



Qualifications and  
Curriculum Authority

# Functional Mathematics

*Sue Pope*



**Develop a modern, world-class curriculum  
that will inspire and challenge all learners  
and prepare them for the future**



# New Opportunities

The new Secondary Curriculum: A curriculum for the future



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National Curriculum



## Three questions driving curriculum design, development and implementation

- **WHAT** are we trying to achieve?
- **HOW** do we organise learning?
- **HOW** well are we achieving our aims?



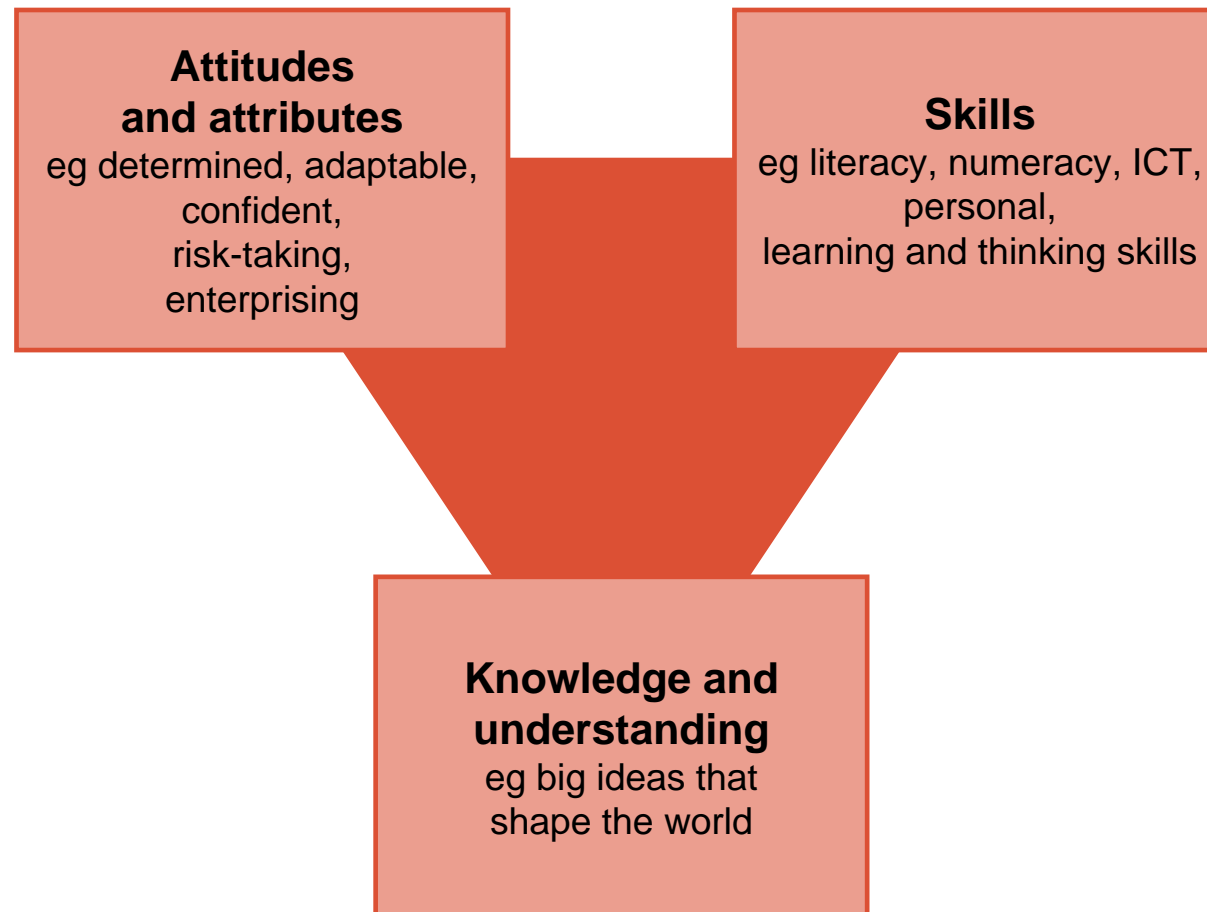
## The Aims

The curriculum aims to enable all young people to become:

- **successful learners** who enjoy learning, make progress and achieve
- **confident individuals** who are able to live safe, healthy and fulfilling lives
- **responsible citizens** who make a positive contribution to society



## Focus for learning





## Approaches to learning

**Varied and matched to learning need**  
eg enquiry, instruction, active, practical, theoretical

**Assessment is fit for purpose and integral** to learning and teaching

Opportunities for **spiritual, moral, social, cultural, emotional, intellectual and physical development**

**In tune with human development**

**Assessment develops learners' self-esteem and commitment to their learning**

**Personalised - offering challenge and support** to enable all learners to make progress and achieve

**Relevant, purposeful and for a range of audiences**

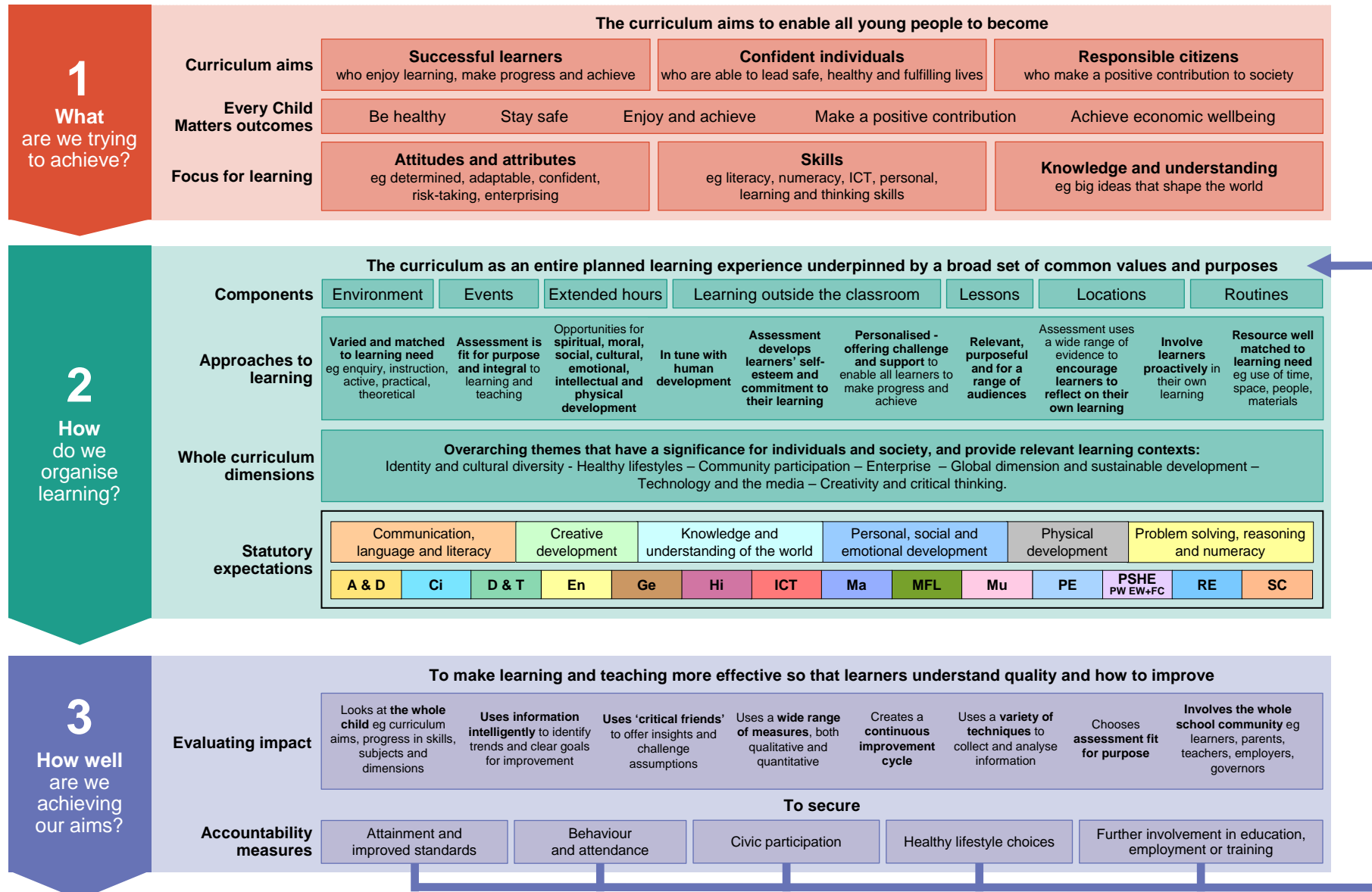
Assessment uses a wide range of evidence to **encourage learners to reflect on their own learning**

**Involve learners proactively** in their own learning

**Resource well matched to learning need**  
eg use of time, space, people, materials

# A big picture of the curriculum

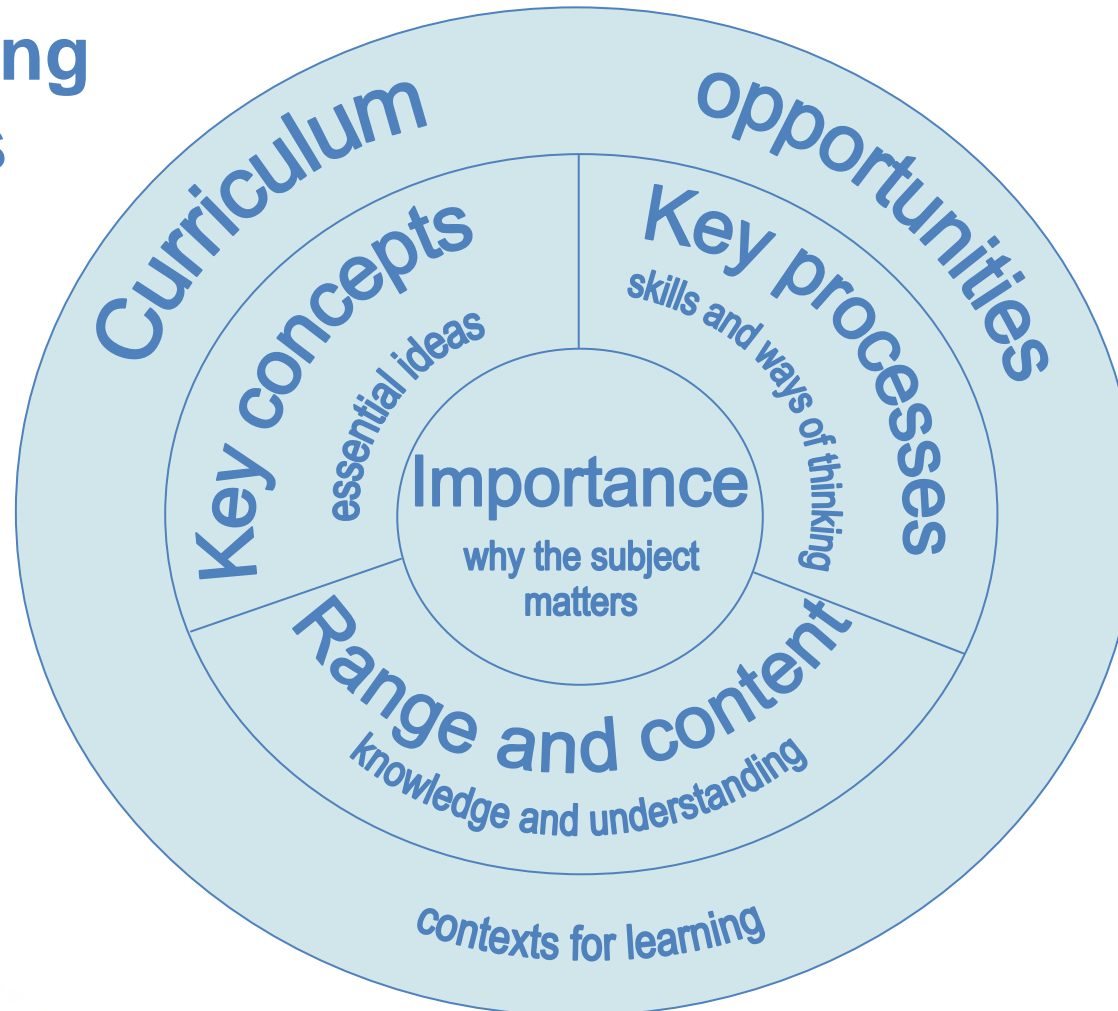
## Three key questions



# New subject programmes of study

[D:\curriculum.qca.org.uk\aims\index.html](http://D:\curriculum.qca.org.uk\aims\index.html)

## Rethinking subjects



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## The importance statement

- Mathematical thinking as a habit of mind
- Mathematics is a creative discipline
- Mathematics is a uniquely powerful way to describe, analyse and change the world
- Mathematics' rich heritage
- Mathematics is used in science, engineering, technology, economics, public decision-making and the knowledge economy



## Key concepts (that underpin the study of mathematics):

- **Competence**

Selecting, using and communicating mathematics

- **Creativity**

Constructing new knowledge, solving problems, developing arguments

- **Applications and Implications of Mathematics**

Nature of mathematics, where mathematics comes from, how it is used

- **Critical Understanding**

Mathematics for modelling and understanding the world



## Key processes:

- **Representing**

Identify mathematical aspects, select appropriate mathematics to use

- **Analysing**

Use mathematical reasoning and appropriate mathematical procedures

- **Interpreting and Evaluating**

Form convincing arguments, relate findings to the original context, distinguish between evidence and proof

- **Communicating and Reflecting**

Communicate effectively for the intended audience, recognise and account for similarities and differences



## Range and Content:

- Nothing has been taken out, the detail has been reduced
- Gives the subject context within which key processes and concepts should be taught
- Number and algebra
- Geometry and measures
- Statistics



## Curriculum Opportunities

- Develop confidence
- Range of tasks – open, closed, explore mathematics in depth, combine different aspects
- Range of contexts – different subjects, society issues, economic well being and financial capability
- Work collaboratively
- Familiarity with resources including ICT



# Timescale

Phased introduction for each Key Stage

- September 2008 - Y7

First KS3 assessments 2011

- September 2010 - Y10

First KS4 assessments 2012

(Two GCSEs and functional mathematics)



## Functional Skills - the underlying principles

- provide authentic contexts and real purposes
- engage with the world beyond the classroom
- explore the transferability and application of skills
- relevant and motivating for learners
- allow learners to make choices and decisions, think creatively and act independently
- provide opportunities to use more than one subject skill, to make links between skills within and across subjects
- provide rich opportunities/sources of evidence for assessment/learning

[QCAWellacre.wmv](http://QCAWellacre.wmv)



## Functional Mathematics

- Entry level 1-3, level 1 and 2
- Level 1 embedded in KS3 PoS
- Level 2 embedded in KS4 PoS
- Level 1 is an essential component of Foundation (level 1) Diplomas
- Level 2 is an essential component of Higher (level 2) and Advanced (level 3) Diplomas
- From 2012 level 2 will be a hurdle for GCSE grade C and above

# Functional Mathematics: Process Skills

Representing	Analysing	Interpreting
Making sense of situations and representing them	Processing and using mathematics	Interpreting and communicating the results of the analysis
<p>A learner can:</p> <ul style="list-style-type: none"> <li>• recognise that a situation has aspects that can be represented using mathematics</li> <li>• make an initial model of a situation using suitable forms of representation</li> <li>• decide on the methods, operations and tools, including ICT, to use in a situation</li> <li>• select the mathematical information to use.</li> </ul>	<p>A learner can:</p> <ul style="list-style-type: none"> <li>• use appropriate mathematical procedures</li> <li>• examine patterns and relationships</li> <li>• change values and assumptions or adjust relationships to see the effects on answers in the model</li> <li>• find results and solutions.</li> </ul>	<p>A learner can:</p> <ul style="list-style-type: none"> <li>• interpret results and solutions</li> <li>• draw conclusions in light of the situation</li> <li>• consider the appropriateness and accuracy of the results and conclusions</li> <li>• choose appropriate language and forms of presentation to communicate results and conclusions.</li> </ul>



## Four aspects that contribute to level differentiation

- **Complexity.** Identifying the separate areas of knowledge needed to tackle a situation, the steps needed to solve the problem and the accessibility of the problem itself (routine or non-routine) determines the level of complexity.
- **Familiarity.** The extent to which a problem or situation requires an individual to relate skills and understanding developed in other contexts to make sense of a new situation. In transferring skills and understanding, the individual may need to adapt or extend their knowledge in order to tackle the problem effectively.
- **Technical demand.** The range of knowledge, skills and techniques that an individual is required to draw on in order to tackle a problem. Demand may vary from a simple calculation to a thorough analysis of a practical situation. *Content in the standards is indicative.*
- **Independence.** The level of autonomy that learners apply to tackling a problem at each stage. It is closely related to the ability to apply problem-solving skills, so that at higher levels learners can demonstrate the ability to select and apply mathematical skills independently.



## TLA: Functional Mathematics

- QIA have produced materials to support Teaching and Learning
- QIA and SNS are responsible for workforce training
- Twelve ABs are piloting functional skills assessment
- 3 year pilot being evaluated by NFER
- See QCA website for information, including a monthly bulletin