

How Mastering Mathematics addresses your Assessment needs at KS3

We have structured our resources so that it is easy to identify:

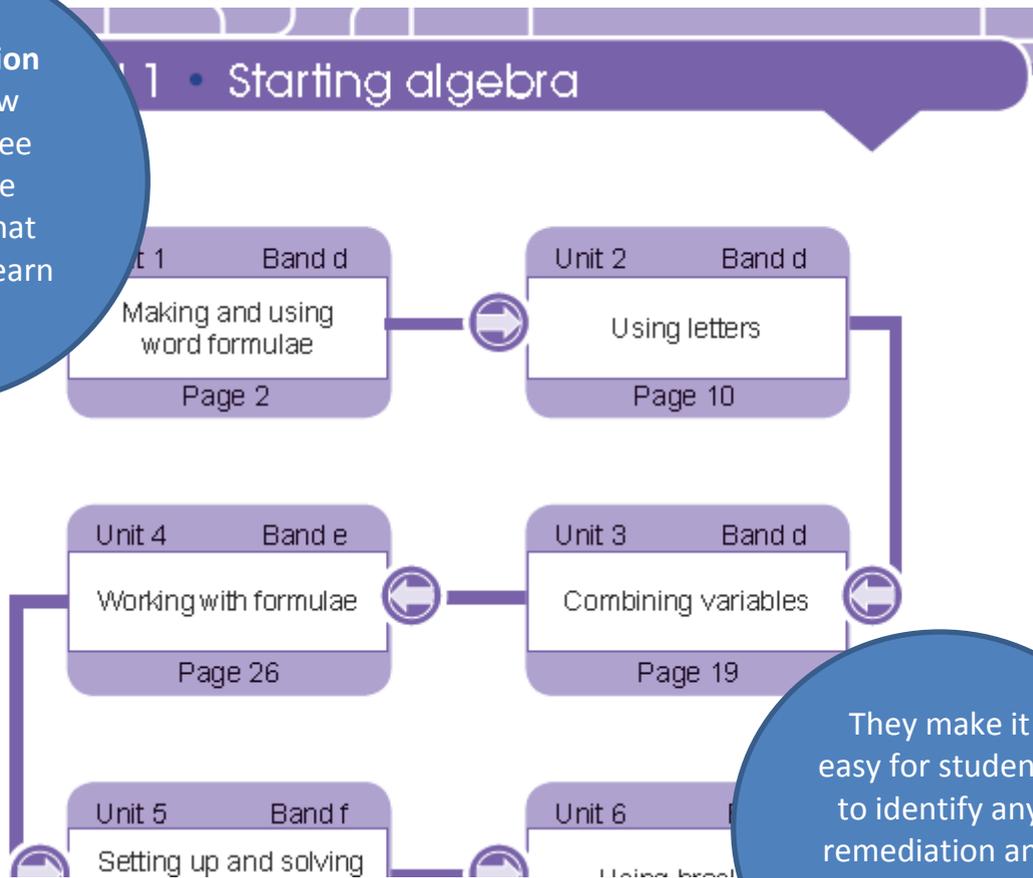
- when students are having difficulties
- the reason they are having difficulties
- resources that might help

Our Scheme of work helps identify what students need to do next whatever stage they are at.

Band d	A1.3 Combining variables		
Prior learning	Mastering Mathematics A1.2 Using letters, N1.5 Adding and subtracting negative numbers		
POS	Use and interpret algebraic notation, including: ab in place of $a \times b$, $3y$ in place of $y + y + y$ Substitute numerical values into expressions Understand and use the concepts and vocabulary of expressions and terms Simplify and manipulate algebraic expressions to maintain equivalence by collecting like terms Model situations or procedures by translating them into algebraic expressions Interpret mathematical relationships algebraically		
Advice	When teaching this unit on a particular pathway, the Core, Support and Increased challenge give the personalisation for this unit. The intention is that you teach the Core as standard, the Support is there for students to opt into as you or they decide is appropriate, and the Increased challenge is available for those who have mastered the Core content and so need to go deeper into the ideas by tackling more complex problems.		
Resources	Core <u>Mastering Mathematics</u> Developing Understanding Powerpoint <i>(Teaching and Learning resources)</i> Worked Examples Powerpoint <i>(Teaching and Learning resources)</i> Uses PowerPoint <i>(Teaching and Learning resources)</i> Skills practice B <i>(student book)</i> Wider skills practice <i>(student book)</i> Online questions <i>(Teaching and Learning resources)</i>	Support <u>Mastering Mathematics</u> Building Skills <i>(student book)</i> Developing Understanding (all devices) <i>(Teaching and Learning resources)</i> Worked Examples (all devices) <i>(Teaching and Learning resources)</i> Skills practice A <i>(student book)</i> Reviewing skills <i>(student book)</i>	Increased challenge <u>Mastering Mathematics</u> Applying skills <i>(Student Book)</i>
	Other free resources Direct Links provided in Mastering Mathematics Teaching and Learning Resources		
	Core <u>Standards Unit</u> N2: Evaluating statements about number operations <u>Wisweb</u> Algebra trees Geometric Algebra 1D	Support <u>NLVM</u> Algebra Tiles	Increased challenge <u>Nrich</u> Number Pyramids
	<u>MyMaths lessons</u> Simplifying 1	<u>MyMaths homeworks</u> Simplifying 1	
Next steps	Mastering Mathematics A1.4 Working with formulae, A1.6 Using brackets		

To download your copy of our KS3 Mastering Mathematics Scheme of work visit www.hoddereducation.co.uk/masteringmaths

Our progression strands allow students to see what they've learnt and what they need to learn next.



They make it easy for students to identify any remediation and extension work they need.

Day to Day Formative assessment

Dynamic Learning Teaching and Learning resources

Our [Developing Understanding powerpoints](#) are designed to introduce topics in a way that builds on current understanding and unearths any misconceptions students have.

Collecting like terms

$2a + 7b$ is an expression in a and b .
 $3a - 4b$ is also an expression in a and b .
 They can be added together and the like terms can be collected.
 $2a + 7b + 3a - 4b = 5a + 3b$

1. Find three different expressions that can be added together to give $5a + 3b$.

There are 8 'a's and 'b's altogether in $5a + 3b$ so that's the same as $8ab$.
 So the answer could be: $ab + 3ab + 4ab$.

You have to keep the 'a's and the 'b's separate.
 It could be: $4a + b, 3a + b$ and $-2a + b$.

Menu Back Forward Cont'd More Vocabulary Q 1 Opinion 1 Opinion 2 Answer Q 2 Clue

Mastering Mathematics © Hodder and Stoughton 2014 Combining variables

Opportunities for discussion allow teachers to assess where all their students need to begin the topic.

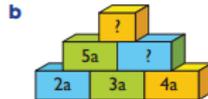
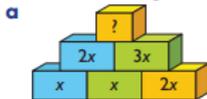
All our sets of questions, available in both print and digital, are designed to build different skills, so teachers can quickly see which ones students have problems with.

Skills Practice A: Students who have difficulties with these questions are having problems with the basic skills and concepts in the unit.

Perhaps they still have misconceptions or an earlier skill is not sound in which case they may need to revisit an earlier unit.

Skills practice A

1 Look at these algebra walls.



The expression in each brick is the sum of the expressions in the two bricks underneath it. Copy the walls and find the missing expressions.

2 Simplify these expressions.

a $m + m + m$

b $2h + 5h - 3h$

c $a + a + a + a + a$

d $x + 2x + 3x + 4x$

e $3g - 2g + 4g - 2g$

f $5j - 2j - j + 3j$

3 Simplify these expressions.

a $4g + 2 - 3g + 5$

b $2d + 4 + 5d + 7 + 3d$

c $4m - 2 + 4m - 3$

d $2x + 3 - x + 2 + 4x$

e $3c + 2 - 2c - 1$

f $3y + 5 - y + 3 + 2y - 8$

4 Simplify these expressions.

a $2c + 5d + 2c + d$

b $a + 2b + 4b + 3a + 3b$

c $3x + 2y - 3x + 4y$

Skills Practice B: Students who have difficulties with these questions are having difficulty applying the skills to harder questions and different contexts.

Although they know the process, perhaps they have not understood it well enough to use it effectively. Going through more examples and Skills Practice A more thoroughly might help.

Skills practice B

1 In each of these questions, you should copy the expression and then simplify it by collecting like terms.

Here is an example.

$$2a + 3b + a + 4b = 2a + a + 3b + 4b \\ = 3a + 7b$$

a $a + 2b + 4 + 5a$

b $4x + 5y - 2x + y$

c $2x - 3y + 6y + 7$

d $9x + 6y - 5x - 4$

e $3p - 4q + 7 - 3p$

f $4p - 5 + 3q - 4$

g $9r - 3s - 8r + 3s$

h $7h - 2i - 4h + 6i$

i $5x + 2y + 3x - 6y - 8x$

2 Sam, Rob and Sean were adding up the number of goals they had scored in football that season.

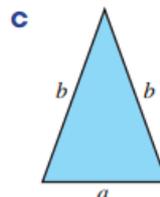
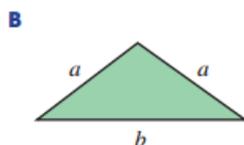
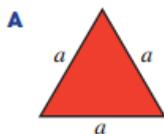
Sam scored x goals.

Rob scored three more than Sam.

Sean scored twice the number that Sam did.

Write down and simplify an expression for the total number of goals scored by all three boys.

3 Look at these triangles.



Wider Skills Practice: Students who have difficulties with these questions are having problems bringing all their maths skills together.

Perhaps they need to revisit a topic they have forgotten or develop strategies to identify the maths they need to use. Doing more of these types of questions will help.

Wider skills practice

Reasoning

1 Look at these three diagrams of a kite.

a

b

c

a In which kite are the longer sides 3 cm more than the shorter sides?
b Find and simplify an expression for the perimeter of each kite.
c What is the perimeter of each kite when $n = 5$?
d Draw and label a different shape whose perimeter is the same as the expression that you found in part **b** for kite A.

2 a i Write down an expression for the sum of the angles in this triangle.
ii Simplify your expression.

Thinking

This section will help you assess a student's readiness for GCSE

Applying Skills: Students who have difficulties with these questions are finding problem solving hard.

These questions offer a whole range of different types of problem solving questions so you may wish to draw out the key problem solving strategies for the question and discuss these further with students.

Applying skills

Problem solving

1 In the Fibonacci sequence, each term is the sum of the previous two.
 1, 1, 2, 3, 5, 8, ...
 A Fibonacci sequence can start with any two numbers.
 4, 2, 6, 8, 14, 22, 36, 58, 94, 152
 Sally is trying out a trick on a friend.
 She asks her friend to write any two numbers in the first boxes of a 2 by 5 grid.

4	2			

Sally then puts on a blindfold.
 She asks her friend to fill the rest of the grid with Fibonacci sequence numbers if needed.

4	2	6	8	14
22	36	58	94	152

Sally then removes her blindfold, has a quick glance at the grid and writes a number on a piece of paper.

396

This section will help you assess a student's readiness for GCSE

Periodic formative assessment

More formal assessment is provided for each unit through two main vehicles

- [Reviewing Skills](#) questions. These are a succinct set of questions that test the main skills developed in the unit.

Reviewing skills

Ideal as hand
written
teacher-
marked
assessments

1 Simplify these expressions.

- a $6d + 7d - 5d$
- b $8m - 10m$
- c $g^2 + 3g^2$
- d $5r + 11r^2 - 2r$

2 a Which of these expressions is largest when $a = 6$?

A

$$\frac{3a - 4}{2}$$

B

$$a^2 - 2$$

C

$$\frac{1}{2}(a + 2)$$

b Find a value of a for which $a^2 - 2$ has the smallest value of the three expressions.

c Find a value of a for which two of the expressions are equal.

3 The expression in each brick of this algebra wall is the sum of the expressions in the two bricks

- Online Test questions. These multiple choice style questions from Mastering Mathematics Teaching and Learning test the main skills of the unit and provide immediate feedback that helps the student understand where they went wrong and reports all details back to the teacher.



Combining variables Assessment

6ab

4a + 2b

10ab

6a + 4b

8a² + 4b²

8a + 4b

Look at these rectangles. Match the rectangles with these formulae for their perimeters.

Perimeter=

Perimeter=

Perimeter=

They are ideal
for computer-
based lessons,
homework and
periodic skill
checks.

Recording progress

So that you can keep track of what your assessments tell you, we have devised an assessment grid so you can easily see what your students know and what they need to learn next.

To download your assessment grid visit www.hoddereducation.co.uk/masteringmaths



Algebra

Band	Strand	Unit	A	N	Other				
c	Sequences	A2.1 What is a sequence?							
d	Sequences	A2.2 Defining sequences							
d	Starting Algebra	A1.1 Making and using word formulae							
d	Starting Algebra	A1.2 Using letters							
d	Starting Algebra	A1.3 Combining variables							
e	Starting Algebra	A1.4 Working with formulae							
f	Sequences	A2.3 Linear sequences							
f	Sequences	A2.4 Special sequences							
f	Functions and Graphs	A3.1 Real life graphs							
f	Functions and Graphs	A3.2 Plotting graphs of linear functions							
f	Starting Algebra	A1.5 Setting up and solving simple equations							
f	Starting Algebra	A1.6 Using brackets							
f	Starting Algebra	A1.7 Working with more complex equations							
f	Starting Algebra	A1.8 Solving equations with brackets							
f	Moving on with Algebra	A4.1 Trial and improvement							
g	Sequences	A2.5 Quadratic Sequences							
g	Functions and Graphs	A3.3 The equation of a straight line							
g	Functions and Graphs	A3.4 Plotting quadratic and cubic graphs							
g	Starting Algebra	A1.9 Simplifying harder expressions							
g	Moving on with Algebra	A4.2 Linear inequalities							
h	Starting Algebra	A1.10 Using complex formulae							

All digital resources from this document can be found [here](#). This sample lesson has been built via the lesson builder in Mastering Mathematics Teaching and Learning Resources. To sign up for a free 30 day trial visit www.hoddereducation.co.uk/masteringmaths