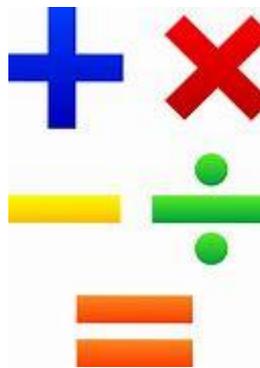




**Rutherglen High School**



**Numeracy Strategy**

*Framework for teaching numeracy to young people with a range of individual needs*

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## **Introduction**

Numeracy is an essential lifeskill for all young people, without it, they will be disadvantaged throughout their life. Numeracy and Literacy strategies combined aim to support young people to achieve a secure foundation as they move through their skills progression from Broad General Education to National Qualifications.

The numeracy strategy will highlight acquisition of current numeracy skills, baseline percentages and current numeracy opportunities. These will be assessed and monitored using Bsquared. An individualised targeted approach will be informed by assessment led practice within the mathematics lessons.

Rutherglen High School aim to provide structured opportunities for numeracy development, embedded in each subject. On a daily basis, several classes will meet virtually during registration to start the day with numeracy skills. During the allocated numeracy period teachers will teach the whole class together for a high proportion of time, and oral and mental work will feature strongly during the lesson. Each aspect will be combined within an online learning platform which aims to encourage parental engagement and continuing development of numeracy skills in the home environment. Numeracy opportunities will continue into the outdoor break time with games and problem solving skills.

Clear progression of skills will be mapped out from BGE to NQ and continual assessment will feed into targeted support for those identified as being from an economically disadvantaged background. This targeted approach should facilitate enhanced learning experiences and close the education attainment gap in mathematics. This framework of teaching skills, achievements and assessment of progression will be recorded on Bsquared.

## **What is numeracy?**

Numeracy is a skill which involves confidence and competence with understanding and using numbers and measures.

It requires an understanding of the number system, a variety of basic number skills and an ability to solve number problems in a variety of contexts.

It also demands practical understanding of the ways in which information is gathered by counting and measuring, and is presented in graphs, diagrams, charts and tables.

As a teacher you can help young people to acquire these skills by giving a focus to the relevant aspects of mathematics embedded within your subject. The outcome should be young people who

are skilled in numeracy and confident and tackling mathematical problems with increasing independence.

Young people should:

- Have a sense of size and number when it fits into the number system and increasingly know by heart number facts such as number buttons, multiplication tables, doubles and halves;
- Use what they know to figure out answers mentally;
- Calculate accurately and efficiently both mentally and with pencil and paper;
- Recognise when it's important to use a calculator and be able to do so effectively;
- Make sense of number problems including non-routine problems and recognise strategies to solve them;
- Explain methods and reasoning;
- Judge whether their answers are reasonable and have strategies for checking;
- Suggest suitable units for measuring and make sensible estimates of measurement;
- Explain and make predictions from the numbers in graphs, diagrams, charts and tables.

### **Closing the education attainment gap in mathematics**

Since 2006, Scottish teenagers have fallen on the PISA maths rankings in comparison to their peers across many other OECD countries and economies. There is a large gap between the highest and lowest performing pupils. Family background has a significant impact on this, with big attainment gaps between young people from economically disadvantaged backgrounds and more advantaged peers.

Other research highlights the importance of exposure to maths in building resilience, where resilient pupils tend to perform better overall in maths. With good maths opportunities and teaching in education in secondary schools young people's achievement and enjoyment of maths is raised.

Getting it right at Rutherglen High School for mathematics teaching and learning is essential to provide a whole school approach to maths for all young people. This includes leadership, attitudes, teaching and learning, progress and assessment, the environment, parent and carer engagement, wider opportunities and well-being. We attempt to encourage a positive attitude and a 'can-do' approach in driving improvement and enjoyment in maths.

Numeracy Action Team are focussed on closing the education attainment gap in mathematics by:

- Fidelity to deep understanding and delivery of informed, reflective, and responsive teaching;
- Effective development should be guided by robust knowledge driven by evidence and attend to attainment for those children from disadvantaged backgrounds;
- Monitor how new pedagogies, resources, and initiatives affect economic disadvantaged groups and not just focus on general school population.

### **Factors that promote high standards of numeracy**

Ethos within Rutherglen high school involves:

- Numeracy coordinator to offer opportunity and support needed to influence practice;
- Desire to increase standards through effective teaching and learning across the whole school;
- Clear realistic targets for raising standards and a manageable plan for achieving them with regular evaluation of the skills progress towards these targets;
- Systematic monitoring and self-review under the direction of leadership team with teachers planning teaching and assessment;
- There is a whole school approach to professional development of teachers and other staff involved in teaching of mathematics, with emphasis on developing knowledge of secondary maths skills and appropriate teaching methods for additional needs and taking cognisance of learning styles;
- Classroom assistants take part in planning and are used effectively to support teachers during numerous lessons;
- Parents are kept well informed and encouraged to be involved through discussions and school and sometimes in work with young people at home;

### **Curriculum and Assessment**

- Staff share a common understanding of numeracy and how best to promote it;
- There is daily dedicated mathematics opportunities during registration, extended through out-of-class activities and regular homework;

- The teaching program for numeracy period is based on identified learning objectives, and is planned thoroughly, to ensure high expectations, consistent approach and there is a good progression throughout the school;
- The foundation of mental calculation and recall of number facts are established thoroughly before standard written methods are introduced;
- Assessments are used to identify young people's strengths and difficulties for an individualised targeted approach;
- Assessments include informal observations and oral questioning, regular mental tests, assessments to judge progress;
- Recording systems give Numeracy Action Team information they need to plan and report successfully on targeted progress in closing the education attainment gap in mathematics.

**Teaching – Whole School approach to numeracy involves:**

- Develop number and number sense lessons – at least 70% of the lesson devoted to number and calculation;
- Focus on specific young people spending a short time 1:1 with a teacher before the lesson begins, to go over a concept they have previously struggled to grasp;
- Engaging parents in the process, arrange workshops to help parents support maths learning both in school and home;
- Raising the profile of maths, with opportunities for maths across subjects, purposefully identified;
- Displaying mathematical problems, language and calculation on classroom walls and corridors;
- Provide appropriate resources to support concrete, visual and abstract calculation;
- Providing 'maths' or 'enterprise' week across the school to develop maths skills and financial literacy;
- Maths tasks teaching through a real-life context developed through theme work and games;
- Starting numeracy lessons with a 'problem' to solve as a class and providing regular maths competitions across the school;
- Engaging young people in maths problem solving or enquiry as soon as they arrive in the mornings;
- Providing time for staff to plan together;
- Giving young people immediate feedback.

- Closely monitoring and assessing children.

## **Teaching Mathematics**

### Teaching Time

To ensure that there is adequate time for developing numeracy skills, each class teacher is expected to provide opportunity within their subject for numeracy. It is important to find time for young people to develop and apply their mathematical skills.

### **Focus on direct teaching**

During each lesson you should aim to spend as much time as possible in direct teaching and questioning of the whole class, a group of pupils, or individuals. High-quality direct teaching is oral, interactive and lively. It is a two-way process in which pupils are expected to play an active part by answering questions, contributing points to discussions, and explaining and demonstrating their methods to the class. Good direct teaching is achieved by balancing different elements;

Directing, Instructing, Demonstrating, Explaining and Illustrating, Questioning and Discussing, Consolidating, Evaluating Young People's Responses and, Summarising.

### Numeracy Group Setting

All young people are assessed with the basic number screening tests. Groups are set according to ability, age and judgement of professional opinion. Teachers are trained in the resources for numeracy period and allocated groups. Targeted support for individuals is discussed and Numeracy Action Team work within the groups for further identified areas of support and coaching and mentoring for teaching staff.

### **Typical numeracy lesson**

Typical 50 minute numeracy lesson in S1 to S4 will be structured like this:

- Targeted support of skills to identified individuals (5 minutes)

- oral work and mental calculation (about 5 to 10 minutes) whole-class work to rehearse, sharpen and develop mental and oral skills
- the main teaching activity (about 25 to 30 minutes) teaching input and pupil activities work as a whole class, in groups, in pairs or as individuals
- A plenary to round off the lesson (about 5 to 10 minutes) work with the whole class to sort out misconceptions and identify progress, to summarise key facts and ideas and what to remember, to make links to other work and discuss the next steps.

### **Out of class and homework**

Young people are encouraged to engage with online learning and out of school experiences with numeracy through the online learning platform completing a range of activities with opportunities for mathematical skills:

- Do an activity which makes use of the home context, such as tipping out a purse and counting what is in it, or weighing things on the kitchen or bathroom scales;
- Play a number game or work on a number puzzle;
- Learn some number facts or multiplication tables by heart;
- Gather information to use in the next lesson: for example, collect data or take measurements;
- Think about how they might solve a problem;
- Prepare their contribution to a group presentation to the class.

For advanced young people, work outside the normal lesson can be completing a short written exercise or task which consolidates and develops from work done in class, with modifications of the presentation for any children who need them

### **Links between maths and other subjects**

Mathematics contributes to many subjects of the secondary curriculum, often in practical ways:

In geography, learners apply number skills in the classroom and in fieldwork to measure, gather and analyse data. They use mathematical information to understand direction, distances and scale and to determine locations when using plans, maps and globes;

In art and design, learners apply number skills such as measurement, estimates, scale, proportion, pattern and shapes to develop, inform and resource their creative activities;

In design and technology, learners use mathematical information and data, presented numerically and graphically, to research and develop their ideas. They use number to measure and calculate sizes, fits and materials;

In history, learners develop their number skills through developing chronological awareness, using conventions relating to time, and making use of data, e.g. census returns and statistics;

In ICT, learners use mathematical information and data presented numerically and graphically in data-handling software. They use number to collect and enter data for interpretation in spreadsheets and simulations and present their findings as graphs and charts, checking accuracy before processing;

In modern foreign languages, learners develop number skills through a range of activities in the target language. These can include number rhymes; ordering numbers; ordering events in time; using number in relevant contexts such as currency exchange; gathering information in a variety of ways, including questionnaires and recording and presenting results in a variety of formats.

In music, learners develop important numerical skills with structure and rhythm.

In physical education, learners develop their number skills by using mathematical information and data. They use the language of position (including co-ordinates and compass points) and movement, as well as data handling and measures in athletic and adventurous activities. They use scale in plans and maps. They measure and record performances, e.g. time, distance and height, and use the data to set targets and improve their performance.

In religious education, learners develop skills in the application of number by using information such as ordering events in time, by measuring time through the calendars of various religions, by calculating percentages of tithing, and by considering the significance of number within religions. They interpret results/data and present findings from questionnaires, graphs and other forms of data in order to draw conclusions and ask further questions about issues relating to religion and the world. In religious education, there are no explicit references to developing number;

In science, learners work quantitatively to estimate and measure using nonstandard and then standard measures, recording the latter with appropriate S.I. units. They use tables, charts and

graphs to record and present information. With increasing maturity they draw lines of best fit on line graphs, use some quantitative definitions and perform scientific calculations;

## **Assessment**

### *Short-term assessments*

The key purpose of assessment should be to help students understand where they are in their learning - supporting them to know what they are secure with in terms of their knowledge, understanding and skills and helping them identify areas to develop. However, assessment can also:

- › allow learners to reflect on learning over time
- › be used to find out where students are before they start something new
- › help teachers reflect on their pedagogy
- › help teachers to develop a better understanding of the student as a learner
- › help to identify learning issues to support the planning of strategic interventions
- › provide a basis for a meaningful dialogue with students, parents/carers and other stakeholders, such as school leaders, governors and Ofsted, about students' progress.

Progress in mathematics may look very different from one student to the next, from one class to the next and from one school to the next. Learning in mathematics is not necessarily linear, and is intrinsically linked to curriculum design and the interplay between knowledge acquisition, conceptual understanding and the development of skills.

Although short-term assessments may provide evidence that students are secure with recent learning, this is only part of the bigger picture. A collection of short-term assessments is unlikely to give an accurate picture of progress; it may mask issues linked to relative strengths within different topic areas or skills. The use of strategic longer-term assessments will contribute to a clearer picture of progress but need to be timed appropriately and reflect the key learning to be assessed. Opportunities to reflect on learning from a range of numeracy related topics assimilates the connections between the underlying concepts which is important

### *Long-term assessments*

## **Access Maths Tests (AMT)**

**We gain valuable insight into our young people's maths ability with AMT; a wide-ranging, standardised and flexible assessment for students aged between 7 and 16. This test:**

- Is used as a screening test to baseline young people at the beginning of the year, transitioning from primary to secondary education, or as a guide to group sets when schools reopen after a period of remote learning.
- Confidently assesses progress in mathematics at regular intervals using parallel forms (two sets of forms) designed for repeat testing
- Easily identifies specific areas that may be limiting a young persons' overall success and plan relevant and targeted intervention strategies to boost or stretch skills.
- Analyses performance and quickly spot gaps in learning permitting focus points for young people and teachers to feed into whole school planning for individualised numeracy targets.

### **Mathematics Assessment for Learning and Teaching (MALT)**

**We gain valuable insight into our young people's maths ability with MALT; a wide-ranging, standardised and flexible assessment for students aged between 12 and 16. This test:**

- Is designed to highlight particular misunderstandings which are diagnostic of key learning needs – counting errors, misconceptions with decimals, etc
- Is delivered in a simple structure for ease to assess young people and get the information we need to ensure a targeted approach for individual needs.
- Offers room for progression across three stages throughout the Curriculum - Key Stage 1, Key Stage 2 and Key Stage 3
- Has one scorer for use with all the tests. This makes it easier to record and monitor year-on-year progress across ages 5–14. It also enables you to mark all of the pencil-and-paper tests on-screen this allowing for differentiated learning styles.
- All questions are mapped to the current experiences and outcomes, to make it easy to assess how well the young people are performing.
- Provides the summative measures of performance needed for screening, monitoring and progress assessment. MaLT tests have been standardised nationally, ensuring secure, reliable results

*Passing on information about young people's attainment progress*

All young people have set numeracy targets that are individual to their needs and progression. Those who are identified as SIMD 1 and 2 are provided targeted support within numeracy periods. All teachers have access to Bsquared to ensure digitalised tracking of learning.

## **Planning**

### *Milestones for complex Learners*

Milestones are important points in development, and demonstrate progression. Young people who are not able to achieve any of the benchmarks within Early Level still require tracking and monitoring of their progression. Whilst many young people will move on to work at Early Level, some will continue to make progress at the pre-early stage.

Milestones support teachers to track the progression of young people with severe and complex needs. Planning continues to be based on the Experiences and Outcomes from Curriculum for Excellence, with a learner-centred approach which celebrates the differences of all young people.

### *Curriculum for Excellence*

Experiences and outcomes are a set of clear and concise statements about young people's learning and progression in numeracy. They are used to help plan learning and to assess progress across the years.

Benchmarks provide clarity on the national standards expected within each curriculum area at each level. They set out clear lines of progression in numeracy and mathematics, and across all other curriculum areas from early to fourth levels. Their purpose is to make clear what learners need to know and be able to do to progress through the levels, and to support consistency in teachers' and other practitioners' professional judgements.

### *National Qualifications*

SQA is one of the four partner national organisations involved in the Curriculum for Excellence. It works with partners on all strands of the development.

SQA has joined with Universities Scotland, QAA Scotland and the Scottish Government to create the Scottish Credit and Qualifications Framework or SCQF. Every Scottish qualification—from the Access level (designed for young people with individual learning needs) to a Doctorate and including vocational as well as ESOL and BSL qualifications—is allocated a level and credit value within this framework, which all partners have agreed to recognise.

There are the many qualifications often imperfectly referred to as vocational, though these are frequently stepping-stones for students at Scottish Colleges of Further Education to pursue one- or two- year programmes tailored from a wide-ranging catalogue of National Units. The actual programme may be very rigidly prescribed by employers or be entirely freely chosen by the young people to meet particular needs.

These include specific qualifications for those with severe to moderate difficulties (Access), the right to aid in completing assessments (for example, a scribe) and the right to challenge any unfair or artificial barrier in the rules for any qualification.

SQA produced new qualifications which have clearer focus on skills development. There is also a greater emphasis on deeper learning by encouragement for young people to think for themselves; to apply and interpret the knowledge and understanding they have developed and to demonstrate the skills they have learned.

National 1-4 will be assessed internally by through a rigorous verification system in conjunction with Sanderson High, subject to regulation by the SQA. National 5 courses and above also have a number of internal assessments, followed by an externally marked exam.

### *Transitions to further Education*

Young people often progress to further education and continue to access a range of SQA courses as well as many more advanced qualifications with employability in mind.

Scottish Vocational Qualifications (SVQ) are an award for vocational education and training awarded by the SQA or other approved awarding bodies in conjunction with industry bodies. Scottish National Qualifications and Scottish Progression Awards are often important in a Modern Apprenticeship scheme along with SVQs. SVQs are developed by United Kingdom employers in tandem with National Vocational Qualifications (NVQ) for England, Wales and Northern Ireland.

SVQ are assessed in the workplace (or closely regulated training workshops) by employers, training providers or colleges approved and monitored by the SQA (or other awarding bodies) accredited by its independent Accreditation Unit.

### *Bsquared planning across the curriculum*

Bsquared are a digital system that has recently been rolled out across Rutherglen High School in alignment with all other schools in South Lanarkshire Council. This council wide assessment and tracking tool provides opportunities for teachers and support staff to take cognisance of all the small steps of progression that young people make, regardless of learning style, ability or challenges they face. The connecting steps assessment software identifies next steps and demonstrates progression with all pupils. This system is used in conjunction with Evisense which allows staff to upload photographs direct to assessment platforms ensuring consistency with assessment and parent/guardian communication.