

Aims:

- To make sense of the world around us and to manage our lives
- To model real life situations and make connections and informed predictions
- To interpret and analyse information, simplify and solve problems, assess risk and make informed decisions
- To develop logical reasoning, analysis and problem solving skills
- To communicate ideas in a concise, unambiguous and rigorous way using a universal language of numbers and symbols

Rationale:

To face the challenges of the 21st century, each young person needs to have confidence in using mathematical skills, and Scotland needs both specialist mathematicians and a highly numerate population.

Audience:

All staff
Quality Indicators:
 2.1, 4.1, 4.2,
 5.1, 5.2, 5.6,
 5.8

Principles for Curriculum Design

Challenge and enjoyment

- Set learners challenging goals
- Make learners think hard about their learning
- Ensure that learning is active and engaging to motivate all learners

Breadth

- Use a variety of contexts through which to develop and demonstrate learning
- Give all pupils the opportunity to be involved in all aspects of school life

Progression

- Ensure that all learners have the opportunity to achieve appropriate success
- Ensure that all learners have the opportunity to share and celebrate their achievements
- Share expectations and standards with learners
- Review and evaluate learners' progress
- Provide timely, accurate verbal and written feedback on their learning

Depth

- Give learners the opportunity to develop and apply greater intellectual rigour
- Give pupils the opportunity to develop secure understanding

Personalisation and choice

- Take account of their prior learning
- Ensure that all learners have ownership of their learning
- Take account of different learning styles

Coherence

- Help learners see the link between different aspects of learning
- Provide opportunities for learners to transfer and apply learning in different contexts

Relevance

- Ensure learners understand the purpose of the activity
- Make links with learners experiences, learning and interests within and beyond the school

Learning Experiences

The experiences and outcomes encourage learning and teaching approaches that challenge and stimulate pupils and promote their enjoyment of Mathematics. To achieve this, teachers will use a skilful mix of approaches, including:

- planned active learning which provides opportunities to observe, explore, investigate, experiment, play, discuss and reflect
- modelling and scaffolding the development of mathematical thinking skills
- learning collaboratively and independently
- opportunities for discussion, communication and explanation of thinking
- developing mental agility
- using relevant contexts and experiences, familiar to young people
- making links across the curriculum to show how mathematical concepts are applied in a wide range of contexts, such as those provided by science and social studies
- using technology in appropriate and effective ways
- building on the principles of Assessment is for Learning, ensuring that young people understand the purpose and relevance of what they are learning
- developing problem-solving capabilities and critical thinking skills

Mathematics is at its most powerful when the knowledge and understanding that have been developed are used to solve problems. Problem solving will be at the heart of all our learning and teaching. We should regularly encourage children and young people to explore different options: 'what would happen if...?' is the fundamental question for teachers and learners to ask as mathematical thinking develops.

Experiences and Outcomes Overview

The mathematics experiences and outcomes are structured within three main organisers, each of which contains a number of subdivisions:

Number, money and measure

- Estimation and rounding
- Number and number processes
- Multiples, factors and primes
- Powers and roots
- Fractions, decimal fractions and percentages
- Money
- Time
- Measurement
- Mathematics – its impact on the world, past, present and future
- Patterns and relationships
- Expressions and equations.

Shape, position and movement

- Properties of 2D shapes and 3D objects
- Angle, symmetry and transformation.

Information handling

- Data and analysis
- Ideas of chance and uncertainty.

Contexts for Learning

In order for pupils to fully understand what they are learning and why, any contexts for learning need to be relevant, engaging and linked to real life scenarios so that pupils can make connections.

Within mathematics there are rich opportunities for links among different concepts: a ready example is provided by investigations into area and perimeter which can involve estimation, patterns and relationships and a variety of numbers. When pupils investigate number processes, there will be regular opportunities to develop mental strategies and mental agility. Teachers will make use of opportunities to develop algebraic thinking and introduce symbols, such as those opportunities afforded at early stages when reinforcing number bonds or later when investigating the sum of the angles in a triangle.

There are many opportunities to develop mathematical concepts in all other areas of the curriculum. Patterns and symmetry are fundamental to art and music; time, money and measure regularly occur in modern languages, home economics, design technology and various aspects of health and wellbeing; graphs and charts are regularly used in science and social studies; scale and proportion can be developed within social studies; formulae are used in areas including health and wellbeing, technologies and sciences; while shape, position and movement can be developed in all areas of the curriculum.

As children and young people develop concepts within mathematics, these will need continual reinforcement and revisiting in order to maintain progression. Teachers can plan this development and progression through providing children and young people with more challenging contexts in which to use their skills.

Engaging with the Wider Community

There may be people listed in the school's Parental Skills Database to contact for support with planned activities.

The school also has a number of working groups which promote numerical competency:

- Charities
- Enterprise
- Fair Trade

The school also has close links with the ASG schools and Hazlehead Academy and participates in ACC/University school challenges.

Assessment

Assessment in mathematics will focus on pupils' abilities to work increasingly skilfully with numbers, data and mathematical concepts and processes and use them in a range of contexts. Teachers can gather evidence of progress as part of day-to-day learning about number, money and measurement, shape, position and movement and information handling. The use of specific assessment tasks will be important in assessing progress at key points of learning including transitions.

From the early years, pupils will demonstrate progress in their skills in interpreting and analysing information, simplifying and solving problems, assessing risk and making informed choices. They will also show evidence of progress through their skills in collaborating and working independently as they observe, explore, experiment with and investigate mathematical problems.

Approaches to assessment should identify the extent to which pupils can apply their skills in their learning, in their daily lives and in preparing for the world of work. Progress will be seen as pupils demonstrate their competence and confidence in applying mathematical concepts and skills. For example:

- Do they relish the challenge of number puzzles, patterns and relationships? Can they explain increasingly more abstract ideas of algebraic thinking?
- Can they successfully carry out mathematical processes and use their developing range of skills and attributes as set out in the experiences and outcomes? As they apply these to problems, can they draw on skills and concepts learned previously?
- As they tackle problems in unfamiliar contexts, can they confidently identify which skills and concepts are relevant to the problem? Can they then apply their skills accurately and then evaluate their solutions?
- Can they explain their thinking and demonstrate their understanding of 2D shapes and 3D objects?
- Can they evaluate data to make informed decisions?
- Are they developing the capacity to engage with and complete tasks and assignments?

Assessment should also link with other areas of the curriculum, within and outside the classroom, offering pupils opportunities to develop and demonstrate their understanding of mathematics through social studies, technologies and science, and cultural and enterprise activities.

For further examples of assessment, please refer to the national NAR website.

<http://www.ltscotland.org.uk/learningteachingandassessment/assessment/supportmaterials/nar/index.asp>

Resources

- Interactive hundred number square
- Show Me boards
- Place value boards and number fans
- Various games and practical materials
- Various teaching schemes, e.g. Heinemann and TeeJay

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

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

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

<http://www.coolmath4kids.com/>

http://www.bbc.co.uk/schools/websites/4_11/site/numeracy.shtml

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