How will you replace your old Framework resources to teach the new KS3 curriculum?

Look no further!

You may be one of the many schools reviewing how your old Framework resources cover the new KS3 curriculum. If you are looking for something to replace your old Framework materials, look no further than MyMaths for Key Stage 3.

For over 10 years the pioneering online teaching resource MyMaths, created by teachers for teachers, has earned its place right at the heart of the maths classroom. Working together with MyMaths we have now created MyMaths for KS3, a brand new course that works with the MyMaths resources you know to deliver the new curriculum.

MyMaths for Key Stage 3 is the only course to provide:

- Truly differentiated structure so that all levels of ability can access the new curriculum, including all the new topics
- Coherent progression through the KS3 phases, with ‘learn it once and learn it well’ philosophy leading to secure knowledge
- Wealth of practice to promote fluency, underpinned by reasoning and problem-solving to build strong foundations for the GCSE transition
- An effectively clear approach to assessment and levelling so you and your students can be in full control of their attainment
- Highly visual student resources, making classroom delivery easier and bringing maths alive for your students
- All materials, including full teacher support for the new curriculum, written by teachers for teachers
- As well as…
  - Official MyMaths website reference codes matching MyMaths resources to your classroom teaching, for a fully coherent KS3 delivery!

The new course looks great, but my school doesn’t currently subscribe to MyMaths. Can I still use it?

Yes! MyMaths for KS3 can be used very successfully on its own. We were absolutely determined to create the best possible KS3 course for any school, whether or not you use MyMaths. Working together with the MyMaths team means MyMaths for Key Stage 3 complements resources on the MyMaths site, so they can be marshalled to deliver the new curriculum in the most effective and blended way. Find out more at www.mymaths.co.uk.

Order your evaluation pack now:
01536 452620 / schools-orders@oup.com

This preview booklet provides you with advance sample pages from the new MyMaths for Key Stage 3 course to be published in January 2014. This free booklet is designed to give you an early idea of how these new resources will help you deliver the new KS3 curriculum successfully, and provide links through to your favourite MyMaths resources.
The ratio of Brian's money to Esme's money is 3 : 5.

Esme has £1.25.

Brian has 75p, and

You can solve ratio problems by multiplying both parts by the

The real life distance = 200 × 8 cm = 1600 cm = 16 m

In real life the distance between the Post Office and church is 30 m.

A map has a scale of 1 : 200.

For every 7 men there are 11 women.

How many women are there?

The ratio of men to women in a sports club is 7 : 11. There are 175 men.

What is the distance on the map?

A model of a space shuttle is built to a scale of 1 : 24. The length

of the real shuttle is 36 m. How long is the model of the shuttle?

A cake recipe requires 150 g of sugar for every 100 g of butter.

15% of 80

20% of £60

40% of 180 g

20% of 1 day

15 kg : 11 lbs

90p : £2

8 inches : 5 ft

80p : £1.80

1500 g : 2 kg

300 ml : 1 litre

9 miles : 30 km

3 hrs : 40 mins

4 km : 2500 m

Did you know?

Romanesco cauliflower is self-similar. The ratio of height : width ratio of the whole head is the same as for the florets.
4 The relationship between one part and the whole

**Example**

The proportion of red in light red is 2 : 1.

**Questions**

1. A recipe for 12 people requires 360 g of sugar.
   - How many grams of sugar are required for 4 people?
2. A scale drawing is made with a scale of 1 : 20. What is the distance in real life of a measurement of 9 cm on the drawing?
3. The method for dividing into a given ratio
   - fruit salad: 2 : 3
   - apples: 7 : 1
   - grapes: 1 : 1
4. A recipe for 4 people requires 360 g of sugar.
   - How many grams of sugar are required for 12 people?
5. The perimeter of a square is 20 cm. What is the length of one side?
6. The perimeter of a square is 20 cm. What is the length of one side?
7. A farm has 28 cows and 42 sheep.
   - What is the ratio of cows to sheep?
8. A recipe for 4 people requires 360 g of sugar.
   - How many grams of sugar are required for 12 people?
9. The method for dividing into a given ratio
   - fruit salad: 2 : 3
   - apples: 7 : 1
   - grapes: 1 : 1
10. A recipe for 4 people requires 360 g of sugar.
   - How many grams of sugar are required for 12 people?
11. The perimeter of a square is 20 cm. What is the length of one side?
12. The perimeter of a square is 20 cm. What is the length of one side?
13. A farm has 28 cows and 42 sheep.
   - What is the ratio of cows to sheep?
14. A recipe for 4 people requires 360 g of sugar.
   - How many grams of sugar are required for 12 people?
15 Ratio and proportion

Introduction
An alloy is a mixture of a metal with other elements. Adding carbon to iron makes steel. By controlling the amount of carbon, you can make the alloy harder or stronger. Adding chromium to iron makes stainless steel which is very resistant to rusting.

What’s the point?
The relative amounts of the elements in an alloy can radically alter its properties. If you don’t understand what you are doing you won’t get what you want. You could build a skyscraper with steel girders that buckle under its weight!

Objectives
By the end of this chapter, you will have learned how to …

- Simplify and use ratios
- Solve problems involving direct proportion
- Calculate a percentage of an amount
- Calculate a percentage increase or decrease
- Use fractions, decimals and percentages to compare simple proportions and solve problems

Check in
1. Calculate these percentages using a mental or informal written method.
   a. 15% of 80
   b. 20% of £60
   c. 40% of 180g

2. Copy and complete this table using a calculator where appropriate.

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Decimal</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>17/20</td>
<td>0.85</td>
<td>85%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>96%</td>
</tr>
</tbody>
</table>

Starter problem
The sizes of various body parts are often related in human beings. For example, as you grow up your arm span remains about the same as your height whilst for an adult their height is three times the circumference of their head. Can you say how tall someone is given their hat size?
**Example**

The ratio of men to women in a sports club is 7 : 11. There are 175 men. How many women are there?

For every 7 men there are 11 women.

For 15 men, there are 27 women in the sports club.

\[ \text{men} : \text{women} = 7 : 11 \]

\[ 175 \times 3 = 525 \]

Multiply both parts of the ratio by 175 = 7 = 25

The ratio of men to women is 7 : 11.

You can solve ratio problems by multiplying both parts by the same number.

**Exercise 15a**

1. Write each of these ratios in its simplest form.
   - a 4 : 14
   - b 12 : 18
   - c 15 : 25
   - d 14 : 21
   - e 40 : 25
   - f 35 : 56
   - g 64 : 40
   - h 72 : 63
   - i 121 : 77
   - j 72 : 144
   - k 27 : 81
   - l 74 : 222
   - m 1024 : 64
   - n 56000 : 16000

2. Write each of these ratios in its simplest form.
   - a 40 cm : 1 m
   - b 90 p : £2
   - c 25 mm : 4 cm
   - d 300 ml : 1 litre
   - e 4 km : 2500 m
   - f 1500 g : 2 kg
   - g 3 hrs : 40 mins
   - h 80 p : £1.80
   - i 3 hrs : 1 day
   - j 40 mins : 1 day
   - k 4 ft : 6 yds
   - l 8 inches : 5 ft
   - m 9 miles : 30 km
   - n 15 kg : 11 lbs

**Problem solving**

3. Write these as ratios in their simplest form.
   - a A cake recipe requires 150 g of sugar for every 100 g of butter.
     What is the ratio of sugar to butter?
   - b At Wellbeing 11–18 Comprehensive School there are 1100 students in Years 7 to 11 and 250 students in the sixth form. What is the ratio of sixth form students to Y7 to Y11 students?
   - c A model of a car is 15 cm long. The real car is 3.75 m long. What is the ratio of the model to the real car?

4. Solve each of these problems.
   - a At a dance club the ratio of boys to girls is 3 : 7. There are 91 girls at the club. How many boys are there?
   - b The main ingredients in a recipe are cauliflower and cheese in the ratio 4 : 3 by weight. How many grams of cheese are needed if the cauliflower weighs 640 g?
   - c A map has a scale of 1 : 250.
     i What is the distance in real life of a measurement of 12 cm on the map?
     ii What is the distance on the map of a measurement of 50 m in real life?
   - d A model of a space shuttle is built to a scale of 1 : 24. The length of the real shuttle is 36 m. How long is the model of the shuttle?

5. Rukshana is 12 years old and her sister Rowshanara is 4.
   - a What is the ratio of their ages?
   - b What will be the ratio of their ages in 10 years’ time?
   - c Investigate what happens to the ratio of their ages as Rukshana and Rowshanara get older.
**15b Division in a given ratio**

You can divide a quantity in a given ratio using a unitary method. You find the value of one equal share of the quantity.

Stewart and Naomi share a 200 g bar of chocolate in the ratio 2 : 3. How much chocolate do they each receive?

- Number of equal parts: $2 + 3 = 5$
- Each of the parts weighs: $\frac{200}{5} = 40$ g
- Stewart gets 2 parts: $2 \times 40 = 80$ g
- Naomi gets 3 parts: $3 \times 40 = 120$ g

By simplifying, Stewart : Naomi
80 g : 120 g
80 : 120
= 2 : 3

By adding,
80 g + 120 g = 200 g

Both checks are correct, so the answer is correct.

**Exercise 15b**

1. Divide these quantities in the ratios given.
   - a) £50 in the ratio 2 : 3
   - b) 60 cm in the ratio 5 : 7
   - c) 72 MB in the ratio 4 : 5
   - d) 90 p in the ratio 1 : 5
   - e) 120 seconds in the ratio 3 : 5
   - f) £240 in the ratio 5 : 3

2. Sian picks some apples. She shares out 15 apples between herself and her mum in the ratio 2 : 3.
   - a) Draw a diagram to show how Sian divides the apples.
   - b) Write the number of apples she gives to her mum.

3. Morgan wins £40. He shares the £40 between himself and his dad in the ratio 3 : 5.
   - a) Draw a diagram to show how Morgan divides the money.
   - b) Write the amount of money he gives to his dad.

**Problem solving**

4. Solve each of these problems.
   - a) At a gym club the ratio of boys to girls is 3 : 4. There are 63 children in total at the club. How many girls are there?
   - b) Jack and Mona share £84 in the ratio 2 : 5. How much money does Jack receive?

5. For each of these questions, check that the answer is correct. Explain your reasoning in each question.
   - a) In a chemistry lab, the ratio of funnels to beakers is 2 : 3. There are 25 pieces of equipment in total. How many funnels and how many beakers are there?
   - b) Javed and Oprah share £65 in the ratio 4 : 9. How much money do they each receive?

6. Meredith wants to design a flag using two colours – blue and green. The flag must be coloured blue to green in the ratio 3 : 5.
   - a) Draw a rectangle 5 cm by 16 cm.
     Colour the flag blue and green in the ratio 3 : 5.
   - b) Draw a different rectangle 12 cm by 8 cm.
     Colour the flag blue and green in the ratio 3 : 5.
   - c) How can you tell which sizes of rectangular flags, drawn on squared paper, can easily be coloured in blue and green in the ratio 3 : 5?
Here is an approximate conversion table for miles and kilometres.

- If you double the number of miles, you double the number of kilometres.
- If you halve the number of miles, you halve the number of kilometres.

The number of miles is directly proportional to the number of kilometres.

When two quantities are in direct proportion, if one of them increases the other one increases by the same proportion.

You can use direct proportion to solve simple problems.

### Example

Three litres of water costs £2.09.

What is the cost of six litres of water?

- 9 litres = £2.09
- 6 litres = £1.67

Six litres of water costs £1.67

You can use the unitary method to solve problems involving direct proportion.

### Example

- a) 20 text messages cost 48p. What is the cost of 15 text messages?
- b) There are 140 calories in a 40g piece of cheese. How many calories are there in a 70g piece of the same cheese?

### Exercise 15c

1. 48 bags of crisps cost £11.04.
   - a) 24 bags of crisps
   - b) 12 bags of crisps
   - c) 1 bag of crisps
   - d) 5 bags of crisps
   - e) 50 bags of crisps
   - f) 6 bags of crisps.

2. Here are three offers for text messages on a mobile phone. In which of these offers are the numbers in direct proportion? In each case explain and justify your answers.

<table>
<thead>
<tr>
<th>D-Mobile</th>
<th>Yellow</th>
<th>Codaphone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text messages</td>
<td>Cost</td>
<td>Text messages</td>
</tr>
<tr>
<td>10</td>
<td>£0.40</td>
<td>5</td>
</tr>
<tr>
<td>20</td>
<td>£0.80</td>
<td>20</td>
</tr>
<tr>
<td>40</td>
<td>£1.60</td>
<td>45</td>
</tr>
</tbody>
</table>

3. Use direct proportion to solve each of these problems.
   - a) 4 apples cost 92p. What is the cost of 12 apples?
   - b) 28g of cashew nuts contain 14g of fat. How many grams of fat are there in 42g of cashew nuts?
   - c) 200g of chips contain 500 calories. How many calories are there in 40g of chips?
   - d) A soup recipe for 4 people uses 500g of mushrooms. i) What weight of mushrooms is needed for 7 people? ii) How many grams of mushrooms are needed for 13 people?

4. Solve each of these problems.
   - a) 3 litres of lemonade costs £1.11.
     - What is the cost of i) 9 litres of lemonade ii) 8 litres of lemonade?
   - b) 4 identical pans have a total capacity of 14 litres. What is the capacity of 7 of these pans?
   - c) 16 pencils cost £1.92. What is the cost of 7 pencils?
   - d) £3 is worth 27 Chinese Yuan. How much is £25 worth in Chinese Yuan?
   - e) 35 litres of petrol costs £38.15. What is the cost of 40 litres of petrol?
   - f) A recipe for 4 people needs 300g of pasta. How much pasta is needed to make the recipe for 7 people?

5. Use direct proportion to copy and complete this approximate conversion table for converting between kilograms and pounds.

<table>
<thead>
<tr>
<th>Kilograms (kg)</th>
<th>Pounds (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>10</td>
<td>22</td>
</tr>
<tr>
<td>23</td>
<td>110</td>
</tr>
</tbody>
</table>

It is called the unitary method because you start by finding the value for one unit.

You can use the unitary method to solve problems involving direct proportion.

Example

a) 20 text messages cost 48p. What is the cost of 15 text messages?

b) There are 140 calories in a 40g piece of cheese. How many calories are there in a 70g piece of the same cheese?
**Example**

Wendy is trying to eat more fruit. In the last 7 days Wendy ate 9 apples and 6 oranges.

**a** What proportion of the fruit eaten is apples and what proportion is oranges?

- Proportion of apples = \( \frac{9}{15} = \frac{3}{5} \)
- Proportion of oranges = \( \frac{6}{15} = \frac{2}{5} \)

**b** What is the ratio of apples to oranges?

- The ratio of apples : oranges = 9 : 6
- Simplified ratio = 3 : 2

\[ \frac{3}{5} \text{ of Wendy’s fruit were apples and } \frac{2}{5} \text{ of her fruit were oranges.} \]

**Example**

Jermaine and Gina share £150 in the ratio 3 : 2. How much money do they each receive?

- Jermaine receives \( \frac{3}{5} \) of £150 = £90
- Gina receives \( \frac{2}{5} \) of £150 = £60

\[ \text{Ratio} \rightarrow \frac{3}{5} : \frac{2}{5} = 3 : 2 \]

\[ \text{Proportion} \rightarrow \frac{3}{5} + \frac{2}{5} = \frac{5}{5} \text{ equal parts} \]

**Exercise 15d**

1. For each of these diagrams
   i. find the ratio of red sections to yellow sections (in its simplest form)
   ii. find the proportion of the shape shaded red (as a fraction in its simplest form)
   iii. copy and complete these two sentences for each shape:
      - red section = \( \frac{1}{4} \times \) yellow section
      - yellow section = \( \frac{1}{3} \times \) red section

2. In a class of 32 students, there are 20 girls.
   a. Write the ratio of boys to girls in the class.
   b. Write the proportion of the class that are girls.

3. In a fish tank, there are 20 goldfish and 25 angelfish.
   a. Write the ratio of goldfish to angelfish in the tank.
   b. Write the proportion of the fish that are goldfish.

4. Use a suitable method to work out these.
   a. Divide 40 kg in the ratio 3 : 2
   b. Divide £120 in the ratio 1 : 5
   c. Divide 360 degrees in the ratio 4 : 5
   d. Divide 180 cats in the ratio 5 : 7
   e. Divide £4 in the ratio 3 : 5
   f. Divide 6m in the ratio 7 : 5

5. Bill and Ben mix blue and yellow paint to each make three shades of green. Bill uses these ratios of blue : yellow
   a. 2 : 8
   b. 3 : 6
   c. 4 : 12
   Ben uses these proportions of blue
   A \( \frac{1}{4} \)
   B \( \frac{1}{5} \)
   C \( \frac{1}{3} \)
   Match the ratios with the correct proportions.

**Problem solving**

6. a. Amy has 28 plates in her cupboard. The ratio of large plates to small plates is 3 : 4. How many small plates does Amy have in her cupboard?
   b. Keiley has 54 files stored on her phone. The ratio of music to video files is 7 : 2.
      i. How many music files does Keiley have on her phone?
      ii. What proportion of the files on her phone are video files?

7. a. \( \frac{3}{5} \) of the people at a pop concert are women. What is the ratio of men to women at the pop concert?
   b. Harry and Posy shared some money in the ratio 3 : 4. Harry received £36. How much money did Harry and Posy share?

8. A sponge cake is made from flour, sugar and margarine in the ratio 4 : 5 : 3 by weight. How many grams of margarine and sugar are needed to mix with 280g of flour?

**Did you know?**

All the colours of the rainbow can be made by combining red, green and blue in the right proportions.
1. Write each of these ratios in its simplest form.
   a. 15 : 45
   b. 30 : 24
   c. 95 cm : 2 m
   d. £3 : 84 p

2. A scale drawing is made with a scale of 1 : 50.
   a. What is the distance in real life of a measurement of 9 cm on the drawing?
   b. What length on the drawing would be needed to represent a distance of 8 m?

3. Divide
   a. £90 in the ratio 2 : 3
   b. 117 g in the ratio 8 : 1

4. In a choir, the ratio of men to women is 4 : 7. If there are 12 men, how many women are there?

5. A recipe for 4 people requires 360 g of pasta. How much pasta will be needed for 6 people?

6. 100 g of brioche contains 345 calories. A slice of brioche is about 30 g. Approximately how many calories does it contain?

7. A farm has 28 cows and 42 sheep.
   a. What is the ratio of cows to sheep?
   b. What proportion of the animals are cows?

8. A What proportion of the pentagon is yellow?
   b. What is the ratio of yellow to blue?

9. Calculate these percentages using a suitable method.
   a. 35% of 120
   b. 78% of 59

10. Increase 88 kg by 12.5%.

11. Decrease £6500 by 65%.

12. Convert these fractions into percentages.
   a. $\frac{18}{25}$
   b. $\frac{26}{35}$
   c. $\frac{14}{17}$

13. Medication A cured 78 out of 94 patients and medication B cured 86 out of 109. Which is the most effective medicine?
Components of MyMaths for Key Stage 3

**Phase 1**
- Student Book 1A
- Student Book 1B
- Student Book 1C
- Teacher Companion 1A
- Teacher Companion 1B
- Teacher Companion 1C
- Homework Book 1A
- Homework Book 1B
- Homework Book 1C
- Workbook 1

**Phase 2**
- Student Book 2A
- Student Book 2B
- Student Book 2C
- Teacher Companion 2A
- Teacher Companion 2B
- Teacher Companion 2C
- Homework Book 2A
- Homework Book 2B
- Homework Book 2C
- Workbook 2

**Phase 3**
- Student Book 3A
- Student Book 3B
- Student Book 3C
- Teacher Companion 3A
- Teacher Companion 3B
- Teacher Companion 3C
- Homework Book 3A
- Homework Book 3B
- Homework Book 3C
- Workbook 3

---

### Online resources

Online Resources for MyMaths for KS3 include a Testbank and an Online Student Book (which includes all 9 student books):

#### Testbank

The **Testbank** offers a wealth of assessment for all abilities, with written tests to promote transition to GCSE, as well as on-screen auto-marked tests to aid learning and assess understanding; all accessible from home so students can use it alongside their MyMaths homeworks. A coherent approach to progression ensures that you and your students can effectively track progress and measure success.

#### Online Student Book

The **Online Student Book** provides digital versions of all 9 student books that you can use in class, annotate, and share with your students. You can click directly from the digital book through to relevant lessons on the MyMaths site either in class or at home. You also get unique InvisiPen worked solutions that students can follow to see exactly how it’s done!

---

**Plus links to MyMaths...**

MyMaths for KS3 includes official links throughout to MyMaths, making it easy to deliver the new KS3 curriculum in the most effectively blended way.

---

MyMaths for Key Stage 3 is published in January 2014. Order your evaluation pack now:

01536 452620 / schools.orders@oup.com

---

*Phase 1 Student Books correspond with Year 7, Phase 2 with Year 8, and Phase 3 with Year 9.*