



Mathematics  
**Mastery**

A week's worth  
of sample lesson  
resources from  
our secondary  
programme

# Sample Resource Pack

Year 8 • Unit 2 • Week 1

Forming and solving equations



Ark**Curriculum+**



## The Mathematics Mastery Secondary programme

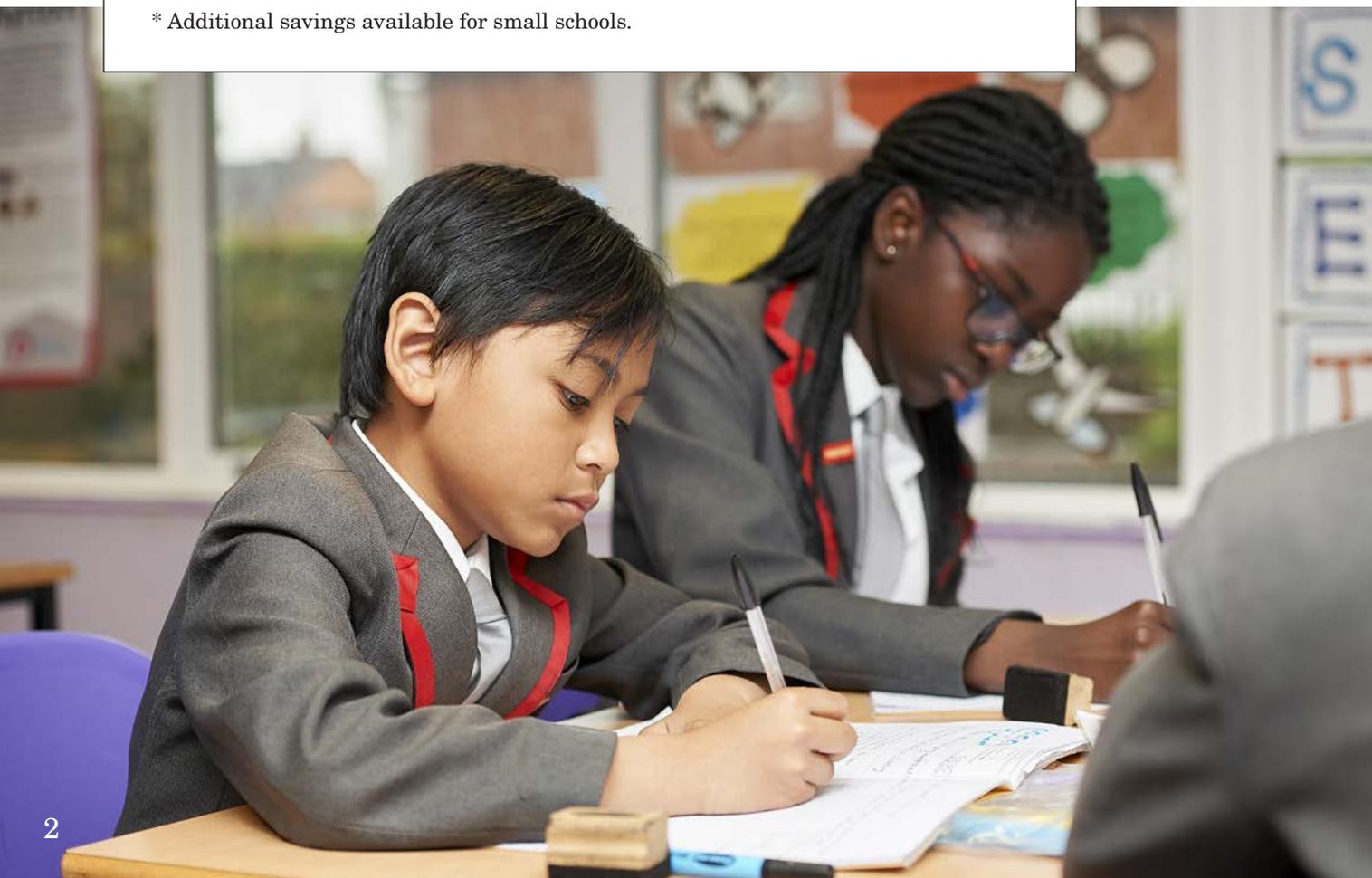
Mathematics Mastery is already used in hundreds of secondary schools across the UK to improve maths skills and teaching.

The programme includes everything that you'll need to deliver a mastery curriculum in the maths classroom.

Now available in three flexible tiers, priced from **just £2,000\***, Mathematics Mastery includes:

- **a well-sequenced and interlinked Key Stage 3 mathematics curriculum** – ensuring students develop fluency and a deep understanding of mathematical concepts
- **integrated training and professional development** – helping to ensure all staff (including trainees and new maths teachers) develop confidence in their maths mastery teaching
- **a full suite of classroom planning, delivery, assessment and intervention resources** – available on MyMastery in bite-sized units, for easy implementation.

\* Additional savings available for small schools.





## Proven impact

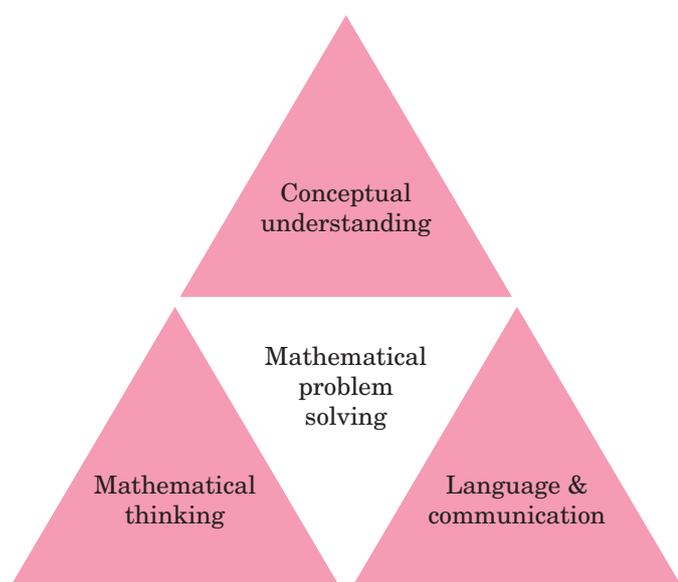
The Mathematics Mastery programme has been shown by EEF (the Education Endowment Foundation) to give pupils on average **one months' additional progress** after one year.

Teachers in our partner schools repeatedly tell us what a difference our programme is making.

## Our approach

The Mathematics Mastery approach is driven by teacher consultation and the latest cognitive and educational research.

It is underpinned by the dimensions of depth – which together enable pupils to develop deep understanding of the subject.



Find out more about the dimensions of depth **here**.

‘Mathematics Mastery has transformed the teaching and learning of maths in our school. Student attainment has risen and our learners are well prepared for the increased rigour they will face in exams.’

**Judith Woodfield,**  
**Headteacher, Bordesley**  
**Green Girls’ School**

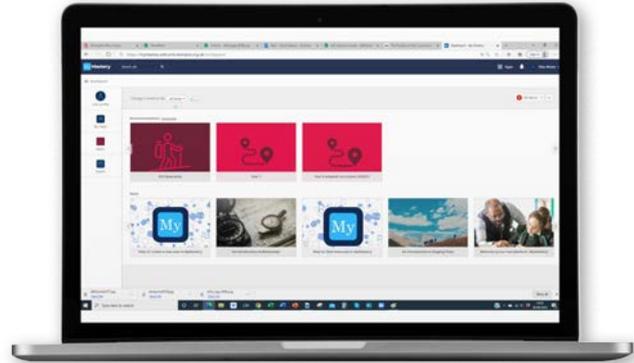


Read more about the Mathematics Mastery programme on our website:  
[www.arkcurriculumplus.org.uk/our-programmes/secondary/mathematics-mastery](http://www.arkcurriculumplus.org.uk/our-programmes/secondary/mathematics-mastery)



# MyMastery

Our new MyMastery learning platform is at the heart of the programme – offering easy ‘anytime, anywhere’ access to the full suite of Mathematics Mastery content.



The resources on MyMastery are split into easily accessible chunks of learning – these are called **staging posts**.

Each staging post covers approximately 8-12 hours of learning, with all the resources and comprehensive professional development needed to support the teaching of that stage and the units within it.

Your sampler includes a taster of the programme content for one week, including:

## Curriculum map

An overview of the units of work and how they combine to build knowledge and understanding.

Y8	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Equations and inequalities						Graphs					
	<b>Sequences</b> <ul style="list-style-type: none"> <li>Use geometric patterns to derive sequences</li> <li>Derive sequences from different contexts</li> <li>Find the <math>n</math>th term of a linear sequence</li> </ul>	<b>Forming and solving equations</b> <ul style="list-style-type: none"> <li>Forming algebraic equations</li> <li>Solving equations with unknowns on both sides</li> </ul>	<b>Forming and solving inequalities</b> <ul style="list-style-type: none"> <li>Language and symbols</li> <li>Using a number line</li> <li>Forming and solving algebraic inequalities</li> </ul>	<b>Linear graphs</b> <ul style="list-style-type: none"> <li>Plot coordinates to generate straight lines</li> <li>Identify key features of a linear graph</li> <li>Make links between algebraic and linear representations.</li> <li>Identify parallel lines from algebraic equation</li> </ul>	<b>Accuracy and estimation</b> <ul style="list-style-type: none"> <li>Rounding to a given number of decimal places and significant figures</li> <li>Upper and lower bounds</li> <li>Estimation</li> </ul>							
Spring	Proportional reasoning						Representations and reasoning with data					
	<b>Ratio, real life graphs and rate</b> <ul style="list-style-type: none"> <li>Review Year 7 ratio</li> <li>Scales and reading maps</li> <li>Read and interpret real life graphs</li> <li>Rates of change including SDT</li> </ul>	<b>Direct and inverse proportion</b> <ul style="list-style-type: none"> <li>Similarity as an example of direct proportion</li> <li>Represent proportional relationships algebraically, in a table and on graphs</li> </ul>	<b>Univariate data</b> <ul style="list-style-type: none"> <li>Construct and interpret charts and graphs</li> <li>Mean, mode, median and range</li> <li>Examine outliers</li> </ul>	<b>Bivariate data</b> <ul style="list-style-type: none"> <li>Scatter graphs</li> <li>Correlation</li> <li>Constructing a line of best fit</li> <li>Interpolation and extrapolation</li> </ul>								
Summer	Angles						Area, volume and surface area					
	<b>Parallel lines</b> <ul style="list-style-type: none"> <li>Review Year 7</li> </ul> <b>Angles in polygons</b> <ul style="list-style-type: none"> <li>Review of Year 7 angles</li> <li>Define the sum of interior and exterior angles of polygons</li> <li>Solve problems involving angles in polygons</li> </ul>	<b>Bearings</b> <ul style="list-style-type: none"> <li>Understand the conventions of bearings</li> <li>Calculate and measure</li> </ul>	<b>Circles and composite shapes</b> <ul style="list-style-type: none"> <li>Explore relationship between radius and the circumference and area</li> <li>Use circle formulae</li> <li>Area and perimeter of composite shapes</li> </ul>	<b>Volume and surface area of prisms</b> <ul style="list-style-type: none"> <li>Use the formulae to calculate the volume of cubes, prisms and composite solids.</li> <li>Recognising and drawing nets of prisms.</li> <li>Use the formulae to calculate the surface area of cubes, prisms and composite solids</li> </ul>								

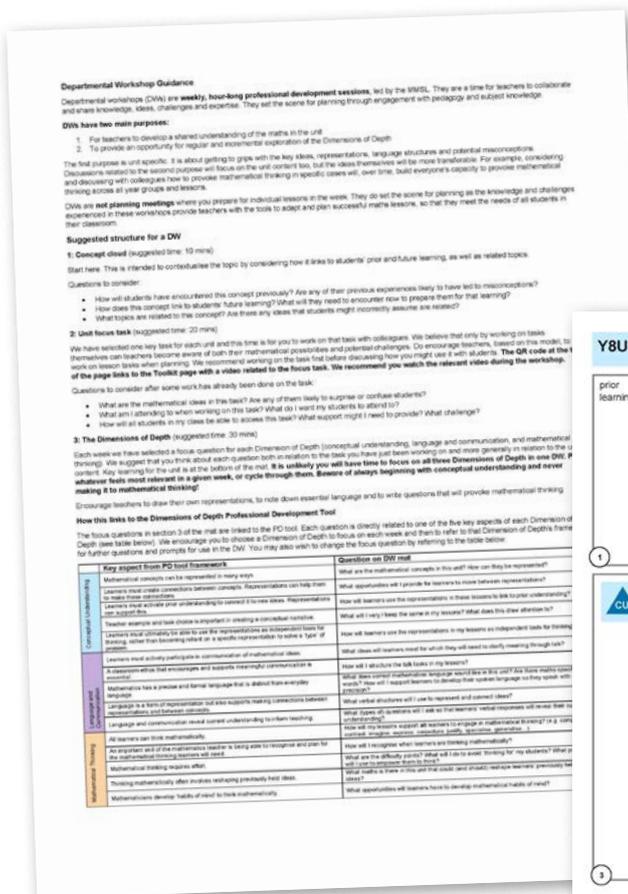


## Departmental workshop guidance

These weekly, hour-long professional development sessions are a time for teachers to collaborate and share knowledge, ideas, challenges and expertise. They set the scene for planning through engagement with pedagogy and subject knowledge.

The workshops:

- allow teachers to develop a shared understanding of the maths in the unit
- provide an opportunity for regular and incremental exploration of the dimensions of depth.



**Y8U1 Sequences** Agreed approaches

**prior learning**

Writing and Solving Equations

related topics

**future learning**

Lesson 3: **Equations**

Notes:

Draw an equation and draw a bar model. How will these help you find the value of x?

$$x + 40 = 60 \quad x + 55 = 60 + 15 = 75$$

60 cm

27

60 = 5x + 27

60

**Do the maths!**

**CU** Select specific CU focus question

**LC** Select specific LC focus question

**MT** Select specific MT focus question



## Lesson slides

PowerPoint slides are provided for each lesson – fully editable to meet your students' needs. Notes and guidance information is also provided, supporting delivery of the lesson.

**Talk Task**

Xavier and Yasmin have formed algebraic **expressions** using cubes. How could you represent their expressions with written algebra?

Under what circumstances would Xavier be right?  
Under what circumstances would Yasmin be right?

**New Learning**

An **expression** is a way of writing a single number using algebra. The value of the expression is **dependent** on the value of the **variable**.

$3x$	$5 - a$	$2y + 3$	$1 + g$	$24 \div m$
$x = \square$	$a = \square$	$y = \square$	$g = \square$	$m = \square$

Using the numbers 1-5, how many ways can you complete these number frames to make pairs of equal expressions.

Do you agree with Declan's statement?

**Develop Learning**

These expressions have been **equated** to a value to form **equations**. The value of the expression, and the value of the **unknown** is set.

$3x = 15$	$5 - a = 2$	$2y + 3 = 5$	$1 + g = 3$	$24 \div m = 6$
-----------	-------------	--------------	-------------	-----------------

- Work out the value of each unknown
- If the value of the unknown in each case increases by 1, what would happen to the numbers in bold?

**Plenary**

Definition	Expressions	Characteristics
Examples		Non-examples
Definition	Equations	Characteristics
Examples		Non-examples

**Independent Task**

**Notes and Guidance**

The purpose of this task is to revisit expressions and understand that the value of the expression is dependent on the value of the variable(s).

Using informal (or formal) methods, students may solve this and find that Xavier is correct when  $a > 2$  and Yasmin is correct when  $a < 2$ . However, the important focus of this task is for students to try different values of  $a$ .

It may also be useful to ask for students' thoughts on Xavier and Yasmin's statements. In many maths topics these statements would be valid:

- "My shape has a greater area than yours"
- "My sum has a greater value than yours"
- "My angle is a greater size than yours"

However, Xavier's and Yasmin's statements are that useful of definitive in this case. This might be an unfamiliar situation in students' prior mathematics learning.





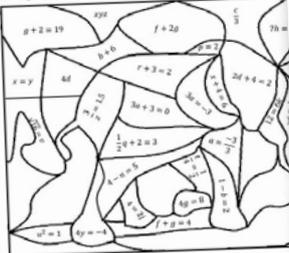
Unit 2 Week 1 Lesson 1: Exercise

1. Look at these expressions:

- $8a$    
   $a - 4$    
   $\frac{a}{2}$    
   $a + 3$    
   $2a - 5$    
   $a^2$    
   $\sqrt{a}$

- a) If  $a = 2$ , arrange the expressions in ascending order of their value.  
 b) If each expression was equated to 4, work out the value of each unknown.  
 c) One of the equations in part b) has more than one solution.

2. a) Colour the picture according to the rules.



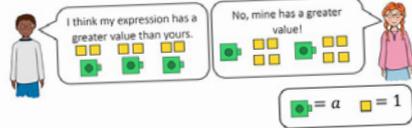
The remaining sections of the picture need to be colour-coded.

b) Write a rule for yellow and an equation or expression that a friend or your teacher could complete the drawing.

Questions for depth:

1. Marva is thinking about the equation  $x = y$ . She starts with the following table:
- |   |    |
|---|----|
| x | -2 |
| y | -1 |
- a) Complete the table.  
 b) What do you notice?  
 Declan is thinking about the equation  $y = 2x - 5$ . He starts with the following table:
- |   |    |
|---|----|
| x | -1 |
| y | -7 |
- d) Complete the table.  
 e) What do you notice?  
 f) Using your observations from b) and f), can you find a rule for Marva's equation and Declan's equation?

Unit 2 Week 1 Lesson 1: Task companion

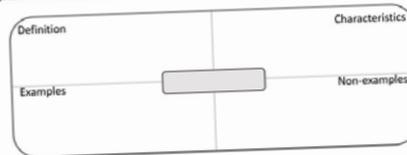


$3x$    
   $5 - a$    
   $2y + 3$    
   $1 + g$    
   $24 \div m$

$x = \square$      $a = \square$      $y = \square$      $g = \square$      $m = \square$   
 $x = \square$      $a = \square$      $y = \square$      $g = \square$      $m = \square$   
 $x = \square$      $a = \square$      $y = \square$      $g = \square$      $m = \square$

$3x = 15$    
   $5 - a = 2$    
   $2y + 3 = 5$    
   $1 + g = 3$    
   $24 \div m = 6$

Make two copies of the diagram below. Write 'expressions' in the central grey box of one and 'equations' in the other. Fill in as much information as you can.



Student resources

These support the independent tasks for each lesson and come in an editable PowerPoint format, allowing you to make tweaks for your unique setting.

Intervention materials

These facilitate support for prior lower attainers.

**Mathematics Mastery** Task 9b

Part A: Here are four ways of combining different Cuisenaire rods to give an equivalent length of the dark green rod. Brad described this combination in three different ways.

Describe each example below. How many different ways can you describe each combination?

Part B: Find more combinations that are equivalent in length to the length of the dark green rod. Describe each combination you find.

**Mathematics Mastery**

Lesson 9 - Forming algebraic expressions

**Do Now**  
 Task sheet 9a can be used at the start. This task involves the students calculating the perimeters of rectangles. This was first covered in the Year 7 Autumn 2 Unit 2: addition of whole numbers. The students need to fill in the length and width from the given description of the rectangle and calculate the perimeter. Remind students that perimeter is the measurement round the outside of the shape.

**Talk task**  
 In this task students need to find as many different combinations of rods which are the same length as the green rod. Use Task sheet 9b to introduce the task. Start by asking the students to describe the combinations in the given examples. Try to find as many different descriptions for each combination. Some possible descriptions for two of the examples given on the task sheet are:  
 You might want to limit the different number of rods the students use to three or four when they find their equivalent combinations. The focus of this task is on the way the students describe their combinations.

**Coach Input:**  
 The aim now is to introduce the students to algebraic expressions and how these can be used to describe the combinations they have found in the last talk task. Discuss with the students that from now on letters could be used to represent the different length of the coloured rods: e represents the length of the white rod, h the length of the dark green rod. This representation can be found on Task sheet 9c. Note the rod length can be represented by any symbol, to be consistent we recommend that you use the naming provided on Task sheet 9c for this lesson.

Please note that the letters chosen to represent the length on the rods do not describe the colour of the rod and do not increase in size with the alphabet. The letters have been assigned to the rods without any pattern intended. If the letter assigned does link to the rod directly (e.g. the white rod labelled w) it is likely to cause more misconceptions as the students develop their algebraic skills.



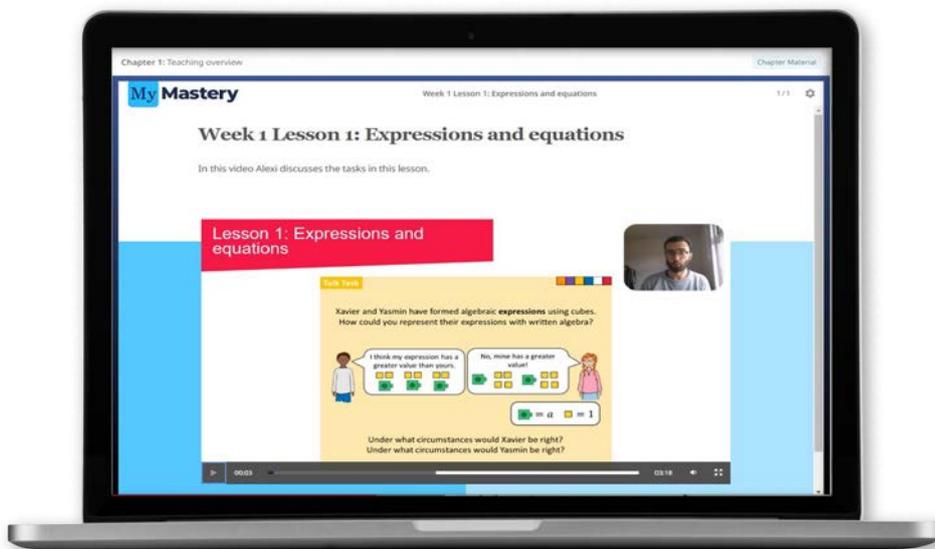
# Professional development

Professional development and training is woven throughout our programme.

Each of our tiers includes access to a wide range of professional development modules to support your teachers as they work through the Mathematics Mastery curriculum.

Available on demand, teachers can access the training they need when it suits them best – offering flexibility and support at the right points through the year.

So to accompany this unit, on MyMastery you will also find:



## Teaching overview videos

These are provided for each lesson within the unit – outlining the key content and learning covered.

All video content can be accessed on demand, at a time that suits your teachers.

Great to help cover teachers get up to speed before they start teaching.



This is only a small selection of the MyMastery content

Other resources include:

- **Induction training** for teachers who are new to the programme
- **Intervention materials** that support catch-up for pupils who demonstrate gaps in learning
- **Formative assessment tools** including weekly diagnostic quizzes to help identify and overcome common misconceptions
- **Support for teachers leading the programme** including online learning tools and guidance documents

plus much more.



## Flexible Mathematics Mastery packages

We offer the Mathematics Mastery programme in three partnership 'tiers' - so there are options to suit each school's different requirements and budget.

Our **Mastery** tier includes access to all of the Mathematics Mastery curriculum, resources and professional development content on MyMastery.

Our subject **Leadership** and more bespoke **Tailored** tiers offer additional, more personalised, support with live induction training, a subject mastery leadership course, dedicated School Development Lead for your school and access to our annual conference.

Visit [www.arkcurriculumplus.org.uk/join-us](http://www.arkcurriculumplus.org.uk/join-us) to find out more.



## Contact us to find out more about the programme

Our friendly partnerships team will be happy to talk you through the Mathematics Mastery programme and help you decide on the right approach and package for your school.

 [partnerships@arkcurriculumplus.org.uk](mailto:partnerships@arkcurriculumplus.org.uk)

 **020 3116 6363**

You can also book a call online at  
<https://calendly.com/ark-curriculum-plus>

Mathematics Mastery is a curriculum programme from



The Yellow Building, 1 Nicholas Road  
London W11 4AN

