

# Mathematics and Numeracy Units

## Introduction



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# Mathematics Units Introduction



**We have designed these booklets to support the teaching and learning of the minimum statutory content for Mathematics and Numeracy at Key Stage 3.**

Each booklet contains five units providing teaching and learning opportunities through suggested classroom activities. We have designed them to provide examples of how pupils can acquire, develop and consolidate their knowledge and understanding of:

- Number;
- Algebra;
- Shape, Space and Measures; and
- Handling Data.

The content of each booklet supports the Northern Ireland Curriculum. (For further guidance, see the *Statutory Curriculum at Key Stage 3: Rationale and Detail* and the *Key Stage 3 Non Statutory Guidance for Mathematics with Financial Capability*, both available at [www.nicurriculum.org.uk](http://www.nicurriculum.org.uk))

The overall aim of each booklet is to provide suggested classroom activities that help pupils to further engage with mathematics, inside and outside the classroom. Some activities will also enhance their appreciation of the foundations of mathematics and how its applications work.

Each unit in each booklet provides suggested classroom activities and points for discussion, so you can adapt them depending on your class. They are not prescriptive. We have designed them to provide teachers with ideas of how to engage pupils in discussion and how to link teaching and learning to the minimum statutory content for Mathematics and Numeracy at Key Stage 3. For each unit pupils of varied abilities can engage with and access the different activities depending on your own expectations and demands.

The extent to which each unit provides the pupils with the stated opportunities will depend on how you deliver it and which activities you provide.

## **Key Stage 3 Northern Ireland Curriculum**

Each unit in each booklet outlines opportunities for developing pupils through the key elements of the curriculum for Mathematics and Numeracy at Key Stage 3. These include the Knowledge, Understanding and Skills, Curriculum Objectives, and Learning Outcomes.

## Knowledge, Understanding and Skills

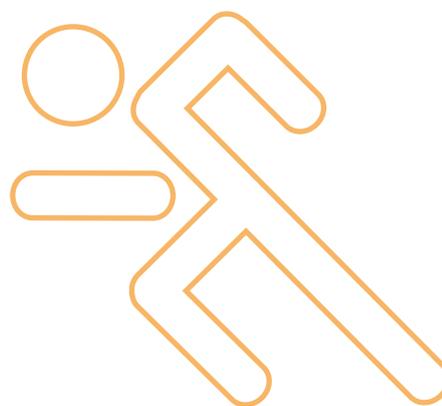
Pupils should have opportunities, through the contexts of the Curriculum Objectives, to develop:

- knowledge and understanding of:
  - Number;
  - Algebra;
  - Shape, Space and Measures;
  - Handling Data;
- knowledge and understanding of personal finance issues and skills to enable competent and responsible financial decision-making;
- their application of mathematical skills to real life and work situations;
- the creative use of technology to enhance their mathematical understanding by demonstrating:
  - creative thinking in their approach to solving mathematical problems;
  - increasing competence in mental mathematics skills;
  - increasing competence in pencil and paper methods;
  - increasing confidence in the use of mathematical language and notation;
  - practical skills using technology.

## Curriculum Objectives

The Northern Ireland Curriculum aims to empower pupils to achieve their potential and to make informed and responsible choices and decisions throughout their lives. It should provide learning opportunities for each young person to develop as:

- an individual;
- a contributor to society; and
- a contributor to the economy and the environment.



## Learning Outcomes

The Learning Outcomes require the demonstration of skills and application of knowledge and understanding of Mathematics. Pupils should be able to:

- demonstrate mental mathematical capability with simple problems;
- decide on the appropriate method and equipment to solve problems—mental, written, calculator, mathematical instruments, or a combination of these;
- demonstrate financial capability in a range of relevant everyday contexts;
- research and manage information effectively to investigate and solve mathematical problems, including Using ICT where appropriate;
- show deeper mathematical understanding by thinking critically and flexibly, solving problems and making informed decisions, demonstrating Using ICT where appropriate;
- demonstrate creativity and initiative when developing ideas and following them through;
- work effectively with others;
- demonstrate self-management by working systematically, persisting with tasks, and evaluating and improving own performance;
- communicate effectively in oral, visual, written, mathematical and ICT formats, showing clear awareness of audience and purpose.

## Assessment for Learning

Assessment for Learning focuses on the learning process: not to prove learning, but to improve it. Each booklet incorporates many examples of Assessment for Learning, enabling you to integrate it with your classroom practice. Where possible we will state this at the start of each unit in each booklet.

Teachers have opportunities to:

- share learning outcomes, explaining what pupils will be learning and why;
- share and negotiate success criteria;
- develop pupils' reflection on learning through use of peer- and self-assessment;
- give feedback to pupils that shows them how to improve through specific prompts or strategies; and
- practise effective questioning, eliciting good quality feedback from pupils.

Pupils have opportunities to:

- take part in peer assessment, giving and receiving constructive feedback;
- take greater responsibility for their learning and for aspects of assessment; and
- reflect on their learning, showing awareness of their strengths and areas for improvement.

## Cross-Curricular Skills

Using Mathematics is central to the whole curriculum at Key Stage 3. It is the skill of applying mathematical concepts, processes and understanding appropriately in various contexts. Ideally, these should be relevant real-life situations that need a mathematical dimension. Across the curriculum, at a level appropriate to their ability, pupils should be enabled to:

- |  |
|--|
| <ul style="list-style-type: none"> <li>• choose the appropriate materials, equipment and mathematics to use in a particular situation;</li> </ul>                                      |
| <ul style="list-style-type: none"> <li>• use mathematical knowledge and concepts accurately;</li> <li>• work systematically and check their work;</li> </ul>                           |
| <ul style="list-style-type: none"> <li>• use mathematics to solve problems and make decisions;</li> <li>• develop methods and strategies, including mental mathematics;</li> </ul>     |
| <ul style="list-style-type: none"> <li>• explore ideas, make and test predictions and think creatively;</li> </ul>   |
| <ul style="list-style-type: none"> <li>• identify and collect information;</li> <li>• read, interpret, organise and present information in mathematical formats;</li> </ul>            |
| <ul style="list-style-type: none"> <li>• use mathematical understanding and language to ask and answer questions, talk about and discuss ideas and explain ways of working;</li> </ul> |
| <ul style="list-style-type: none"> <li>• develop financial capability; and</li> <li>• use ICT to solve problems and/or present their work.</li> </ul>                                  |

Many of the units in these booklets provide opportunities for the pupils' development of the Using Mathematics Requirements as well as opportunities for pupils to enable their Using Mathematics skills. Many of the units in these booklets incorporate various Requirements. When they do we will provide a selection of relevant references.

## Thinking Skills and Personal Capabilities

Each booklet provides relevant contexts for the development of pupils' Thinking Skills and Personal Capabilities. (For more information, see *Mathematics – Thinking Skills and Personal Capabilities Progression Maps at Key Stage 3*, available at [www.nicurriculum.org.uk](http://www.nicurriculum.org.uk)) Across the Key Stage, these units give pupils opportunities to progress towards:



### Managing Information

- Asking
- Accessing
- Selecting
- Recording
- Integrating
- Communicating

Pupils should discover how to:

- ask focused questions;
- plan and set goals and break a task into sub-tasks;
- use their own and others' ideas to locate sources of information;
- select, classify, compare and evaluate information;
- select the most appropriate method for a task;
- use a range of methods for collating, recording and representing information; and
- communicate with a sense of audience and purpose.



### Thinking, Problem-Solving and Decision-Making

- Searching for meaning
- Deepening understanding
- Coping with challenges

You should help your pupils discover how to:

- sequence, order, classify, and make comparisons;
- make predictions, examine evidence, and distinguish fact from opinion;
- make links between cause and effect;
- justify methods, opinions and conclusions;
- generate possible solutions, try out alternative approaches, and evaluate outcomes;
- examine options and weigh up pros and cons;
- use different types of questions; and
- make connections between learning in different contexts.





### Being Creative

- Imagining
- Generating
- Inventing
- Taking risks for learning

You should help your pupils discover how to:

- seek out questions to explore and problems to solve;
- experiment with ideas and questions;
- make new connections between ideas/information;
- learn from and value other people's ideas;
- make ideas real by experimenting with different designs, actions, and outcomes;
- challenge the routine method;
- value the unexpected or surprising;
- see opportunities in mistakes and failures; and
- take risks for learning.

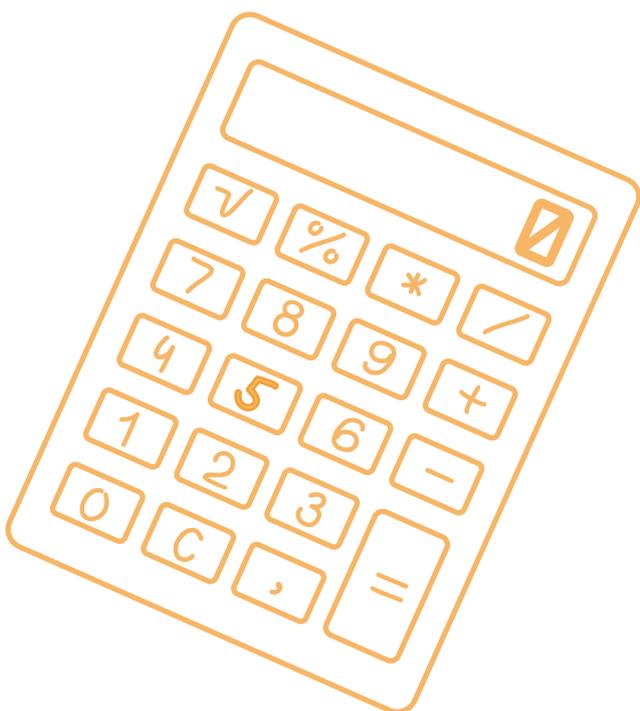


### Working with Others

- Being collaborative
- Being sensitive to others' feelings
- Being fair and responsible

You should help your pupils discover how to:

- listen actively and share opinions;
- develop routines of turn-taking, sharing and co-operating;
- give and respond to feedback;
- understand how actions and words affect others;
- adapt their behaviour and language to suit different people and situations;
- take personal responsibility for work with others and evaluate their own contribution to the group;
- be fair;
- respect the views and opinions of others and reach agreements using negotiation and compromise; and
- suggest ways of improving their approach to working collaboratively.





## Self-Management

- Evaluating strengths and weaknesses
- Setting goals and targets
- Managing and regulating self

To help foster your pupils' self-management skills, you should help them discover how to:

- be aware of their personal strengths, limitations and interests;
- set personal targets and review them;
- manage their behaviour in a range of situations;
- organise and plan how to go about a task;
- focus, sustain attention and persist with tasks;
- review learning and some aspect that might be improved;
- learn ways to manage their own time;
- seek advice when necessary; and
- compare their own approach with others and in different contexts.

Many of the units in these booklets incorporate various Thinking Skills and Personal Capabilities. When they do we will provide a selection of relevant references.

