

curriculum for excellence: numeracy across learning

principles and practice

www.curriculumforexcellencescotland.gov.uk



Numeracy across learning

Principles and practice

All teachers have responsibility for promoting the development of numeracy. With an increased emphasis upon numeracy for all young people, teachers will need to plan to revisit and consolidate numeracy skills throughout schooling.

Building the Curriculum 1

All schools, working with their partners, need to have strategies to ensure that all children and young people develop high levels of numeracy skills through their learning across the curriculum. These strategies will be built upon a shared understanding amongst staff of how children and young people progress in numeracy and of good learning and teaching in numeracy. Collaborative working with colleagues within their own early years setting, school, youth work setting or college and across sectors will support staff in identifying opportunities to develop and reinforce numeracy skills within their own teaching activities.

What does it mean to be numerate?

Being numerate helps us to function responsibly in everyday life and contribute effectively to society. It increases our opportunities within the world of work and establishes foundations which can be built upon through lifelong learning. Numeracy is not only a subset of mathematics; it is also a life skill which permeates and supports all areas of learning, allowing young people access to the wider curriculum.

We are numerate if we have developed:

the confidence and competence in using number which will allow individuals to solve problems, analyse information and make informed decisions based on calculations.

A numerate person will have acquired and developed fundamental skills and be able to carry out number processes but, beyond this, being numerate also allows us to access and interpret information, identify possibilities, weigh up different options and decide on which option is most appropriate.

Numeracy is a skill for life, learning and work. Having well-developed numeracy skills allows young people to be more confident in social settings and enhances enjoyment in a large number of leisure activities. For these and many other reasons, all teachers have important parts to play in enhancing the numeracy skills of all children and young people.

Numerate people rely on the accumulation of knowledge, concepts and skills they have developed, and continually revisit and add to these. All practitioners, as they make use of the statements of experiences and outcomes to plan learning, will ensure that the numeracy skills developed from early levels and beyond are revisited and refreshed throughout schooling and into lifelong learning.

How are the numeracy experiences and outcomes structured?

The numeracy experiences and outcomes have been structured using eight organisers:

- Estimation and rounding
- Number and number processes
- Fractions, decimal fractions and percentages
- Money
- Time
- Measurement
- Data and analysis
- Ideas of chance and uncertainty.

All of these areas of numeracy will be familiar and all teachers will recognise how they impact on their own lives. Reflecting on this will help teachers to identify where opportunities may exist to develop numeracy for children and young people.

Mathematics is not my specialism. How will I contribute to the development of numeracy skills?

For individual teachers in secondary schools and other practitioners, it means asking the question, 'How am I meeting the numeracy needs of the learners in front of me?'. This does not mean that you will teach everything that a mathematics teacher develops but that you think of the numeracy experiences you can provide for young people. The greatest impact for learners will come where all practitioners, in all learning environments, include rich numeracy experiences as part of their day-to-day learning and teaching programmes.

You might begin by asking to what extent you already provide numeracy experiences for learners. As a first step, you may want to consider where numeracy plays a part in the aspects you contribute to the curriculum. Does your programme involve estimating, measuring, using and managing time, carrying out money calculations? Does it involve reading information from charts and tables or explaining consequences of actions? If it does, and you highlight this and build upon it in the learning activities, you are making a valuable contribution to developing numeracy in all learners.

What are the features of effective learning and teaching in numeracy?

The experiences and outcomes promote and support effective learning and teaching methodologies which will stimulate the interest of children and young people and promote creativity and ingenuity.

A rich and supportive learning environment will support a skilful mix of a variety of approaches, including:

- active learning and planned, purposeful play
- development of problem-solving capabilities
- developing mental agility
- frequently asking children to explain their thinking
- use of relevant contexts and experiences, familiar to children and young people
- using technology in appropriate and effective ways
- building on the principles of Assessment is for Learning, including understanding the purpose and relevance of the activities
- both collaborative and independent learning
- making frequent links across the curriculum, so that concepts and skills are developed further by being applied in different, relevant contexts
- promoting an interest and enthusiasm for numeracy.

Teachers will plan to establish and consolidate children's fundamental numeracy skills using imaginative, interactive approaches, so that young people develop a sound understanding of number. Through such approaches they will grow in confidence in recall and use of number bonds and multiplication facts, in their understanding of place-value, and in the application of mental strategies. Teachers will reinforce these skills continually throughout the education of each child and young person.

How can I promote progression in children and young people's development of numeracy skills? How do I know which numerical skills I should develop and that they are at an appropriate level?

Children and young people will most effectively develop their numeracy through cumulative growth in their understanding of key concepts and the application of their skills in new contexts. There are fundamental points of learning along these 'pathways of progression': these allow teachers to identify the progression within a child or young person's understanding and what his or her next steps in development will be. It is essential for teachers to work together to extend their shared understanding of progression.

The statements of experiences and outcomes do not have ceilings, so that all children and young people can be challenged at an appropriate level. Collaboration with colleagues in relation to pathways of progression will encourage a shared understanding of expectations of standards as well as effective learning and teaching within numeracy.

Shared planning for the contexts in which children and young people learn and apply numeracy skills is also crucial. Children and young people need opportunities to bring together different combinations of numeracy skills from the various lines of progression. High quality learning depends upon achieving a suitable balance between developing key facts and integrating and applying them in relevant and imaginative contexts.

Have we raised the bar in the expectations for numeracy?

Our expectations for numeracy are indeed higher than previously. This is because of the increasing recognition that we must raise levels of performance in numeracy and sustain them throughout lifelong learning. Many other countries are raising the numeracy performance of their children, young people and wider population. Scotland needs to perform at the highest level, so raising the bar in numeracy is important for each individual and also for the prosperity of the nation.

To support this, experiences and outcomes without ceilings should ensure young people are challenged at an appropriate level and are given the opportunity to progress at a suitably aspirational pace. The level of achievement at the fourth level has been designed to approximate to that associated with SCQF level 4.

This paper and the experiences and outcomes in numeracy provide a clear statement of the expectations that will support all practitioners in contributing confidently to the important responsibility which we all share for developing the numeracy skills of our children and young people.

What are broad features of assessment in numeracy?

(This section complements the advice for mathematics and numeracy.)

As numeracy is the responsibility of all staff, and because of the importance of numeracy across all aspects of a young person's learning, all staff should be clear about their responsibilities and their roles in the assessment of numeracy. Assessment will focus on how well children and young people can work with numbers and data and how well they can use them in their learning and lives, including preparation for future work. From the early years to the senior stages, and particularly at times of transition, it is vital to have a clear picture of the progress each child and young person is making across all aspects of numeracy so that further learning can be planned and action can be taken if any ground has been lost.

Teachers can gather evidence of progress as part of day-to-day learning both in mathematics classes and across the curriculum. The use of specific assessment tasks will be important in assessing progress at key points of learning. Children and young people's progress will be seen in their skills in using number to solve problems, in analysing information and in making informed decisions based on calculations. Approaches to assessment should identify the extent to which children and young people can apply these skills in their learning in and beyond the classroom, in their daily lives and in preparing for the world of work.

As children and young people gradually build up the concepts and skills contained in the experiences and outcomes, they will demonstrate their competence and confidence in applying them in a number of ways. For example:

- Can they explain their thinking to show their understanding of number processes and concepts?
- Are they developing securely the full range of the skills and attributes set out within 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 when working independently and with others, and can they then evaluate their solutions?
- Are they developing their understanding of personal finance?
- Can they evaluate data to make informed decisions?
- Are they developing the capacity to engage with and complete tasks and assignments?

Assessment of numeracy across learning, within and outside the classroom, offers children and young people opportunities to practise and extend their skills, for example within enterprise activities, social studies, technologies and science.