by using familiar benchmarks.
Calendars

Why is it important?
Use of calendars to organise daily routines, events and activities.
Time

Calendars
Calendars are a structured representation of the months of the year. They reinforce the order of and number of days in the months of the year and can be used to illustrate the irregularity of number patterns in the months. Calendars can also be used to calculate elapsed time.
Converting units of time

Why is it important?
Converting between units of time is necessary when identifying and carrying out time calculations.

Converting units of time
Converting units of time

Knowledge that there are 60 seconds in a minute, 60 minutes in an hour and 24 hours in a day are essential when estimating or calculating lengths of time.
Time calculations including more complex durations

Why is it important?
Time calculations including more complex durations
Extracting and using specific information from a variety of sources. Using this information to plan and schedule events and activities, including journeys, for personal lives and for work and leisure. Calculating journey times is an introduction to establishing the relationship between time, speed and distance and sets the foundation for more complex calculations and estimation.
Time calculations including more complex durations

Why is it important?
Time calculations including more complex durations

Using the four operations accurately to do calculations in relation to time, using the most efficient method and unit.

Point.
Time calculations including more complex durations

**Why is it important?**

Time calculations including more complex durations help in extracting and using specific information from a variety of sources. Using this information to plan and schedule events, both for personal and professional lives, is crucial. It introduces concepts of speed and distance, which are foundational for more complex calculations. Calculating journey times is an introduction to understanding the relationship between time, speed, and distance. This understanding is essential for practical applications such as travel planning, time management, and scheduling.
Time calculations including more complex durations

Why is it important?
Time calculations including more complex durations
Extracting and using specific information from a variety of sources. Using this information to plan and schedule events and activities, including for work and leisure. Calculations and estimation.

Journey times
Using the start and finish times to calculate how long a journey will last.
Using appropriate units of time

Why is it important?
Understanding that using appropriate units of time helps when selecting the most appropriate form to calculate and express the answer, dependent on the context.
Using appropriate units of time

Being able to select and use the most appropriate and efficient unit of time for the situation and context.

Using appropriate units of time

Using appropriate units of time helps in selecting the correct form to calculate and express the answer, dependent on context.
Why is it important?
It is important in some aspects of travel and leisure to be able to estimate time taken, speed and distance travelled. More accurate time, speed and distance calculations are required for a range of real life contexts.
Why is it important? It is important in some aspects of travel and leisure to be able to estimate time taken, speed and distance travelled. More accurate time, speed and distance calculations are required. Using the standard formula to calculate the unknown value when given the other two.
Why is it important?
It is important in some aspects of travel and leisure to be able to estimate time taken, speed and distance travelled. More accurate time, speed and distance calculations are required for a range of real life contexts.

Estimation in relation to distance/speed/time
Estimations are used in daily situations to determine either an approximate arrival time, speed or distance for a journey.
Why is it important?

It is important in some aspects of travel and leisure to be able to estimate time taken, speed and distance travelled. More accurate time, speed and distance calculations are required for a range of real life contexts.

Calculations

Calculations are required for specific more formal situations e.g. areas of employment where this is a necessary part of daily business. Formula can be used to calculate one quantity given the other two.
Time

Time/ speed/ distance

Why is it important?
It is important in some aspects of travel and leisure to be able to estimate time taken, speed and distance travelled. More accurate time, speed and distance calculations are required for a range of real life contexts.

Graphs
Time distance graphs can be used to investigate the relationships between distance, speed and time. Used to describe the features of a journey.

Calculations
Time management

Why is it important?
Time management is an essential skill for life, learning and work. Time management is important in business in terms of meeting deadlines for submitting projects and in life for coordinating leisure activities.
Time management

Planning for different real-life situations. Flexible planning is taken into account when any adjustments are required. Responsive planning is necessary in order to address any unexpected events or changes.

Time management is an essential skill for life, learning and work. Time management is important in business in terms of meeting deadlines for submitting projects and in life for coordinating leisure activities.
Measurement

- Awareness of size and amount
- Comparison of size and amount
- Non-standard units
- Concept of area
- Concept of volume
- Standard units
- Convert units
- Calculations involving measurement
- Formula and inter-relationships
- Tolerance in measurement
Measurement

Awareness of size and amount

Why is it important?
An understanding of how measurements can be taken and applied in everyday contexts is an important life skill. Developing an awareness of size and amount promotes an understanding of spacial awareness and develops the specific vocabulary needed to make comparisons.
Measurement

Awareness of size and amount

Use appropriate vocabulary to describe the features of shapes and objects, linking to size and amount. Use the language of opposites and comparisons, particularly within practical situations, to develop understanding of these concepts and how they can be applied.

Why is it important?

An understanding of how measurements can be taken and applied in everyday contexts is an important life skill. Developing an awareness of size and amount promotes an understanding of spatial awareness and develops the specific vocabulary needed to make comparisons.

Awareness of size and amount

Use appropriate vocabulary to describe the features of shapes and objects, linking to size and amount. Use the language of opposites and comparisons, particularly within practical situations, to develop understanding of these concepts and how they can be applied.
Comparison of size and amount

Why is it important?
The ability to compare size and amount leads to a deeper understanding of relationships between measurements and how these can be applied to a range of situations and contexts.

- Comparison of size and amount
- Ordering
- Conservation of size, weight and volume

Comparison of size and amount
Comparison of size and amount

Use appropriate vocabulary to describe the features of shapes and objects, linking to size and amount.

Comparison of size and amount leads to a deeper understanding of relationships between measurements and how these can be applied to a range of situations and contexts.

Ordering

Conservation of size, weight and volume

Concept of volume

Concept of area

Concept of volume

Non-standard units

Calculations involving measurement

Standard units

Formula and inter-relationships

Awareness of size and amount

Comparison of size and amount

Tolerance in measurement

Why is it important?
The ability to compare size and amount leads to a deeper understanding of relationships between measurements and how these can be applied to a range of situations and contexts.

Ordering

Conservation of size, weight and volume

Comparison of size and amount

Use appropriate vocabulary to describe the features of shapes and objects, linking to size and amount.
Measurement

Comparison of size and amount

Why is it important?
The ability to compare size and amount leads to a deeper understanding of relationships between measurements and how these can be applied to a range of situations and contexts.

Ordering
Develop vocabulary associated with comparison and order objects according to set criteria and for different purposes.
Measurement

Comparison of size and amount

Why is it important?
The ability to compare size and amount leads to a deeper understanding of relationships between measurements and how these can be applied to a range of situations and contexts.

Conservation of size, weight and volume
Recognise that shapes and objects that look different can have equal length, weight or volume.
Non-standard units

Why is it important?
Measuring and estimating with non-standard units develops understanding of why standard units are necessary and help to provide an estimation of size. This leads to developing an understanding of the concept of standard units.
Non-standard units

Non-standard measurements can be used to develop the concept that measure and estimate of surface area can be described in terms of numerical values.
Measurement

Concept of area

Why is it important?
The ability to compare size and amount leads to a deeper understanding of relationships between measurements and how these can be applied to a range of situations and contexts.

- Concept of area
- Understanding area
- Estimating area
- Units of area
Concept of area

Develop an understanding of the concept of area through practical activities, investigation and discussion. This is related to geometric concept of enclosed area.

Why is it important?
The ability to compare size and amount leads to a deeper understanding of relationships between measurements and how these can be applied to a range of situations and contexts.
Measurement

Understanding area

Area is used to describe the size of any surface. This includes the surface within any given 2D shape. The conservation of area is knowing that when any surface is split into smaller parts then the total area of the parts is equal to the original surface area.
Measurement

Concept of area

Why is it important?
The ability to compare size and amount leads to a deeper understanding of relationships between measurements and how these can be applied to a range of situations and contexts.

Estimating area
Use non-standard units to build an understanding of estimating an area of a surface. Then select the most appropriate standard unit for the context.
Concept of area

Units of area
Conventions for describing and recording experiential measurements of area are introduced when it is recognised that there is a need for a standard unit of area and initially in context to build from non-standard to standard.

Why is it important?
The ability to compare size and amount leads to a deeper understanding of relationships between measurements and how these can be applied to a range of situations and contexts.

Units of area

Estimating area
Concept of volume

Why is it important?
Volume links with spatial awareness and impacts on a variety of objects encountered daily. The skills required to solve problems relating to volume are skills needed for learning, life and work.
Concept of volume

Volume is the measure of space taken up by a 3D object. The conservation of volume is knowing that when any object is split into smaller parts then the total volume of the parts is equal to the original volume.
Concept of volume

Why is it important?
Volume links with spatial awareness and impacts on a variety of objects encountered daily. The skills required to solve problems relating to volume are skills needed for learning, life and work.

Unit of volume
Conventions for describing and recording measurements of volume should be introduced when appropriate and initially in context.
Concept of volume

Why is it important?
Volume links with spatial awareness and affects objects encountered daily. The skills relating to volume are skills needed for learning, life, and work.

Estimating volume
The ability to estimate volume is built on an understanding of how to estimate other properties of shapes such as length, breadth, depth, and area.

- Concept of volume
- Unit of volume
- Estimating volume
- Capacity
- Mass

MAIN MENU
- Measurement
- Awareness of size and amount
- Comparison of size and amount
- Tolerance in measurement
- Formula and inter-relationships
- Non-standard units
- Calculations in measurement
- Standard units
Measurement

Concept of volume

Why is it important?
Volume links with spatial awareness and impacts on a variety of objects encountered daily. The skills required to solve problems for learning, life and work.

Capacity
Spatial awareness of 3D objects and the amount they can contain. Interior volume of an object.

Estimating volume
Measurement

Concept of volume

Why is it important?
Volume links with spatial awareness and impacts on a variety of objects encountered daily. The skills required to solve problems relating to volume are skills needed for learning, life and work.

Mass
A large body of matter with no definite shape. The amount of matter in an object.
Measurement

Why is it important?
Using standard units ensures a universal system of measurement which helps us to interpret, communicate and calculate measurements.
Standard units

Standard units are the universal system of measurement.

Why is it important?

Using standard units ensures a universal system of measurement which helps us to interpret, communicate and calculate measurements.

Link between concept and formula of area

Measure using standard units

Inter-relationships between units of measurement

Standard units

Standard units are the universal system of measurement.
Why is it important to measure using standard units? Using standard units ensures a universal system of measurement which helps us to interpret, communicate and calculate measurements. Awareness of a variety of types of scales should include analogue and digital and the most effective and efficient measuring instruments to be used.
Measurement

Standard units

Why is it important?
Using standard units ensures a universal system of measurement which helps us interpret, communicate and calculate measurements.

Link between concept and formula of area

Measure using standard units

Inter-relationships between units of measurement

Understanding the relationship between units of measure e.g. 10mm=1cm, 100cm=1m.
Measurement

Standard units

Why is it important?
Using standard units ensures a universal system of interpret, communicate and calculate measurements.

Link between concept and formula of area
More efficient ways of calculating surface area. Methodology should not detract from the concept of area.

Inter-relationships between units of measurement

Awareness of size and amount

Tolerance in measurement
Measurement

Convert units

Why is it important?
Ability to convert between units enable the most efficient and appropriate unit or measurement to be used. It underpins the rules and concepts in many areas e.g. science, engineering and technology.
Measurement

**Convert units**

The metric system is the internationally agreed system of units. Knowledge and understanding of the inter-relationship between different units. Knowledge of appropriate prefixes and understanding the language of measurement and notation.

- **Convert unit**
- **Selecting appropriate units**

**Why is it important?**

Ability to convert between units enable the most efficient unit to be used. It underpins the rules and concepts in many areas e.g. science, engineering and technology.

**Selecting appropriate units**

The metric system is the internationally agreed system of units. Knowledge and understanding of the inter-relationship between different units. Knowledge of appropriate prefixes and understanding the language of measurement and notation.
Measurement

Selecting appropriate units

Why is it important?

Ability to convert between units enable the most efficient and appropriate unit or measurement to be used. It underpins the rules and concepts in many areas e.g. science, engineering.

Convert units

Selecting appropriate units

Use the most appropriate unit of measurement in relation to individual contexts. The most appropriate unit of measurement is used to carry out a calculation.
Calculations involving measurements

Why is it important?
Calculations involving perimeter, area and volume are needed in real life contexts and enable us to work out accurate amounts.

- Calculations involving measurements
- Select the most appropriate calculation dependant on the situation and context
Calculations involving measurements
Carrying out calculations using the four operations involving perimeter, area and volume. Using whole numbers, fractions, decimal fractions or percentages according to context.
Calculations involving measurements

Why is it important?
Calculations involving measurements are used regularly in real life contexts to work out accurate amounts.

Select the most appropriate calculation dependant on the situation and context
Being able to apply the right calculation to fit the situation or context. Selecting the appropriate calculation, perimeter, area, or volume taking account of the dimensional aspect of the situation or context.
Formula and inter-relationships

Why is it important?
Formula is used to simplify the process of calculations and to calculate an unknown variable. Awareness of the inter-relationship between different formula and supports further calculations to be made e.g., diameter = \(2r\), radius \(r\), circumference \(C = \pi D\) or \(C = 2\pi r\).
**Formula**

Specific formula are used to carry out calculations involving measurement. These provide a method for accurately and efficiently calculating perimeter, area, and volume. Use knowledge of the formula to be able to undertake a number of related calculations associated with length, breadth, height, area, and volume. Understand the interconnectivity between the variances in the formula.

Why is it important?

Formula is used to simplify the process of calculations and to calculate an unknown variable. Awareness of the inter-relationship between different formulas and supports further calculations, for example, diameter = \( x \) radius \( C = \pi D \) or \( C = 2\pi r \).
Why is it important?
Formula is used to simplify the process of calculations and to calculate an unknown variable. Awareness of the inter-relationship between different formulas and supports further calculations, e.g., diameter = \( x \) radius \( C = \pi D \) or \( C = 2\pi r \).

Inter-relationships
Understand the links between perimeter and area. Being able to work backwards and forwards when calculating measurements. Knowledge and understanding of relationships between dimensions and how to manipulate formulas dependent on the context.
Tolerance in measurement

Why is it important?
Relates to acceptable margins of error when measuring, estimating or calculating measurements. Understanding of tolerance in measurement is appreciation of accuracy when making calculation.
Measurement

Tolerance in measurement

To understand margins of error are acceptable in different contexts and the impact this could have.
Data and analysis

- Concept of data analysis
- Collect and organise
- Display and communicate
- Interrogate
- Drawing conclusions
Data and analysis

Concept of data analysis

Why is it important?
Data and analysis is an essential aspect of everyday life. It is the ability to use a range of information presented in various forms.
Data and analysis

**Concept of data analysis**
Using data to make informed choices and decisions. Exploring data to make sense of the world around us.
Data and analysis

Collect and organise

Why is it important?
Collecting and organising data and information supports decision making relevant to the context.

Interrogate
Data and analysis

**Collect and organise**
Gathering information from a variety of sources and organising it in a way that suits the audience.

- **Collect and organise**
- **Matching, sorting and comparing**
- **Gathering and organising**

Collecting and organising data and information supports decision making relevant to the context.
Collect and organise

Why is it important?
Collecting and organising data and information supports decision making relevant to the context.

Matching, sorting and comparing
Matching objects which have the same characteristics. As criteria increases then this become sorting e.g. matching more than two objects. Sorting involves separating objects into groups according to their similarities or differences. Progression is made when moving from comparing individual items to comparing groups. This becomes increasingly sophisticated as learners progress their understanding.

Gathering and organising

Interrogate
Data and analysis

Collect and organise

Why is it important?
Collecting and organising data and information supports decision making relevant to the context.

Gathering and organising
A range of information and data can be collected from a variety of appropriate sources and for many purposes.

This is organised into an appropriate form; table, chart or diagram to support interrogation and analysis.

Data can be organised into groups depending on the context.
Data and analysis

Display and communicate

Why is it important?
To share information and findings in a logical form.

- Display and communicate
- Types of display
- Communicating findings

Interrogate
Data and analysis

Display and communicate
Sharing information in a variety of forms that can be understood by the intended audience.
Data and analysis

Types of display
The choice of how to display information will vary and should be appropriate for the context and the intended audience. Progression from simple bar graphs and picture charts to venn diagrams and pie charts.
Data and analysis

Display and communicate

Why is it important?
To share information and findings in a logical form.

Communicating findings
Presenting the findings and conclusions from the collation of information and data.
Data and analysis

Interrogate

Why is it important?
In real life situations information is provided in a variety of ways. To interrogate the information enables choices and decisions to be made.
Data and analysis

**Interrogate**
Simple interrogation of data is reading and extracting key information from tables, charts, graphs etc. This enables decisions around the validity and reliability of the data e.g. in relation to sample size.
Data and analysis

Interrogate

Why is it important?
In real life situations information is provided in a variety of ways. This enables choices and decisions to be made.

Critical analysis of data
Critical analysis is an in-depth scrutiny of data which could include looking at trends, correlations and relationships between data.
Data and analysis

Drawing conclusions

Why is it important?
Drawing conclusions from data to help make informed choices.

- Drawing conclusions
- Reliability and validity
- Bias and sample size
- Statistical calculations

Interrogate
Data and analysis

Drawing conclusions
Using the information presented in different forms and its source to draw conclusions which could affect decision making.

Statistical calculations
Reliability and validity
Bias and sample size
Data and analysis

Drawing conclusions

Why is it important?

Drawing conclusions from data to help make informed choices.

Reliability and validity

Reliability is the credibility of the source as well as the collation of the data. Reliability is the repeatability of a particular set of findings e.g. how accurate would the information be in a second identical information gathering activity? Reliability is a necessary ingredient for determining the overall validity of an investigation or survey and enhancing the strength of the results.

- Drawing conclusions
- Reliability and validity
- Bias and sample size
- Statistical calculations

Interrogate
Data and analysis

Drawing conclusions

Why is it important?
Drawing conclusions from data to help make informed choices.

Bias and sample size
Bias is who or what is included in the intended sample. A biased sample can result in a non-valid data set. The size of the group can have an impact on the validity of the survey.
Data and analysis

Drawing conclusions

Why is it important?

**Statistical Calculations**
Statistical calculations support the evaluation and interpretation of data and draw conclusions from data.

**Bias and sample size**
Ideas of chance and uncertainty

Simple choice and decision making
Predicting and describing likelihood
Choice and decision making based on likelihood
Probability
Applying knowledge of probability
Ideas of chance and uncertainty

Simple choice and decision making

Why is it important?
Using everyday language to identify outcomes of familiar events supports the development of critical thinking skills. This enables discussion around choices and consideration of alternative options when making choices and decisions.
Ideas of chance and uncertainty

Simple choice and decision making

Using everyday language to identify outcomes of familiar events supports the development of critical thinking skills. This enables discussion around choices and consideration of alternative options when making choices and decisions.

Simple choice and decision making

Describing the possible outcomes using everyday language e.g. will happen, won’t happen.
Ideas of chance and uncertainty

Predicting and describing likelihood

Why is it important?
Predicting and describing the likelihood of events occurring can help develop the ability to make informed choices and mathematical thinking.
Ideas of chance and uncertainty

Predicting and describing likelihood

Using information to determine possible outcomes
Ideas of chance and uncertainty

Predicting and describing likelihood

Why is it important?
Predicting and describing the likelihood of events occurring can help develop the ability to make informed choices and mathematical thinking.

Language of chance
Being able to classify outcomes using appropriate language e.g. likely, certain.

Simple choice and decision making

Applying knowledge of probability
Ideas of chance and uncertainty

Predicting and describing likelihood

Why is it important?
Predicting and describing the likelihood of events occurring can help develop the ability to make informed choices and mathematical thinking.

Scale
Knowledge of the numerical scale to describe probability 0-1.
Ideas of chance and uncertainty

Choice and decision making based on likelihood

Why is it important?
Developing an understanding of how likely an event is to happen will support the decision making process.
Ideas of chance and uncertainty

Choice and decision making based on likelihood

Likelihood is the probable chance of an event occurring and using this information to make informed choices.

- Choice and decision making
- Conducting chance experiments
- Order the chance of specified outcomes

Why is it important?
Developing an understanding of how likely an event is to happen will support the decision making process.
Ideas of chance and uncertainty

Choice and decision making based on likelihood

Why is it important?
Developing an understanding of how likely an event is to happen will support the decision making process.

Conducting chance experiments
To calculate the likelihood of an event occurring. Practical experiments to support understanding of possible outcomes and the likelihood of an event occurring.

Simple choice and decision making

Applying knowledge of probability

Choice and decision making
Conducting chance experiments
Order the chance of specified outcomes
Ideas of chance and uncertainty

Choice and decision making based on likelihood

Why is it important?
Developing an understanding of how likely an event is to happen will support the decision making process.

Order the chance of specified outcomes
Given the numerical value to determine which is most or least likely to occur.
Ideas of chance and uncertainty

**Probability**

**Why is it important?**
Calculating theoretical probability helps build an understanding of the consequences of events and likelihood of an event occurring.

- **Probability**
- **Assigning numerical values**
- **Interpreting probability**
- **Notation**
Ideas of chance and uncertainty

**Probability**

The likelihood of an event occurring. Many events cannot be predicted with total certainty.

Calculating theoretical probability helps build an understanding of events and likelihood of an event occurring.
Assigning numerical values

A probability scale is used to numerically represent the probability of an event occurring. The numerical representation can be in the form of fractions, decimal fractions or percentages within a scale of 0-1 or 0-100%. The probability of any possible mutually exclusive event happening is 1 i.e. certain.
Ideas of chance and uncertainty

**Probability**

**Why is it important?**
Calculating theoretical probability helps build an understanding of the consequences of events and likelihood of an event occurring.

**Interpreting probability**
Using the numerical representation to determine the likelihood of the event happening to inform decision making.

- Probability
- Assigning numerical values
- Interpreting probability
- Notation
Ideas of chance and uncertainty

Probability

Why is it important?
Calculating theoretical probability helps build an understanding of the consequences of events and likelihood of an event occurring.

Notation
A method of expressing the probability of an event occurring using a mathematical statement.

Interpreting probability

Simple choice and decision making

Applying knowledge of probability
Ideas of chance and uncertainty

Applying knowledge of probability

Why is it important?
Understanding and being able to quantify risks helps us to make more informed decisions.
Ideas of chance and uncertainty

Applying knowledge of probability

The ability to assess risk involves considering all the possible outcomes and planning for them. This would include understanding of chance experiments involving repeated trials often with the use of technology.

Applying knowledge of probability

Understanding and being able to quantify risks helps us to make more informed decisions.
Ideas of chance and uncertainty

Applying knowledge of probability

Why is it important?
Understanding and being able to quantify risks helps us to make more informed decisions.

Formula
Is used to calculate the probability of an event occurring.