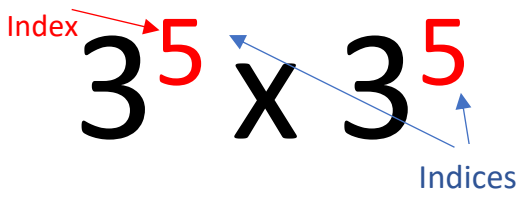
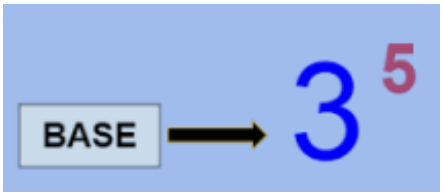
‘Indices’

The Knowledge for Progression:

- To know that when multiplying terms with the same base you add the indices.
- To know that when dividing terms with the same base you subtract the indices.
- To know that when raising a power to the power you multiple the indices.
- To know that a value to the power of 0 is 1.
- To know that a value to the power of 1 is itself.
- To know that $a^{-n} = \frac{1}{a^n}$.
- To know that the denominator of a fractional index is the root.
- To know that the numerator of a fractional index is the power.

Speak Like a Mathematician

Key Word	Dual Coding	Definition
Indices		Indices is plural for index or power. The number that tells you how many times to multiply the base by itself
Base		The value that is being raised to a power

‘Calculations with standard form’

The Knowledge for Progression:

- To know that standard form is an alternative way to express large and small numbers.
- To know that standard form has a set notation.

Speak Like a Mathematician

Key Word	Dual Coding	Definition
Standard form	Standard form is written in the form $a \times 10^n$. Where a is $1 \leq a < 10$ and n is any positive or negative number	An alternative number system to express large and small numbers

‘Factors, multiples, and primes’

The Knowledge for Progression:

- To know that a factor is a value that divides without remainder.
- To know that a multiple is the repeated multiplication of a number.
- To know that a prime number is an integer with only 2 factors, 1 and itself.
- To know that the product is the result of multiplying values together.
- To how that the highest common factor (HCF) is calculated by multiplying the values in the intersection of the Venn diagram.
- To how that the lowest common multiple (LCM) is calculated by multiplying all the values in the Venn diagram.

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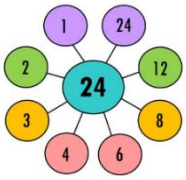
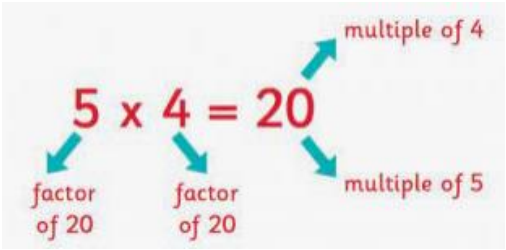
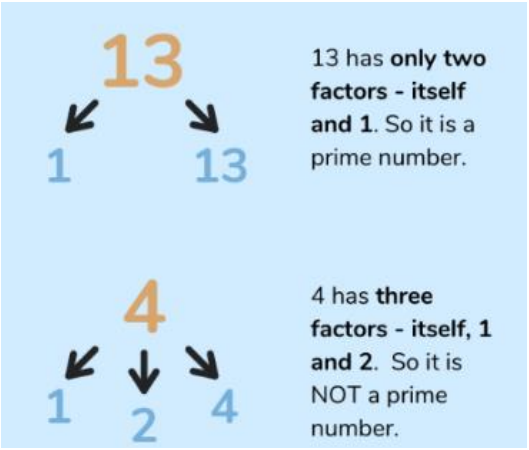
Key Word	Dual Coding	Definition
Factor		A value that divides without remainder
Multiple		Repeated multiplication of a value
Prime		An integer with only two factors, one and itself

‘Algebraic manipulation’

The Knowledge for Progression:

- To know that terms are a constant, variable or combination of both and can be positive or negative. The 4 operations can be applied in the same way as numerical operations.
- To know that an expression is made up of constants, variables and mathematical operations, but does not include an = sign.
- To know that a formula describes a mathematical relationship between variables.
- To know that a column vector describes movement.
- To know that expanding means the removal of brackets by multiplication.
- To know that factorising is a way of writing an expression as the product of its factors using brackets.
- To know that a quadratic expression is in the form of $ax^2 + bx + c$.

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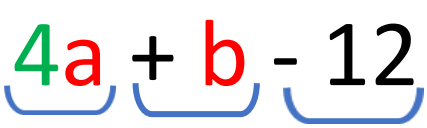
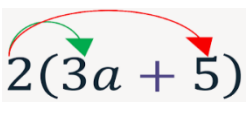
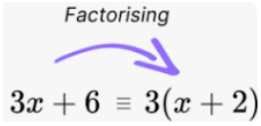
Key Word	Dual Coding	Definition
Variable		A letter or a symbol representing a numerical value
Coefficient		A numerical value that comes before a variable
Term		A constant, variable or combination of both
Expression	4a + b - 12	Made up of constants, variables, and mathematical operations
Linear Expression	2y + 3	A first order expression, it has no variable with an exponent higher than one
Quadratic Expression	$2y^2 + 3y + 8$	A second order expression, which is in the form $ax^2 + bx + c$
Equation	4a + b – 12 = 32	Two expressions connected by an equal symbol
Formula	$S = \frac{D}{T}$	Describes a mathematical relationship between variables
Column Vector	$\begin{pmatrix} 3 \\ 2 \end{pmatrix}$ *is* $\begin{pmatrix} 3\ right \\ 2\ up \end{pmatrix}$	Describes movement
Expand		The removal of brackets by multiplying
Factorise		A way of writing an expression as the product of its factors using brackets

‘Surds’

The Knowledge for Progression:

- To know that a rational number can be written as a fraction.
- To know that an irrational number cannot be written as a fraction.
- To know that a surd is a root of a number that cannot be simplified into a rational number.
- To know that rationalising creates an equivalent fraction with a rational denominator.

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Key Word	Dual Coding	Definition
Rational number	$6 \quad 3.65 \quad \frac{2}{5} \quad -0.\dot{4}$	An integer or a decimal that recurs or terminates
Irrational number	$\pi \quad \sqrt{11} \quad -\sqrt{5}$	A number that has an infinite number of digits and does not recur or terminate
Surd	✓ $\sqrt{11} \equiv 3.31662\ldots$ ✗ $\sqrt{9} \equiv 3$	A root that cannot be simplified into a rational number
Rationalise	$\frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$	The process of removing surds from the denominator of a fraction

‘Solving equations and inequalities’

The Knowledge for Progression:

- To know that an equation contains an equals symbol, variable and constant.
- To know that an inequality contains an inequality symbol, variable and constant.
- To know that equation/inequality are formed from expressions.
- To know that solve means to find the value of the variable.
- To know that solving always requires performing the inverse operations.

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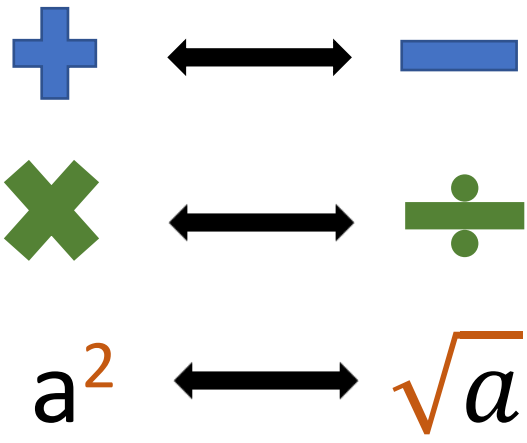
Key Word	Dual Coding	Definition
Equation	$4a + b - 12 = 32$	Two expressions connected by an equal symbol
Inequality	$4a + b - 12 > 32$	Two expressions connected by an inequality symbol
Solve	$\frac{x}{5} = 6$ $x = 30$	Find the value of the variable
Inverse		Opposite operations that reverse the effect of the other operation

‘Financial maths with percentages’

The Knowledge for Progression:

- To know that a balance is the amount in your bank account.
- To know that a credit is money going into an account.
- To know that a debit is money going out of an account.
- To know that percentage change = (difference in values ÷ original value) x 100.
- To know that compound interest is interest upon interest over time.

Speak Like a Mathematician

Key Word	Dual Coding	Definition
Balance		The amount of money in your bank account
Credit		Money going **into** your bank account
Debit		Money going **out** of your bank account
Compound Interest		Interest you earn upon previous interest over time
Depreciation		Reduction in value over time