





NUMERACY POLICY

St John Fisher Catholic High School



School/Academy:	St John Fisher Catholic High School
Date adopted by Governing Body:	13th October 2021
Signed (Chair):	 Mr D Mallin
Signed (Headteacher):	 Mrs A Rigby

Produced by:	Mr J Robson
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Date to be reviewed	Comments
October 2022	



Definition

‘Numeracy is a proficiency which is developed mainly in mathematics but also in other subjects. It is more than an ability to do basic arithmetic. It involves developing confidence and competence with numbers and measures. It requires understanding of the number system, a repertoire of mathematical techniques, and an inclination and ability to solve quantitative or spatial problems in a range of contexts. Numeracy also demands understanding of the ways in which data are gathered by counting and measuring, and presented in graphs, diagrams, charts and tables.’

(Framework for Teaching Mathematics – years 7 to 9 – DfES)

Aims

The aims of this numeracy policy are:

- 1) to develop, maintain and **raise the standards** in numeracy across the school.
- 2) to ensure **consistency of practice** including methods, vocabulary and notation.
- 3) to indicate areas for **collaboration** between subjects.

1 - Raising Standards

In form time, one morning a week in KS3 is dedicated to a numeracy activity following registration and the daily act of worship.

We use ‘Numeracy Ninjas’ which is a whole-cohort numeracy intervention. In each session students complete a 5-minute skills test which includes: 10 questions on mental numeracy calculation strategies, 10 times tables questions and 10 questions on key topics that must be mastered before studying GCSE Mathematics.

The tests are marked in class by students who record their Ninja Score out of 30. This score is recorded so that further interventions can be put in place where necessary.

This little-and-often approach, in combination with a research-informed design, which systematically plans the revisiting of skills, ensures students’ improved numeracy skills and fluency are retained over time.

Extra-curricular opportunities

There is a range of extra-curricular Numeracy learning experiences offered to the pupils of St John Fisher Catholic High School. These may include:

- Times Tables Rock Stars – in mathematics classes where a need is identified.
- Junior/Intermediate Mathematical Challenge (UKMT) – Year 8 and 9
- The stock market challenge – Year 10;

Numeracy support for SEN pupils

The Numeracy Coordinator will work in conjunction with the SENCO to ensure:

- Early identification and assessment of pupils’ difficulties;
- Collaboration with subject teachers prior to the formulation of pupils’ individual health and care plans (IHCPs) in order to identify initial Numeracy targets.

2 - Consistency of Practice

In lessons

Numeracy is promoted through high quality learning and teaching which focuses on mathematical knowledge and concepts; problem solving, decision-making, the development of financial capability and the exploration of mathematical ideas.



All staff recognise the importance of numeracy skills and knowledge and will assist within their subjects, where appropriate, to help raise Numeracy standards across the school.

Pupils should be encouraged to:

- See mental calculation as the first resort when faced with any calculation.
- Explain any calculation they have done by showing all their working out.
- Estimate an answer before a calculation is done whenever possible.
- Consider the reasonableness of their answers after a calculation has been done.
- Know how to use the relevant buttons on their calculator when its use is appropriate and how to interpret the display sensibly.
- Use appropriate mathematical language confidently.

Please also see the relevant sections in the '[Roles and Responsibilities](#)' section below.

3 – Collaboration – **Work in Progress**

A key aim of this policy is to embed cross-curricular links to mathematics and numeracy in the curricula of all departments. This is currently a **work in process** and will be achieved by:

- Looking at the mathematics schemes of work to adding links to other curriculum areas.
- Looking at the schemes of work of other curriculum areas and adding links to mathematics/numeracy.
- Exploring the possibility of changing the order in which one or both departments teach a topic/skill if mutually beneficial.

Some areas to explore in each department are listed below.

Art	Symmetry. Use of paint mixing as a ratio context.
English	Comparison of 2 data sets on word and sentence length.
Food Technology	Recipes as a ratio context. Reading scales.
Geography	Representing data. Use of Spreadsheets
History	Timelines. Sequencing events
ICT	Representing data - considered use of graphs, bar charts for discrete data, histogram data.
MFL	Dates, sequences and counting in other languages. Use of basic graphs and surveys to practice foreign language vocabulary and reinforce interpretation of data.
Music	Fractions.
PE	Collection of real data for processing in mathematics. Estimation, time and measurement
RE	Interpretation and comparison of data gathered from secondary courses (internet) on e.g. developing and developed world
Science	Calculating with, and rearranging, formulae. Graphing skills.
Technology	Measuring skills. Units of area and volume. Scale and proportion. Practical Equipment.

Links and changes made will be added to [appendix 3](#).

4 – Roles and responsibilities

Governors

The Board of Governors will:



- Support all strategies to improve the numeracy skills of pupils and promote ‘the achievement of high standards of educational attainment’;
- Support the Numeracy Coordinator in improving standards in numeracy.

SLT

Senior Leadership Team will:

- Set and expect the highest possible standards for numeracy;
- Monitor, evaluate and review the whole school numeracy policy;
- Identify key priorities in numeracy as outlined in the School Development Plan which includes relevant professional training.

Numeracy Coordinator

The Numeracy Coordinator will:

- Provide leadership, guidance and direction for the delivery of numeracy across the curriculum;
- Support Curriculum Leaders to plan, monitor and resource numeracy initiatives;
- Regularly revise and update the school’s Numeracy Policy;
- Work with the Special Education Needs Coordinator to provide support for pupils with numeracy difficulties and organise resources to support pupils with numeracy difficulties;
- Communicate with parents of identified pupils and report on progress at the end of each term;
- Promote numeracy across the school;
- Ensure standard methods for calculations are made available to all staff;
- Provide relevant numeracy information for the Mathematics Department Action Plan and for reports to SMT and the board of Governors.

Head of Mathematics

The Head of Mathematics will:

- Provide leadership, guidance and direction for the delivery of mathematics within the department and across the curriculum;
- Identify relevant training opportunities for department members in relation to aspects of numeracy;
- Develop effective department numeracy strategies for those pupils who have Special Educational Needs or Additional Numeracy needs.

SENCO

The SENCO will:

- Working with other relevant staff, ensure appropriate assessment arrangements for pupils on the SEN register and assess the specific numeracy needs of pupils on the SEN register.
- In collaboration with the Numeracy Coordinator, identify pupils who would benefit from numeracy support;
- Provide numeracy support on a one-to-one/ small group basis for a period agreed with the Numeracy Coordinator.

Heads of Department

The other Curriculum Leaders will:



- Ensure Numeracy is embedded in their subject area schemes of work and encourage members of their department to follow the common methods detailed in the appendices;
- Identify relevant training opportunities for department members in relation to aspects of numeracy;
- In consultation with the Mathematics Department and Numeracy Coordinator, develop effective Numeracy strategies for those pupils who have Special Educational Needs or Additional Numeracy needs.

Subject Teachers

The Subject Teachers will:

- Build pupils' confidence in numeracy and mathematics regardless of their particular subject expertise. Avoid perpetuating negative attitudes of mathematics in front of students;
- Promote meaningful opportunities for pupils to develop Numeracy within their subject area;
- Value pupils' different methods for calculations but model efficient methods and accurate use of vocabulary – see [appendix 1](#) for some common methods of calculation and [appendix 2](#) for mathematical vocabulary.

Form Teachers

Form teachers will:

- Lead their form in numeracy activities as directed by the Numeracy Coordinator;
- Check for mathematical equipment (calculators in particular) during equipment checks – setting sanctions where necessary.

Parents

Parents will:

- Encourage their children to use the range of strategies they have been taught and resources they have been pointed to in order to improve their levels of numeracy;
- Encourage their children to participate, and support their children, in Numeracy based events/competitions;
- Encourage their children to avail of any numeracy support offered.

Pupils

Pupils will:

- Take responsibility for improving their own numeracy needs to become more independent learners;
- Make improvements through the setting and monitoring of their own individual targets;
- Avail of numeracy support where offered and carry out all work/catch up on missed work in other subjects as a result of attending numeracy support.



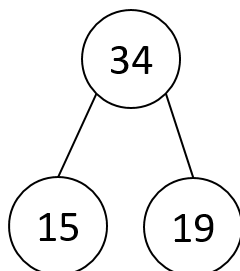
Appendices

1- Methods of calculation

Addition and Subtraction.

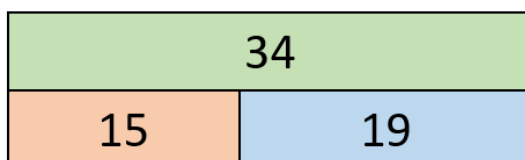
Some common approaches to visualising number and solving addition and subtraction questions.

Part Whole Model



A part whole model, where the two numbers at the bottom (the parts) equal the number at the top (the whole).

Bar Model and Fact Families



$$15 + 19 = 34$$

$$19 + 15 = 34$$

$$34 - 19 = 15$$

$$34 - 15 = 19$$

A bar model can be used to show the relationship between groups of numbers. The fact family (sometimes called number sentences) below it show all the different related facts for that bar model.

Tens Frame

Some students may use a tens frame, where numbers are broken into their 'Ones', 'Tens', 'Hundreds' etc. Compare this to the column method below.



TTh	Th	H	T	O
10000	1000 1000	100 100 100		1 1 1 1
	1000	100 100	10 10 10 10 10 10	1 1 1 1 1 1 1 1
1	3	5	7	2

10

Column Method

TTh	Th	H	T	O
1	2	3	0	4
	1	2	6	8
1	3	5	7	2

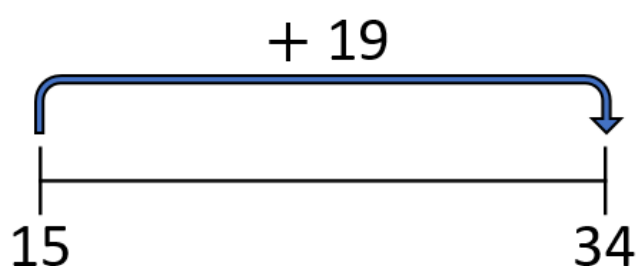
1

Most would not have the column headings but it could be useful if struggling. Similar methods for subtraction, but with a focus on 'borrowing'

	7 8	15 6	1 3
—		7	5
	7	8	8

Number Line

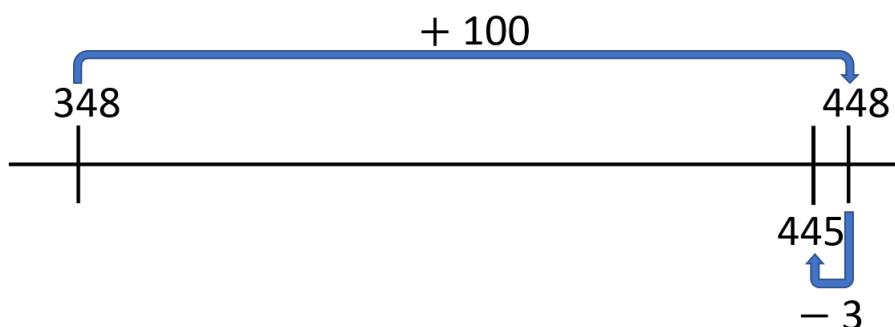
Some students will visualise how addition or subtraction will change a number by referring to a number line. Students might use this as a mental or written method, and the number line doesn't need to be drawn to scale.





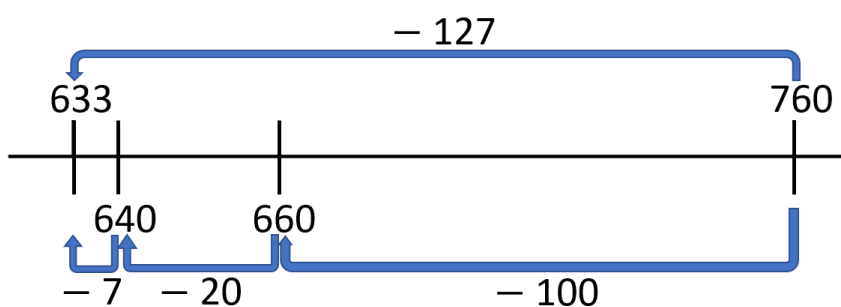
Addition:

$$348 + 97 = 348 + 100 - 3$$
$$= 445$$



Subtraction:

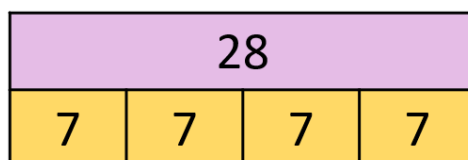
$$760 - 127 = 760 - 100 - 20 - 7$$
$$= 633$$



Multiplication

Some common solving multiplication questions.

Bar Model and Fact Families



$$7 \times 4 = 28$$

$$4 \times 7 = 28$$

$$28 \div 4 = 7$$

$$28 \div 7 = 4$$



A bar model can be used to show the relationship between groups of numbers. The fact family (sometimes called number sentences) below it show all the different related facts for that bar model.

Tens Frame

Some students may use a tens frame, where numbers are broken into their 'Ones', 'Tens', 'Hundreds' etc. For multiplication, we are thinking of it as repeated addition. This wouldn't be an appropriate method if multiplying by much more than 5. For example, 3504×5 .

TTh	Th	H	T	O

Column Method

TTh	Th	H	T	O
	3	5	0	4
				5
1	7	5	2	0
1	2		2	

Most would not have the column headings but it could be useful if struggling. When multiplying by a 2 digit number, we would first multiply by 'ones' and then by 'tens'. We then add the two sub totals together.



$$326 \times 32$$

	Th	H	T	O	
		3	2	6	
×			3	2	
		6	5	2	(326 × 2)
+	9	7	8	0	(326 × 30)
1	0	4	3	2	
	1	1			

Grid Method

The number (here 3504) is segmented into 300, 500 and 4. Each part is multiplied by 5 and then the three subtotals added together. This can be applied to long multiplication also.

×	3,000	500	4
5	15,000	2,500	20

This can be applied to long multiplication also.

×	400	70	3
60	24,000	4,200	180
4	1,600	280	12



Division

Bus Stop Method

$$4 \overline{) 512911} \begin{array}{l} 1272 \\ \text{r}3 \end{array}$$

$$4 \overline{) 512911} \frac{3}{4}$$

$$4 \overline{) 512911.3020} \begin{array}{l} 1272.75 \\ \text{r}0 \end{array}$$

Students should be encouraged to give remainders as fractions or decimals.



2- Key vocabulary.

Mathematical Term	Meaning
Acute angle	An angle which measures below 90°.
Adjacent angles	Angles with a common side and vertex.
Angle	Created by two rays and containing an endpoint in common.
Arc	A set of points that lie on a circle and that are positioned within a central angle.
Area	The space contained within a shape.
Average	A number expressing the central or typical value in a set of data, in particular the mode, median, or (most commonly) the mean.
Bisect	To divide into two equal sections.
Chord	A line segment that connects two points on a circle.
Circle	A set of points that are all the same distance from a given point.
Circumference	The distance measured around a circle.
Coefficient	A number that is placed in front of a variable. For example, in 6x, 6 is the coefficient.
Common denominator	A number that can be divided evenly by all denominators in the problem.
Complementary angles	Two angles in which the sum of their measurements equals 90°.
Congruent	Exactly the same. Identical in regard to size and shape.
Coordinate graph	Two perpendicular number lines, the x axis and the y axis, which make a plane upon which each point is assigned a pair of numbers.
Cube	A solid with six sides, with the sides being equal squares and the edges being equal. Also, the resulting number when a number is multiplied by itself twice.
Cube root	A number that when multiplied by itself twice gives the original number. For example, 4 is the cube root of 64.
Denominator	The bottom symbol or number of a fraction.
Diameter	A line segment that contains the centre and has its endpoints on the circle. Also, the length of this segment.
Difference	That which results from subtraction.
Equation	A relationship between symbols and/or numbers that is balanced.
Equilateral triangle	A triangle that has three equal angles and three sides the same length.
Even number	An integer which can be divided by 2, with no remainder.
Exterior angle	The angle that makes a straight line with an interior angle.
Factor	A number or symbol which divides evenly into a larger number.
Fraction	A symbol which expresses part of a whole. It contains a numerator and a denominator.
Highest common factor	The largest factor that is common to two or more numbers.
Hypotenuse	In a right triangle it is the side opposite from the 90° angle.
Improper fraction	A fraction in which the numerator is larger than the denominator.
Integer	A whole number. It may be positive, negative, or zero.
Interior angles	Angles formed inside the shape or inside two parallel lines.
Intersecting lines	Lines that come together at a point.
Interval	The numbers that are contained within two specific boundaries.
Irrational number	A number that is not rational (cannot be written as a fraction $\frac{x}{y}$, with x a natural number and y an integer).
Isosceles triangle	A triangle with two equal sides and two equal angles across from them.
Lowest common multiple	The smallest multiple that is common to two or more numbers.
Linear equation	An equation where the solution set forms a straight line when it is plotted on a coordinate graph.
Lowest common denominator	The smallest number that can be divided evenly by all denominators in the problem.
Mean	The sum of the items in a group divided by the number of items.



Mathematical Term	Meaning
Median	The middle item in an ordered group. If the group has an even number of items, the median is the average of the two middle terms.
Mixed number	A number containing both a whole number and a fraction.
Natural number	A counting number.
Negative number	A number less than zero.
Nonlinear equation	An equation where the solution set does not form a straight line when it is plotted on a coordinate graph.
Number line	A visual representation of the positive and negative numbers and zero.
Numerator	The top symbol or number of a fraction.
Obtuse angle	An angle which is larger than 90° but less than 180° .
Odd number	An integer (whole number) that is not divisible evenly by 2.
Origin	The intersection point of the two number lines of a coordinate graph. The intersection point is represented by the coordinates (0,0).
Parallel lines	Two or more lines which are always the same distance apart. They never meet.
Percentage	A common fraction with 100 as its denominator.
Perpendicular lines	Two lines which intersect at right angles.
Pi (π)	A constant that is used for determining the circumference or area of a circle. It is equal to approximately 3.14.
Positive number	A number greater than zero.
Power	A product of equal factors. $3 \times 3 \times 3 \times 3 = 3^4$, read as "three to the power of four". Power and exponent can be used interchangeably.
Prime number	A number that has two unique factors; itself and one.
Proper fraction	A fraction in which the numerator is less than the denominator.
Pythagoras' theorem	A theorem concerning right triangles. It states that the sum of the squares of a right triangle's two legs is equal to the square of the hypotenuse ($a^2 + b^2 = c^2$ where c is the hypotenuse).
Quadrants	The four divisions on a coordinate graph.
Quadratic equation	An equation that may be expressed as $ax^2 + bx + c = 0$.
Radius	A line segment where the endpoints lie one at the centre of a circle and one on the circle. The term also refers to the length of this segment.
Ratio	A comparison between two numbers or symbols. Written as x:y.
Rational number	An integer or fraction such as $\frac{7}{7}$ or $\frac{9}{4}$ or $\frac{5}{1}$. Any number that can be written as a fraction $\frac{x}{y}$ with x an integer and y is a natural number.
Reciprocal	The multiplicative inverse of a number. For example, $\frac{2}{3}$ is the reciprocal of $\frac{3}{2}$.
Right angle	An angle which measures 90° .
Scalene triangle	A triangle in which none of the sides or angles are equal.
Simplify	To combine terms into fewer terms. Can also mean changing a fraction into its lowest terms. For example, $\frac{3}{6}$ is reduced to $\frac{1}{2}$.
Square	The resulting number when a number is multiplied by itself. Also, a four-sided figure with equal sides and four right angles. The opposite sides are parallel.
Square root	The number which when multiplied by itself gives you the original number. For example, 6 is the square root of 36.
Standard form	A number between 1 and 10 and multiplied by a power of 10. Used for writing very large or very small numbers.
Straight line	The shortest distance between two points. It continues indefinitely in both directions.
Supplementary angles	Two angles that when combined the sum equals 180° .
Term	A literal or numerical expression that has its own sign.
Transversal	A line which crosses two or more parallel or nonparallel lines in a plane.
Triangle	A three-sided closed figure. It contains three angles that when combined the sum equals 180° .



Mathematical Term	Meaning
Vertically opposite angles	The opposite angles that are formed by the intersection of two lines. Vertically opposite angles are equal.
Volume	The amount which can be held, as measured in cubic units. The volume of a rectangular prism = length times width times height.
X-axis	The horizontal axis on a coordinate graph.
X-coordinate	The first number in an ordered pair. It refers to the distance on the x-axis.
Y-axis	The vertical axis on a coordinate graph.
Y-coordinate	The second number in an ordered pair. It refers to the distance on the y-axis.



3- Cross curricular Links - WIP

Links and changes to schemes of work:

Topic	Mathematics SoW	Cross Curricular Link