

The Oswaldtwistle School



Whole School Numeracy Policy March 2022

To be reviewed March 2023







Whole School Numeracy Policy

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1. What is Numeracy?

Numeracy, sometimes known as 'Mathematical Literacy', is the basic mathematical skills required to function in modern day living. Being numerate means being able to reason with numbers and other mathematical concepts, along with being able to apply these in a range of contexts and to solve a variety of problems.

Numeracy Skills include:

-  Interpret data, charts and diagrams
-  Processing information
-  Solving problems
-  Checking answers
-  Understanding and explaining solutions
-  Make decisions based on logical thinking and reasoning

We use numeracy every day in all areas of our lives. Our confidence and ability with numbers impacts us financially, socially, and professionally. It can even have an impact on our health and wellbeing. Poor numeracy can affect people's confidence and self-esteem.

Numeracy at Oswaldtwistle is at the heart of all learning and is involved in all aspects of our daily lives. As teachers of all subjects, it is our duty to enable and encourage our learners to develop in all of the above and therefore become young numerate adults. Numeracy skills can be developed across the curriculum, not just what happens in maths lessons, and therefore the development and consolidation of numeracy is a whole school responsibility.

2. Aims for Oswaldtwistle School

- ✚ To develop, maintain and improve standards of Numeracy across all key stages and sites.
- ✚ To raise the profile of numeracy across the curriculum.
- ✚ To ensure that all teaching and learning is embedded with numeracy that is relevant and meaningful to students learning, and mathematically accurate.
- ✚ To give students of all abilities and backgrounds the opportunity to improve their numeracy skills.
- ✚ To raise the awareness of Numeracy amongst staff through training and departmental meetings.
- ✚ To encourage staff to share good Numeracy practice and engage in cross curricular Numeracy activities to ensure consistency of practice.
- ✚ To have an open-door policy in regards to Numeracy, so both Staff and Students feel supported.
- ✚ To promote logical thinking skills and apply numeracy in doing so.
- ✚ Develop Numeracy posters aimed at the different subjects to display how numeracy is used across the curriculum and its importance.

3. Strategies

Develop positivity towards Numeracy

All staff has the responsibility to be Numeracy role models – demonstrating positive attitudes surrounding Numeracy and Maths as well as expressing the importance to students in real life. Staff should encourage students to engage with Numeracy posters, Maths challenges, Maths vocabulary activities, form time activities and skills checks to plug gaps in Numeracy knowledge.

Develop a consistent approach to Numeracy

In order to develop a consistent approach to Numeracy across the school, staff should:

- ✚ Use agreed approaches to Numeracy
- ✚ Ensure any relevant equipment that can be used for Mathematical reasons is available
- ✚ Encourage students to estimate an initial answer in order to decide if their answer is realistic
- ✚ Follow any mathematical notation and be consistent with this
- ✚ Encourage students to show all working out for all numeracy-based questions and activities
- ✚ Provide training for staff in basics of numeracy
- ✚ Assist in encouraging students to use mental calculations wherever possible
- ✚ Use correct mathematical language such as 'subtract' rather than 'take away'

Raising the profile of Numeracy

Department of Mathematics

- ✚ Create a positive and attractive environment which celebrates numeracy.
- ✚ Identify pupils who require additional intervention to plug numeracy gaps and take out of lessons to provide numeracy intervention support.
- ✚ Seek opportunities to use topics and examination questions from other subjects in mathematics lessons.
- ✚ Be aware of the mathematical techniques used in other subjects and provide guidance and training to other departments so that a sound, coherent and consistent approach is used in all subjects, using preferred methods.
- ✚ Provide information about common misconceptions and errors which may occur during teaching of specific topics.
- ✚ Be aware of appropriate expectations of pupils and difficulties that might be experienced with numeracy skills.

Other subject areas and form time

- ✚ Create a positive and attractive environment which celebrates numeracy.
- ✚ Ensure that staff are familiar with correct mathematical language, notation, conventions, and techniques relating to their own subject and encourage pupils to use these correctly.

- ✚ Provide examples of where numeracy may be applied in other subjects to the subject leads to include in their planning
- ✚ Explore possibilities for cross-curricular links with the department of Mathematics
- ✚ Provide Numeracy problem solving and key word tasks to be completed in form time to promote fluency the discussion of numeracy.

4. Use of Calculators

In deciding when pupils use a calculator in lessons, we should ensure that:

- ✚ Pupils' first resort should be mental methods.
- ✚ Pupils have sufficient understanding of the calculation to decide the most appropriate method: mental, pencil and paper or calculator.
- ✚ Pupils understand the four arithmetical operations and recognise which to use to solve a Particular problem and recall the order of operations (BIDMAS).
- ✚ We help pupils, where necessary, to use the correct order of operations – especially in multi-step calculations, such as $(3.2 - 1.65) \times (15.6 - 5.77)$.
- ✚ Pupils have the technical skills required to use the basic functions of a calculator constructively and efficiently, the order in which to use keys, how to enter numbers as money, measures, fractions, etc.
- ✚ When using a calculator, pupils are aware of the processes required and are able to say whether their answer is reasonable.
- ✚ Pupils can interpret the calculator display in context (e.g. 5.3 is £5.30 in money calculations).

5. Mathematical Vocabulary

The following are all important aspects of helping pupils with the technical vocabulary of Mathematics;

- ✚ Using a variety of words that have the same meaning e.g. add, plus, sum.
- ✚ Encouraging pupils to be less dependent on simple words and encouraging the use of the mathematical dictionaries e.g. exposing them to the word multiply as a replacement for times.
- ✚ Discussions about words that have different meanings in mathematics from everyday life e.g. take away, volume, product, etc.
- ✚ Highlighting word sources e.g. quad means 4, lateral means side so that pupils can use them to help remember meanings.
- ✚ Promote analysis of words, reviewing the prefixes and where they come from. E.g. Sept – Oct – October, Octagon, Octopus all relating to the number 8.
- ✚ Use of Numeracy Vocabulary in form time activities to promote discussion around the given words and their meanings.

All maths key words can be found in section 8 of this policy.

6. Cross Curricular Links

Art	<p>Symmetry Use of paint mixing as a ratio Perspectives – Enlargements Scale Drawings</p>
Curriculum for Life	<p>Overseas development budgets Data analysis Statistics Questionnaires</p>
English	<p>Comparison of 2 data sets on word and sentence length. Understanding facts and figures in non-fiction texts Statistics</p>
Geography	<p>Representing data Analysing data Use of Spreadsheets Distance/Time</p>
History	<p>Timelines Sequencing events Analysing Data</p>
PE	<p>Collection of real data Estimation Speed, Distance, Time Statistical Comparisons</p>
Science	<p>Calculating with formulae Graphing skills Ratio and proportion Problem solving Balancing Equations</p>
Technology	<p>Measuring skills Units of area and volume Scale drawings Plans and Elevations Ratio</p>

7. Mathematics Yearly Overview

	KS3	KS4 Foundation	KS4 Higher
Autumn 1	Number and the Number System & Calculating	Number and the Number System & Calculating	Calculating & Visualising and Constructing
Autumn 2	Checking, Approximating and Estimating & Visualising	Visualising and Constructing & Understanding Risk & Algebraic Proficiency	Algebraic Proficiency & Proportional Reasoning
Spring 1	Algebraic Proficiency & Exploring FDP & Proportional Reasoning	Exploring FDP & Proportional Reasoning & Pattern Sniffing	Pattern Sniffing & Solving Equations and Inequalities
Spring 2	Pattern Sniffing & Measuring Spaces & Angles & Calculating with FDP	Investigating Angles & Calculating with FDP & Solving Equations	Calculating Space & Conjectures
Summer 1	Solving Equations & Calculating Space	Calculating Space & Algebraic Proficiency	Algebraic Proficiency & Solving Equations and Inequalities
Summer 2	Mathematical Movement & Measuring Data & Presenting Data	Understanding Risk & Presenting Data & Measuring Data	Understanding Risk & Presentation of Graphs

Please note, this is not set in stone and may alter during the year due to the fluid nature of the school, student understanding, prior knowledge and retrieval skills. Please ask the maths department if you want to know where a topic fits in with your subject. We are more than happy to help.

8. Maths Vocabulary

A

Acute angle	An angle less than 90° .
Adjacent	Adjacent sides are next to each other and are joined by a common vertex.
Algebra	Algebra is the branch of mathematics where symbols or letters are used to represent numbers.
Angle	An angle is formed when two straight lines cross or meet each other at a point. The size of an angle is measured by the amount one line has been turned in relation to the other.
Approximate	An approximate value is a value that is close to the actual value of a number.
Arc	Part of a circumference of a circle.
Area	The amount of space a shape takes up. E.g. the area of the lawn is 35 square metres.
Asymmetrical	A shape which has no lines of symmetry.
Average	A value to best represent a set of data. There are three types of average - the mean, the median and the mode.
Axis	An axis is one of the lines used to locate a point in a coordinate system.

B

Bearing	A three-digit angle measured from north in a clockwise direction.
BIDMAS	A way of remembering the order in which operations are carried out. It stands for Brackets - Indices - Division - Multiplication - Addition - Subtraction.
Bisect	To divide an angle or shape exactly in half.
Brackets	Used to determine the order in which operations are carried out. For example, $3 + 4 \times 2 = 11$ but $(3 + 4) \times 2 = 14$.

C

Calculate	To work out the value of something. This does not have to mean you need a calculator!
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Centilitre (cl)	A measure of volume. 100 centilitres = 1 litre (100 cl = 1 l). 1 centilitre = 10 millilitres (1 cl = 10 ml).
Centimetre (cm)	A measure of distance. 1 centimetre = 10 millimetres. (1 cm = 10 mm). 100 centimetres = 1 metre. (100 cm = 1 m).
Chord	A straight line drawn from one point on the edge of a circle to another.
Circumference	The perimeter of a circle.
Coefficient	The number in front of an algebraic symbol. For example, the coefficient of 5x is 5.
Congruent	If you can place a shape exactly on top of another then they are said to be congruent. You may rotate, reflex or translate the shape.
Constant	A letter or symbol whose value always stays the same. The constant π is a common example.
Credit	To add money to a bank account. For example, I had £500 credited to my bank account.
Cross section	The end section created when you slice a 3D shape along its length.
Cube number	The product when an integer is multiplied by itself twice. For example, 5 cubed = $5 \times 5 \times 5 = 125$.
Cuboid	A 3D shape with all sides made from rectangles.
Cumulative frequency	A running total of the frequencies, added up as you go along.

D

Day	A time period of 24 hours. There are 7 days in a week.
Debit	To take out money from a bank account. For example, £400 was debited from my account.
Decagon	A ten-sided polygon.
Decimal	Not a whole number or integer. For example, 3.6 or 0.235.
Decrease	To make an amount smaller.
Denominator	The bottom part of a fraction.
Diameter	The distance across a circle which passes through the centre.

Difference	Subtract the smaller value from the larger value to find the difference between two numbers.
Distance	How far away an object is. For example, it is a distance of 3 miles to the city centre.
Distribution	How data is shared or spread out.
E	
Equal	Used to show two quantities have the same value.
Equation	Two expressions which have the same value, separated by an '=' sign. E.g. $3y = 9 + y$
Equilateral triangle	A triangle with all sides and angles the same size.
Estimate	To find an approximate answer to a more difficult problem. E.g. 31.2×5.94 is roughly equal to $30 \times 6 = 180$.
Even number	Any number which is a multiple of 2. Even numbers always end in 2, 4, 6, 8 or 0.
Expand	To multiply out brackets in an expression. For example, $2(3x + 7) = 6x + 14$.
Expression	A collection of terms which can contain variables (letters) and numbers. E.g. $4pq - q + 7$
F	
Factor	A number that divides another number exactly. E.g. 4 is a factor of 12.
Factorise	To put an expression into brackets by taking out a common factor. For example, $20x + 15y = 5(4x + 3y)$.
Figures	Another name for numbers. For example, one thousand and fifty in figures is 1050.
Formula	An equation used to describe a relationship between two or more variables.
Frequency	How many times something happens. Another word for 'total'.
Frequency density	The frequency divided by the class width.
G	
Gradient	How steep a line is. Found by dividing the distance up by the distance across.

Gram (g)	A measure of mass. 1 gram = 1000 milligrams. (1 g = 1000 mg)
H	
HCF	Stands for 'highest common factor'. It is the largest factor common to a set of numbers. E.g. The HCF of 16 and 24 is 8.
Heptagon	A seven-sided polygon.
Hexagon	A six-sided polygon.
Histogram	A diagram drawn with rectangles where the area is proportional to the frequency and the width is equal to the class interval.
Hypotenuse	The longest side on a right-angled triangle.
I	
Increase	To make an amount larger.
Indices	Another name for powers such as ² or ³ .
Integer	A whole number.
Inter-quartile range (IQR)	The difference between the upper and lower quartile.
Irrational	A decimal which is never ending. It must also not be a recurring decimal.
J	
Justify	Another word for 'explain'. Often crops up on your maths exam. E.g. 'Calculate the mean and range for each player. Who is the better player Justify your answer.'
K	
Kilogram (Kg)	A measure of mass. 1 kilogram = 1000 grams. (1 kg = 1000 g)
Kilometre (Km)	A measure of distance. 1 kilometre = 1000 metres. (1 km = 1000 m)
L	
LCM	Stands for 'lowest common multiple'. It is the smallest multiple common to a set of numbers. E.g. The LCM of 3 and 4 is 12.
Litre (l)	A measure of volume. 1 litre = 100 centilitres (1 l = 100 cl). 1 litre = 1000 millilitres (1l = 1000 ml).

Loci	The plural of locus.
Locus	A collection of points which are the same distance from another point or line.
Lower range	The smallest value in a set of data.

M

Mean	A type of average found by adding up a list of numbers and dividing by how many numbers are in the list.
Median	The middle value when a list of numbers is put in order from smallest to largest. A type of average.
Metre (m)	A measure of distance. 1 metre = 100 centimetres. (1 m = 1000 cm).
Millilitre (ml)	A measure of volume. 10 millimetres = 1 centilitre (10 ml = 1 cl). 1000 millilitres = 1 litre (1000 ml = 1 l).
Millimetre (mm)	A measure of distance. 10 millimetres = 1 centimetre. (10 mm = 1 cm).
Modal	Another term for mode
Mode	The most common value in a list of numbers. If two values are tied then there is two modes. If more than two values are tied then there is no mode. A type of average.
Month	A time period of either 28, 29, 30 or 31 days. There are 12 months in a year.
Multiple	A number which is part of another number's times table. E.g. 35 is a multiple of 5.

N

Natural number	A positive integer
Negative	A value less than zero
Nonagon	A nine-sided polygon.
Numerator	The top part of a fraction.

O

Obtuse angle	An angle between 90° and 180°.
Octagon	An eight-sided polygon.

Odd number	A number that is not a multiple of 2. Odd numbers always end in 1, 3, 5, 7 or 9.
Operation	An action which when applied to one or more values gives an output value. The four most common operations are addition, subtraction, multiplication and division.
P	
Parallel	Two or more lines which are always the same distance apart.
Parallelogram	A quadrilateral with two pairs of parallel sides.
Pentagon	A five-sided polygon.
Perimeter	The distance around a shape.
Perpendicular	Two or more lines which meet at right angles.
Pi (π)	An irrational constant used when calculating the area and circumference of circles. It is approximately equal to 3.14.
Polygon	A shape made from straight lines.
Positive number	A number greater than zero.
Prime	A number which has exactly two factors. The number one and itself.
Prism	A 3D shape with the same cross section all along its length.
Probability	A measure of how likely an event is to occur.
Product	The answer when two values are multiplied together.
Q	
Quadratic equation	An equation where the highest power is two. For example, $x^2 + 4x + 6 = 0$ is a quadratic equation.
Quadrilateral	A four-sided polygon.
R	
Radius	The distance from the centre of a circle to its circumference. The plural of radius is radii.
Random sampling	A method of choosing people at random for a survey.

Range	The largest number take away the smallest value in a set of data.
Rational	A decimal number which ends or is recurring.
Reciprocal	The reciprocal of any number is 1 divided by the number. E.g. the reciprocal of 3 is $\frac{1}{3}$., the reciprocal of $\frac{3}{4}$ is $\frac{4}{3}$.
Recurring	A decimal which never ends but repeats all or parts of the sequence of numbers after the decimal point. E.g., 0.333333 or 0.141414.
Reflex angle	An angle greater than 180° .
Regular	A shape with all sides and angles the same size.
Remainder	The amount left over when a number cannot be divided exactly. For example, 21 divided by 4 is 5 remainder 1.
Right angle	An angle of 90° .
Rotation	To turn a shape using an angle, direction and centre of rotation.
Round	To reduce the number of significant figures or decimal places a number has. For example, £178 rounded to the nearest £10 is £180.
S	
Scale factor	How many times larger or smaller an enlarged shape will be.
Segment	An area of a circle enclosed by a chord.
Sequence	A list of numbers which follows a pattern. For example, 6, 11, 16, 21, ...
Simplify	To write a sum, expression or ratio in its lowest terms. For example, 4:10:6 can be simplified to 2:5:3.
Solid	A 3D shape.
Solve	To find the missing value in an equation.
Speed	How fast an object is moving. Average speed = Total distance divided by time taken.
Square number	The product when an integer is multiplied by itself. For example, 1, 4, 9, 16, 25, 36, 49, 64, 81, 100.
Sum	The answer when two or more values are added together.
Surface area	To total area of all sides on a 3D shape.

Symmetrical	A shape which has at least one line of symmetry.
T	
Tally	A system of counting where every group of four vertical lines is followed by a horizontal line to easily count in steps of five.
Tangent	A straight line that just touches a point on a curve. A tangent to a circle is perpendicular to the radius which meets the tangent.
Term	A number, variable or combination of both which forms part of an expression.
Transformation	The collective name for reflections, rotations, translations and enlargements.
Translation	To move a shape from one position to another by sliding in the x-axis followed by the y-axis.
Trapezium	A quadrilateral with one pair of parallel sides.
Tree diagram	A method of solving probability questions by listing all the outcomes of an event. Probabilities are calculated by multiplying down the branches.
Triangle	A three-sided polygon.
Triangular number	A sequence of numbers generated by adding one more than was added to find the previous term. For example, 1, 3, 6, 10, 15, 21, ...
U	
Units	A quantity used to describe a measurement. Examples are kilograms, metres and centilitres.
Upper range	The largest value in a set of data.
V	
Value	A numerical amount or quantity.
Variable	A letter which we don't know the value of.
Volume	The amount an object can hold. E.g. a bottle of cola has a volume of 2 litres.
W	
Week	A time period of 7 days.
Wide	Used to describe the width of something

Width	The distance from side to side. E.g. 'The swimming pool is 10 metres wide.'
X	
X-Axis	The horizontal axis on a graph. The line going across the page.
Y	
Y-Axis	The vertical axis on a graph. The line going from top to bottom.
Y-Intercept	The value of the y-coordinate when a graph crosses the y-axis.
Year	A time period of 12 months or 365 days. (366 in a leap year.)
Z	
Z-Axis	Represents the depth of an object when working with 3D coordinates.

9. Useful Websites

[MathsGenie.co.uk](https://www.mathsgenie.co.uk) (How to Videos)

[CorbettMaths.com](https://www.corbettmaths.com) (How to Videos)

[Youtube.com](https://www.youtube.com) (How to Videos)

[MathsMadeEasy.co.uk](https://www.mathsmadeeasy.co.uk) (Online Practice Papers)

[OnMaths.com](https://www.onmaths.com) (Online Practice Papers)

10. Evaluation

	ACTION	IMPACT	MEASURE
1	All year groups to take part in Numeracy Form Time activities Tuesday – Logical thinking skills Thursday – Discussion of Numeracy related key words.	Improved numeracy skills Improved logical thinking skills Improved fluency with mathematical discussions for Students and Staff	Pupil voice Staff Voice
2	Staff to enter student data into BehaviourWatch 4 times per year	Progress data can be tracked by SP Areas of weakness identified Students identified in need of intervention	Data Capture Outcomes Intervention plan written Staff Voice
3	SP to review student ability and arrange for appropriate intervention to take place (Work designed and provided by SP)	Analysis of data to identify students with areas of weakness in Numeracy Intervention Intervention plans in place – improved outcomes for pupils	Pupil Voice Staff Voice Data Capture outcomes
4	Opportunities for Numeracy highlighted in Schemes of Work and cross-curricular links made.	Staff are able to plan appropriately for opportunities for numeracy within their day-to-day lessons Students use standard methods across school	Schemes of Learning Lesson Observation Pupil Voice Pupil workbooks
5	Mathematical key words displayed and used in lessons where appropriate	Students draw links between Maths and other subjects Mathematical vocabulary improved	Pupil Voice Staff Voice Pupil workbooks
6	Marking focused on Mathematical Literacy where appropriate	All calculations / working is corrected and appropriately set out. Corrections are completed by students	Pupil Voice Pupil Workbooks
7	Subject specific posters supplied to classroom to promote the use of Numeracy across the curriculum	Further cross-curricular links made More awareness of the use of Numeracy skills outside of the mathematics classroom	Pupil Voice Staff Voice Lesson Observations