

NUMERACY POLICY – THE BRIDGE SHORT STAY SCHOOL

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1.

DEFINITION OF NUMERACY

By numeracy we mean the ability to use mathematics in everyday life.

Being numerate means having the confidence and skill to use numbers and mathematical approaches in all aspects of life - at work, in practical everyday activities at home and beyond, as consumers, in managing our finances, as parents helping our children learn, as patients making sense of health information, as citizens understanding the world about us.

Numeracy complements literacy and is sometimes called 'mathematical literacy'. Both skills are needed in order to function fully in modern life.

Being numerate means being able to reason with numbers and other mathematical concepts and to apply these in a range of contexts and to solve a variety of problems.

Being numerate is as much about thinking and reasoning logically as about 'doing sums'.

It means being able to:

- Interpret data, charts and diagrams
- Process information
- Solve problems
- Check answers
- Understand and explain solutions
- Make decisions based on logical thinking and reasoning.

Numeracy involves skills that are sometimes not adequately learnt in the classroom - the ability to use numbers and solve problems in real life.

[www.nationalnumeracy.org.uk, 2015]

THE DEVELOPMENT OF THE CONCEPT OF NUMERACY

1959 - (Crowther report) - Numeracy is defined as a word to represent the mirror image of literacy.

1982 - (Cockcroft report) - A numerate pupil is one who has the ability to cope confidently with the mathematical needs of adult life. There should be an emphasis on the wider aspects of numeracy and not purely the skills of computation.

1995 (OED) - Numerate means acquainted with the basic principles of mathematics.

2.

AIMS OF THE NUMERACY STRATEGY

- To raise numeracy standards across the curriculum.
- To equip young people with the skills they need to succeed in life.
- To support other lessons need and uses of numeracy in their lessons.
- To remove a possible barrier to young people education.
- To ensure consistency of practice including methods, vocabulary, notation etc.
- To assist the transfer of pupils' knowledge, skills and understanding between subjects.

3.

OBJECTIVES OF THE NUMERACY STRATEGY

Objective	Relevant page of numeracy strategy	Staff responsible or affected
All staff will be involved in promoting numeracy skills in relevant activities.	6, 7-9, 14, 16	All staff
All staff will be able to demonstrate good numeracy skills to the students.	5, 10, 14	All staff
All staff will know where to access support and materials in relation to numeracy.	10, 11-13, 14	All staff
Students will be actively participating in numeracy daily.	7-9,	All staff
Staff will be able to use correct mathematical vocabulary and support pupils in the correct use of mathematical vocabulary.	10-13	All staff
To prepare students for their financial futures, providing an education in spending, wages, banking, saving and loans.	13	Maths staff, tutors, pastoral.
Staff will be aware of how common misconceptions can accidentally be reinforced.	10	All staff
Staff will question and correct students misconceptions with numeracy.	10	All staff

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WHAT GOOD PRACTICE OF NUMERACY LOOKS LIKE IN A CLASSROOM.

- Allowing pupils time to work out mathematical problems related to their work, rather than giving them the answer because it is not a maths lesson.
- Questioning incorrect mathematics if it occurs and helping to lead to pupil through the correct method.
- Displaying best practice by using correct methods and terms, i.e. not describing one half as bigger than the other.
- Emitting a positive image of maths, not telling the pupils that you “don’t like maths”, “maths wasn’t your subject at school” or that you’re “not very good at maths”. Helping a pupil tackle a maths problem with enthusiasm and a ‘can do’ attitude will make a big difference to how hard they will try.
- Draw out students’ understandings and use their explanations as teaching points and challenge all students to reach their mathematical potential.

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RAISING THE PROFILE OF NUMERACY.

Activities to consider:-

Numeracy focus posters in each tutor room.

Illustrating the importance of, for example:- pupils being able to make sense of information in chart/graphical form and be able to describe the 'story' behind the graph.

Pupils being able to make sense of calculation answers, check the reasonableness of an answer and select the most appropriate method of solution.

Key word posters e.g. the language of operations, pre-fixes.

Posters produced in other subjects displayed in maths rooms e.g. pupils work from The Mill illustrating the use of mm in measurement.

Sign posts around school giving the distance to other places e.g. the hall, specific classrooms, the post office etc.

Stickers giving measurements of doors, windows, desks etc in imperial & metric units.

Laminated cards made available in non-Mathematics lessons to help students with key maths skills e.g. drawing a pie chart.

Examples and exercises used in Mathematics lessons based on examples and the schemes of work of other subjects.

Key Vocabulary/key facts to be provided in student working folders.

Glossary of maths terms to be available in all teaching rooms

Maths problem for of the week for use in tutor periods

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CROSS CURRICULAR - MATHEMATICS IN OTHER LESSONS.

Science

- Measuring quantities as weights or capacity.
- Substituting numbers into a formula.
- Converting between units.
- Calculation of volume and area.
- Measure distances, diameters etc.
- Use a scale, i.e. temperature on a thermometer.
- Order results numerically.
- Calculate averages.
- Design a data collection sheet and record results.
- Margins of error, calculating accuracy of results.
- Use of graphs.
- Use numerical evidence to support a prediction.

Food technology

- Measuring out ingredients, using the scales.
- How much more _____ is needed?
- Comparing the required weight/ volume of an ingredient with the size of the packet.
- Proportion, scaling up or down recipes.
- Dividing out portions.
- Converting units.
- Timings, If the cookies take ___ minutes what will be the time when they are finished?

Media, business and ICT

- Pupils could collect and classify data, enter it into data handling software.
- Pupils could produce graphs and tables, and interpret and explain their results.
- Discuss units of measure of memory, and prefixes.
- Profit/loss.
- Spotting patterns in consumer activities.
- Percentages in data comparisons.

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- Scrutinising questionnaire results.

Sport and outdoor pursuits

- Map reading skills and time of the day.
- Using and measuring distances in a variety of activities.
- Pupils keep score, add up score in games.
- Pupils use a formula to work out maximum heart rate, and percentages to calculate training heart rate.
- Calculate total length from number of laps.
- Questions on time, total time, time for one half, time remaining.
- Counting repetitions in the gym, using multiplication i.e. 4 sets of 10.

English

- When reading a book, discuss the current page and how many pages it is till page __?
- In a text if a quantitative reference is made discuss the numbers and calculations that could involve (e.g. Benny scored twice as many hoops as Tom, you could ask what Benny's score was if Tom scored 4)
- Descriptive writing piece about information presented in statistical form.
- Pupils could present their conclusion of a piece of writing that they have read graphically.
- Time lines can be used to show a sequence of events in a piece of literature

Art

- Isometric drawing. Plans and Elevation.
- Polygons and polyhedrons.
- Ratios when mixing inks, dyes and paints.
- Calculating the area and/or perimeter of shapes and canvases.
- Using scale factors to alter the size of an image.

Music

- Counting beats.
- Following a rhythm/pattern.
- Timing.

Enrichment (i.e. The Mill, work experience, careers, College, Young apprentice, CSI)

- Pay scales, net and gross pay, pay per month.

- Time of the day, worked hours.
- Bus timetables and other public transport timetables.
- Measuring and building at The Mill
- Planting calendar.
- Area for seedlings.
- Profit and loss in young apprentice.
- Evidence analysis in CSI.

Humanities

- Using scale, direction ratio and distance on maps.
- Comparing statistics for different countries and communities.
- Presenting data from fieldwork investigations.
- Timelines of events in history.
- Calculating the difference in time between two events.
- Interpreting data from graphs and charts.

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CROSS CURRICULAR – GENERAL NON-SUBJECT SPECIFIC.

- With timed tasks get the pupils to read the time from the analogue clock, ask them what time it will be when they finish their ____ minute task, or if you give them a finish time ask them how many minutes they have left.
- Can you present the data or information you are using in lesson as a graph or chart?
- When lending equipment you can question a pupil on how many _____ are left.
- Numeracy focus posters in each tutor room. Illustrating the importance of, for example:- pupils being able to make sense of information in chart/graphical form and be able to describe the 'story' behind the graph. Pupils being able to make sense of calculation answers, check the reasonableness of an answer and select the most appropriate method of solution.
- When discussing the pupils current working level and target level ask the pupils how many sub levels there is between and how long they have, then ask the pupil to work out how long they have to progress each sub level.
- When filling in a pupils target sheet get them to calculate their average for the lesson or tell you what percentage they were above r below 70% in a certain target area.
- At the end of the lesson ask the pupil to count up how many questions they have answered or paragraphs they have produced.

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COMMON MISCONCEPTIONS RELATED TO MATHEMATICS.

- One half can be bigger or smaller than the other half. It can't, if something is halved, then it is split into two equal portions.
- Multiplying always makes a number bigger (and similarly dividing always makes a number smaller) It doesn't, if you multiply by a number less than 1 (i.e. a negative number or a positive decimal) than the answer will be smaller than the original value.
- -4 is bigger than -1, this one is often corroborated verbally by inaccurate use of mathematical language. When discussing this with pupils use temperature as a context to help them understand.
- $5 \times 0 = 5$ or $17 \times 0 = 17$ or $0.2 \times 0 = 0.2$ etc. Any number multiplied by zero equals zero, five lots of nothing is nothing.
- Squaring is the same as multiplying by 2, often confused because the symbol for squaring is a superscript 2. Squaring is multiplying the number by itself, i.e. $5^2 = 5 \times 5 = 25$
- When subtracting you always subtract the smaller number from the greater number. This is incorrect, you could be doing a calculation where you are supposed to have a negative number or when doing the column method of subtraction you may need to 'borrow'.
- When adding fractions you just add the numerators then add the denominators. This is incorrect, first you need the denominators to be the same value, then you can add the numerators but the denominator will stay the same.

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KEY MATHEMATICAL WORDS.

- Numerator: The number on the top of a fraction.
- Denominator: The number on the bottom of a fraction.
- Sum: The answer obtained by adding.
- Product: The answer obtained by multiplying.
- Angle: A measure of rotation between 2 straight lines.
- Operator: A mathematical action, includes adding, subtracting finding a fraction of etc.

- Arc: A portion of a curve, often used for a portion of a circle.
- Average: Loosely an ordinary or typical value, however, a more precise mathematical definition is a measure of central tendency which represents and or summarises in some way a set of data. The term is often used synonymously with 'arithmetic mean', even though there are other measures of average.
- Bisect: Used in geometry, means to split into **two equal** parts.
- Bisector: A point, line or plane that divides a line, an angle or a solid shape into two equal parts. A perpendicular bisector is a line at right angles to a line-segment that divides it into two equal parts.
- Cancel: Simplifying by dividing by common factors.
- Composite shape: A shape formed by combining two or more shapes.
- Chord: A straight line segment joining two points on a circle or other curve.
- A pair of compasses: An instrument for constructing circles and circular arcs and for marking points at a given distance from a fixed point.
- Correlation: A measure of the strength of the association between two variables. High correlation implies a close relationship and low correlation a less close one.
- Cube: In geometry, a three-dimensional figure with six identical, square faces. Adjoining edges and faces are at right angles.
- Cuboid: A three-dimensional figure with six faces, at least four of which are rectangles.
- Diameter: Any of the chords of a circle or sphere that pass through the centre.
- Digit: One of the symbols of a number system most commonly the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. Examples: the number 29 is a 2-digit number; there are three digits in 2.95. The position or place of a digit in a number conveys its value.
- Dividend: In division, the number that is divided. E.g. in $15 \div 3$, 15 is the dividend
- Divisor: The number by which another is divided. Example: In the calculation $30 \div 6 = 5$, the divisor is 6. In this example, 30 is the dividend and 5 is the quotient.
- Equilateral: Of equal length - e.g. an equilateral triangle is a triangle with all 3 sides of equal length.
- Equivalent fraction: Fractions with the same value as another. For example: $4/8$, $5/10$, $8/16$ are all equivalent fractions and all are equal to $1/2$.
- Evaluate: Find the value of a numerical or an algebraic expression. Examples: Evaluate $28 \div 4$ by calculating, $28 \div 4 = 7$
- Event: A possible outcome of a statistical trial, for example 'heads' when a coin is tossed.
- Factor: A number which you can divide by and get a whole number answer, E.g.: 1, 2, 3, 4, 6 and 12 are all factors of 12

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- Formula: An equation linking sets of physical variables. e.g. $A=\pi r^2$ is the formula for the area of a circle.
- Frequency: The number of times an event occurs; or the number of individuals (people, animals etc.) with some specific property.
- Gradient: A measure of the slope of a line.
- Improper fraction: An improper fraction has a numerator that is greater than its denominator.
- Integer: Any of the positive or negative whole numbers and zero.
- Intercept: To cut a line, curve or surface with another.
- Intersect: To have a common point or points. Examples: Two intersecting lines intersect at a point; two intersecting planes intersect in a line.
- Linear: A one-dimensional expression or equation, algebraically the function will be to the power of 1 i.e. not squares, $y=4x+9$ is a linear equation
- Mean: Often used synonymously with average. The mean of a set of discrete data is the sum of quantities divided by the number of quantities.
- Mensuration: In the context of geometric figures the process of measuring or calculating angles, lengths, areas and volumes.
- Mixed number: A whole number and a fractional part expressed as a common fraction. Example: $1\frac{1}{3}$
- Net: 1. A 2D figure composed of polygons which by folding and joining can form a polyhedron (3D). 2. Remaining after deductions. Examples: The net profit is the profit after deducting all operating costs. The net weight is the weight after deducting the weight of all packaging.
- Number bond: A pair of numbers with a particular total e.g. number bonds for ten are all pairs of whole numbers with the total 10.
- Origin: A fixed point from which measurements are taken.
- Outcome: The result of a statistical trial. For example, when a coin is tossed there are two possible outcomes 'head' or 'tail'; when a cubic die is cast there are six possible outcomes
- Perimeter: The length of the boundary of a closed figure.
- Protractor: An instrument for measuring angles.
- Quadratic: A two-dimensional expression, where one part of the expression has a power of two. E.g. $3x^2 + 7x - 4$
- Quotient: The result of a division. Example: $46 \div 3 = 15\frac{1}{3}$ and $15\frac{1}{3}$ is the quotient of 46 by 3.
- Radius: In relation to a circle, the distance from the centre to any point on the circle. Similarly, in relation to a sphere, the distance from the centre to any point on the sphere.
- Reflex angle: An angle that is greater than 180° but less than 360° .
- Sector: The region within a circle bounded by two radii and one of the arcs they cut off.
- Segment: The part of a line between two points. Within a circle, the region bound by an arc and the chord joining its two end points.
- Square number: A number that can be expressed as the product of two equal numbers. Example $36 = 6 \times 6$ and so 36 is a square number or "6 squared".

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- Tangent: A line is a tangent to a curve when it meets the curve in one and only one point
- Unit: A standard used in measuring e.g. the metre is a unit of length; the degree is a unit of turn/angle, etc.
- Variable: A quantity that can take on a range of values, often denoted by a letter, x, y, z, t, ... etc.
- Vertex: The point at which two or more lines intersect. Plural: vertices.
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This website [<http://www.amathsdictionaryforkids.com>] is brilliant for any more definitions you want to know.

10.

FINANCIAL NUMERACY

Objective: For pupils to be financially literate.

Implementation:

- Attention to ensuring that learners appreciate the value of money and the implications of over expenditure/loans and interest.
- Promote understanding of the value of money and the importance of looking after money and the advantages related to saving money regularly.

Outcomes:

- Learners understand and use the conventional method of recording money and interpret a calculator display in relation to money.
- Learners calculate and solve problems involving budgeting, saving and spending, including currency exchange rates, profit and loss, discount, hire-purchase, the best bargains, household bills and compound interest.

Resources:

- <http://www.pfeg.org/resources>
- <http://www.barclaysmoneyskills.com/Information/Resource-centre/School-children.aspx>
- <http://mybnk.org/financial-educationfree-resources/lesson-plans-2/>
- <https://teachers.natwest-pocketmoney.com/home.html>
- http://www.nicurriculum.org.uk/docs/key_stage_3/areas_of_learning/maths_and_numeracy/talk_money_talk_maths/talk_money_talk_maths.pdf

11.

NUMERACY AND PUPILS WITH SEN.

Objectives:

- Providing effectively for pupils with SEN

Implementation:

- All pupils' numeracy skills are assessed upon entry to school.
- A structure to find numeracy difficulties in place, using BKSBS diagnostic tools to highlight these numeracy difficulties. Teachers and teaching assistants work closely with each other to support learners' learning needs through a specific intervention programme.
- Teachers and assistants use various recording methods; scribed work, computer work, games, visual representations, to ensure that SEN learners can show their understanding, not only through written methods.
- Individual programme of study put in place to extend the numeracy skills of more able and talented learners, this could include FSMQ and Key stage 5 work.
- A specific support provision in place to support the development of EAL pupils' numeracy, where language is not a barrier.
- Teachers and assistants are aware of the level of EAL pupils' language procurement and can provide appropriate numeracy tasks to further develop their tasks.
- Monitor the progress of every individual learner and adapt the provision. Ensure that all staff are aware of learners' ability in number through the pupil's PLP.

Outcomes:

- Suitable plan and a detailed and diagnostic record of attainments and difficulties for each pupil.
- Various targets groups in the school.
- Learners make significant progress. SEN learners make good progress against their individual targets in numeracy skills.
- Lesson observations and self evaluation cycle report on the success of SEN pupils to communicate/record their understanding of what they have learned through appropriate media.
- SEN learners see the positive influence of the provision/additional intervention on the confidence and attainment of learners.
- Teachers and assistants are confident in differentiating for the whole range of abilities in their care.

12.

NUMERACY CHALLENGE OF THE WEEK

Objective:

- A weekly numeracy puzzle to be worked on as part of tutorial.

Implementation:

- Provided by maths teacher, on shared drive in the maths folder, sub-folder numeracy puzzle or on the internet, link provided.
- Answers to be submitted to Maths teacher at the centre by end of each week.
- A display board in each centre should show the numeracy puzzle of the week, and last week's puzzle with answers. Also you could keep a tally of how many each tutor group has completed.
- For visual puzzles, photographic evidence may be needed to show that the group completed the puzzle.

Outcomes:

- For pupils to engage in a numeracy challenge as part of a group.
- To encourage some healthy competitiveness into numeracy.
- To encourage pupils to engage in numeracy outside of the maths room.
- To strengthen pupils problem solving skills.
- To develop pupils confidence and pride in maths.

13.

RESOURCES AND SUPPORT

Here are a collection of really useful websites:

<http://www.mad4maths.com/parents/>

<http://www.mrbartonmaths.com/>

<http://www.subtangent.com/math/index.php>

<http://www.mymaths.co.uk/> (username: **first** password: **first1**)

<http://www.skillsworkshop.org/numeracy>

<http://mathsticks.com/my/> (username: **TheBridge** password: **TheBridge1**)

<http://www.suffolkmaths.co.uk/>

<http://nrich.maths.org/frontpage>

<http://www.math-salamanders.com/index.html>

<http://www.primaryresources.co.uk/math/math.htm>

<https://www.khanacademy.org/> (you would need to set up a profile)

<http://woollemaths.co.uk/>

<http://resources.woodlands-junior.kent.sch.uk/math/>

<http://www.brainrush.com/>

<http://www.functionalmathematics.co.uk/>

14.

ASSESSMENT AND MONITORING OF NUMERACY AND PUPIL PROGRESS.

The ways in which the maths department will be assessing each pupil's abilities and progress in numeracy are:

- Initial assessment upon starting at the school to give base line level. This will be based on BKSBS initial assessment and teacher assessment.
- BKSBS diagnostic review showing RAG rating for each topic at the pupils level, this will be done at the start of their time at The Bridge and can be repeated to check progress. When moving up a level they will complete the BKSBS diagnostic review at the next level.
- Continuous teacher assessment throughout their time at The Bridge.
- Through marking pupils written work.
- Through AfL, questioning of pupils during lesson time, pupils response, pupil to pupil dialogue, use of mini whiteboards, RAG voters and other immediate pupil feedback.
- Each half term every pupils assessment data will be input on SIMS to monitor progress.
- Each half term pupils PLP's will be updated, this will review the previous half terms objectives, state the level they are working at and set new objectives for the next half term. This can be used to monitor progress and used to plan any intervention required.

15.

REVIEWING NUMERACY POLICY WITH SUCCESS CRITERIA

Method of reviewing.	What this will look like.
Initial review of numeracy at The Bridge	N/A (during first maths department meeting, information can be used for comparison)
Audit/questionnaire for departments.	The maths department will produce a questionnaire for all departments to complete in their penultimate department meeting of the academic year, these will

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	be reviewed by the maths department in the final department meeting of the year.
Evaluation of numeracy policy	Evaluation by maths teachers termly during department meeting. This should be fixed on the agenda for the final department meeting of each term.
Feedback from tutors and teachers.	Verbal feedback during debrief regarding the pupils progress, also submitted answers to the weekly numeracy challenges will give an indication of the pupils progress in numeracy.
Through lesson observations.	Pupils are using maths in all lessons. Both staff and pupils feel confident in the mathematical element of the lesson.
Lesson plans	Identification of the mathematical element(s) are highlighted in lesson plans and where appropriate in schemes of work.
Work scrutiny	Senior management can see evidence of maths being used in lessons through pupils work in their books/folders and in displays. With corrections if necessary.

This policy was ratified by the management committee on 4th October 2016

Review Frequency: Every 2 years