Using Collins KS3 Maths Frameworking to teach for mastery

Collins

Mastery myths buster

Myth #1: Mastery has a single clear definition

Myth #2: Mastery does not allow for any differentiation

Myth #3: There is a special ‘Mastery Curriculum’

Myth #4: Mastery in maths involves repetitive practice

Myth #5: Mastery means you have to use particular textbooks

Mastery in a nutshell means

Students will achieve:

Competence – carry out mathematical tasks fluently and accurately

Confidence – work on an unfamiliar problem and use maths to solve it

These are the aims of the KS3 Programme of Study which Maths Frameworking delivers

Features of mastery

1. High expectations for all
2. Same pace for whole class
3. Carefully designed curriculum and well planned lessons
4. Practice and consolidation
5. Questioning in class to identify and immediately remedy misconceptions

What should we expect?

Teaching resources that provide high quality materials that teachers can use with confidence. Teacher time is best spent preparing high-quality lessons and not producing resources.

A detailed and well-designed curriculum ensure a logical progression in sequenced steps. It will make links between different areas of the curriculum content and ensure there are no gaps in learning.

Maths Frameworking

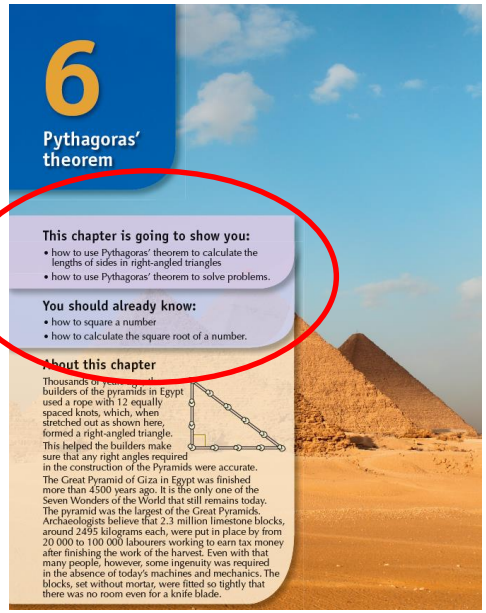
How Maths Frameworking supports mastery

- ✓ Structured curriculum
- ✓ Detailed lesson plans
- ✓ Developing fluency
- ✓ Deepening understanding
- ✓ Ensuring progression
- ✓ Supporting excellent teaching

Maths Frameworking

Structured curriculum

- ✓ Carefully planned course to cover whole KS3 curriculum
- ✓ Continuity and progression
- ✓ Clear signposting and setting of expectations



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Detailed lesson plans

- ✓ Focus on concepts and encourage discussions
- ✓ Varied and stimulating activities
- ✓ Common misconceptions and remediation

Common misconceptions and remediation

- A common misconception is to think that all polygons have the same order of rotational symmetry as they do number of sides. Avoid finding lines of symmetry only on regular polygons; provide a range of shapes. You could also ask pupils to draw their own on squared paper, with '*x*' order of rotational symmetry.

Probing questions

- Can you think of a polygon with rotational symmetry of order 1? How could you check?
- Can you think of a polygon with rotational symmetry of greater than order 1?

Part 1

- This mental starter is to check that pupils know the points of the compass and understand the terms clockwise and anti-clockwise.
- Imagine that you are facing North.
- Now turn 180° clockwise. In which direction are you now facing?
- Imagine that you are facing South.
- Now turn 90° clockwise. In which direction are you now facing?
- Imagine that you are facing West.
- Now turn 180° anticlockwise. In which direction are you now facing?
- Imagine that you are facing East.
- Now turn 90° anticlockwise. In which direction are you now facing?

Part 2

- Pupils will require tracing paper or various templates for this activity.
- Explain that there are two types of symmetry for 2D shapes: *line symmetry* and *rotational symmetry*.
- A plane shape has rotational symmetry if it can be rotated about a point to look exactly the same in a new position.
- Draw a square on the board or on an OHP. Ask pupils to draw a large square in their books.

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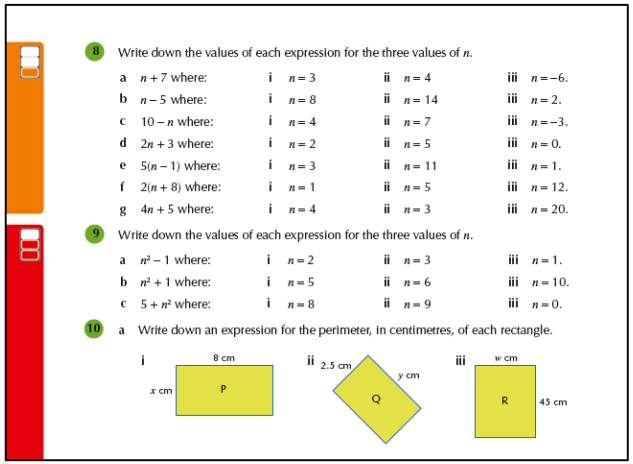
Developing fluency

- ✓ Wide variety of questions for in class and for homework
- ✓ Questions to test conceptual understanding
- ✓ Questions to test competence (e.g. problem solving)



8 Write down the values of each expression for the three values of n.

a	$n+7$ where:	i $n=3$	ii $n=4$	iii $n=-6$.
b	$n-5$ where:	i $n=8$	ii $n=14$	iii $n=2$.
c	$10-n$ where:	i $n=4$	ii $n=7$	iii $n=-3$.
d	$2n+3$ where:	i $n=2$	ii $n=5$	iii $n=0$.
e	$5(n-1)$ where:	i $n=3$	ii $n=11$	iii $n=1$.
f	$2(n+8)$ where:	i $n=1$	ii $n=5$	iii $n=12$.
g	$4n+5$ where:	i $n=4$	ii $n=3$	iii $n=20$.

9 Write down the values of each expression for the three values of n.

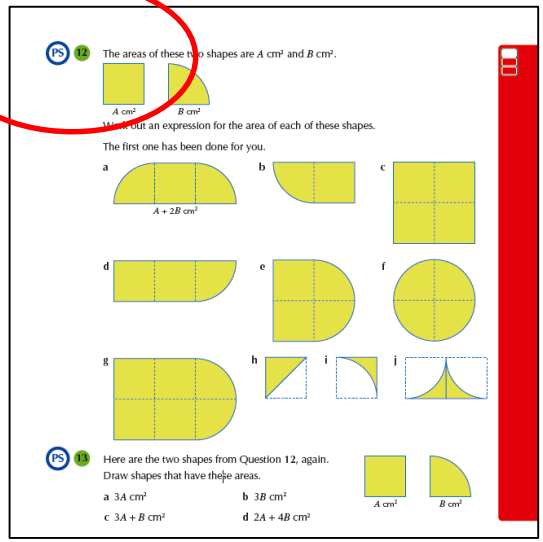
a	n^2-1 where:	i $n=2$	ii $n=3$	iii $n=1$.
b	n^2+1 where:	i $n=5$	ii $n=6$	iii $n=10$.
c	$5+n^2$ where:	i $n=8$	ii $n=9$	iii $n=0$.

10 a Write down an expression for the perimeter, in centimetres, of each rectangle.

i 8 cm, x cm, P

ii 2.5 cm, y cm, Q

iii w cm, 45 cm, R



PS 12 The areas of these two shapes are A cm² and B cm².

A cm² B cm²

Work out an expression for the area of each of these shapes.

The first one has been done for you.

a $A+2B$ cm²

b c d e f g h i j

PS 13 Here are the two shapes from Question 12, again.

Draw shapes that have these areas.

A cm² B cm²

a $3A$ cm² b $3B$ cm²

c $3A+B$ cm² d $2A+4B$ cm²

Deepening understanding

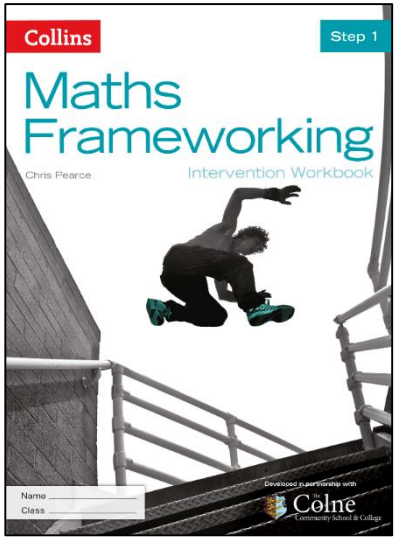
- ✓ Teacher Guide ‘probing questions’
- ✓ To assess understanding and give immediate feedback
- ✓ Help to clarify misconceptions

Common misconceptions and remediation

- Pupils often get confused because of the rather vague and often inaccurate use of the language for central tendency in real life. Encourage them to explore and critique the use of this language in real life.

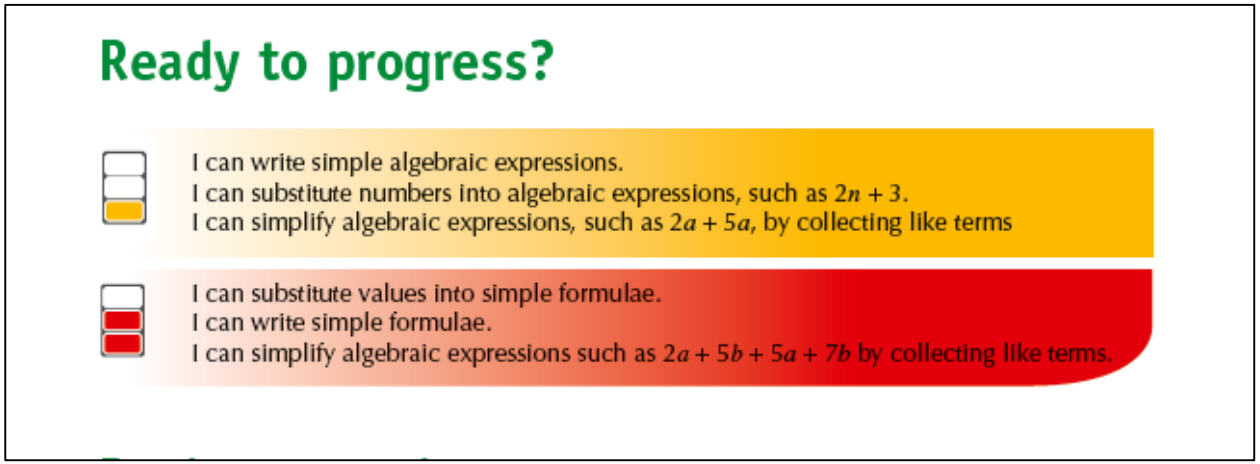
Probing questions

- Can you find five numbers that have a mean of 6 and a range of 8?
- The mean height of a class is 155 cm. What does this tell you about the tallest and shortest pupil?
- Make up a statement or question for this chart or graph that refers to the mean and range of the data.



Ensuring progression

- ✓ Progression for all – Big Idea
- ✓ The need to be secure before moving on
- ✓ Ready to progress?



Ready to progress?

I can write simple algebraic expressions.
I can substitute numbers into algebraic expressions, such as $2n + 3$.
I can simplify algebraic expressions, such as $2a + 5a$, by collecting like terms

I can substitute values into simple formulae.
I can write simple formulae.
I can simplify algebraic expressions such as $2a + 5b + 5a + 7b$ by collecting like terms.

Supporting excellent teaching

- ✓ Enables focus on preparation rather than planning
- ✓ Built on 12 years of feedback and good practice
- ✓ Encourages joint teacher preparation

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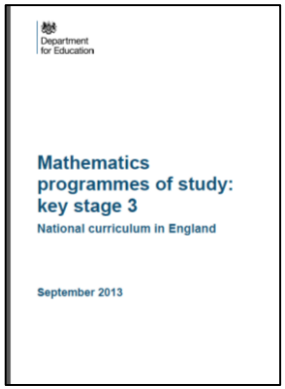
To sum up

Mastery approach =



curriculum

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teaching practice

You **can** use Maths Frameworking to teach for mastery