

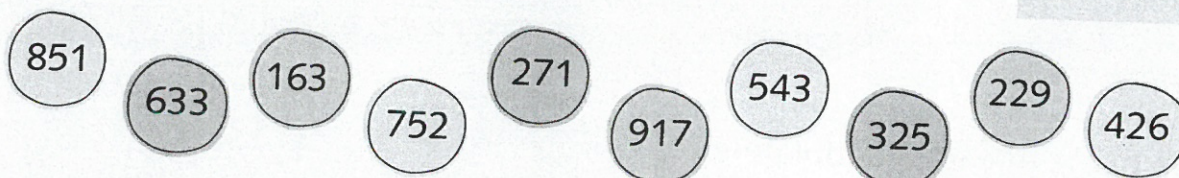
# Multiplication HTO $\times$ O using the formal written method (I)

Use the formal written method to calculate HTO  $\times$  O



Challenge 1

Write the multiples of 100 that each of these numbers comes between. Circle the multiple of 100 it is closest to.



Example

700  $\leftarrow$  756  $\rightarrow$  800

Challenge 2

Choose eight numbers from Challenge 1. Multiply four numbers by 2 and four numbers by 3. Estimate the answer first then use the formal written method to work out the answer.

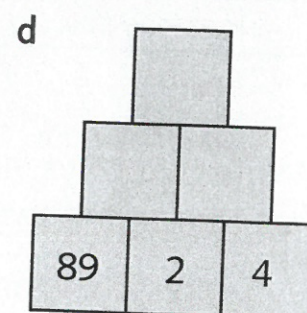
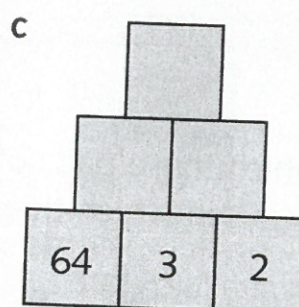
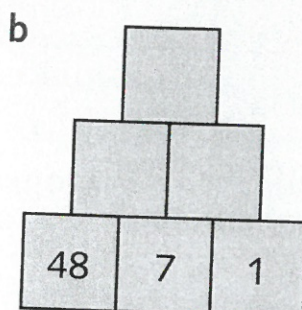
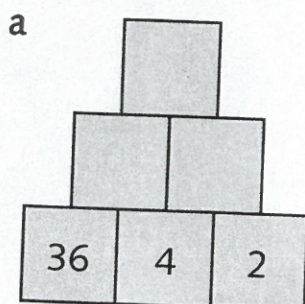
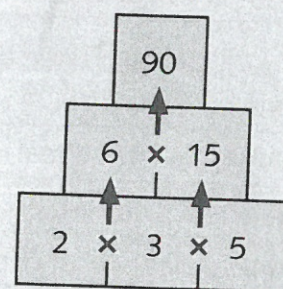
Example

Th	H	T	O
	7	5	6
$\times$	1	1	3
2	2	6	8

Challenge 3

Multiply the two numbers alongside each other in the bottom row together to find the number above in the second row. Multiply the two numbers in the second row together to find the number at the top. Calculate the answers mentally for as long as you are able, then use the formal written method.

Example





# Multiplication $HTO \times O$ using the formal written method (2)

Use the formal written method to calculate  $HTO \times O$



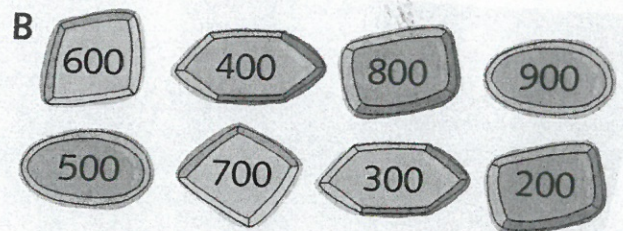
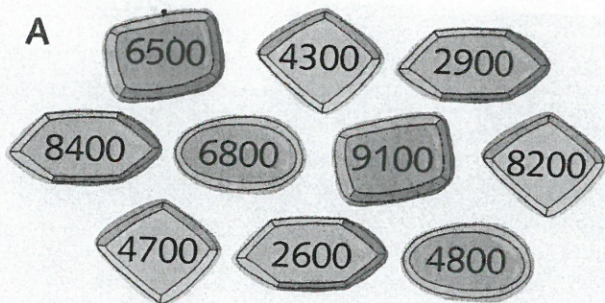
## Challenge 1

- 1 Count back in multiples of the number in the box. Copy and complete each sequence.

- a 30 270, , , , , , ,  
 b 60 600, , , , , , ,  
 c 90 810, , , , , , ,  
 d 40 440, , , , , , ,



- 2 Choose a multiple of 100 from box A and a multiple of 100 from box B. Add them together and write the answer. Make eight calculations. Choose different numbers each time.



## Challenge 2

- 1 Estimate the answer to each calculation.

- a  $246 \times 3$    b  $849 \times 4$    c  $687 \times 9$    d  $684 \times 6$   
 e  $263 \times 8$    f  $473 \times 7$    g  $549 \times 5$    h  $736 \times 8$

- 2 Find the answer to each of the calculations above using the formal written method of multiplication. Check your answer is close to your estimated answer.

### Example

$$473 \times 7 \rightarrow 500 \times 7 = 3500$$

	Th	H	T	O
		4	7	3
$\times$		5	2	7
	3	3	1	1

## Challenge 3

- Find the missing numbers in these calculations.

a  $463 \times \triangle = 2315$

b  $257 \times \triangle = 1028$

c  $337 \times \triangle = 2022$

d  $835 \times \triangle = 2505$

e  $476 \times \triangle = 2380$

f  $736 \times \triangle = 1472$



# Multiplication HTO $\times$ O using the most efficient method

Use the most efficient method to calculate HTO  $\times$  O



Challenge 1

- 1 a  $8 \times 2$   
b  $80 \times 2$   
c  $800 \times 2$

- 2 a  $4 \times 7$   
b  $40 \times 7$   
c  $400 \times 7$

- 3 a  $7 \times 6$   
b  $70 \times 6$   
c  $700 \times 6$

- 4 a  $9 \times 8$   
b  $90 \times 8$   
c  $900 \times 8$

- 5 a  $9 \times 7$   
b  $90 \times 7$   
c  $900 \times 7$

- 6 a  $5 \times 6$   
b  $50 \times 6$   
c  $500 \times 6$



Challenge 2

Sort these calculations into two groups: those you would work out mentally and those where you would use a written method. Then work out the answer to each calculation using the most efficient method.

$233 \times 3$

$432 \times 3$

$655 \times 4$

$632 \times 3$

$746 \times 8$

$869 \times 7$

$637 \times 8$

$434 \times 2$

$513 \times 3$

$754 \times 2$

$779 \times 9$

$856 \times 7$

Challenge 3

Play this game with a partner. Each player chooses a number from the circles on the right.

Take turns to:

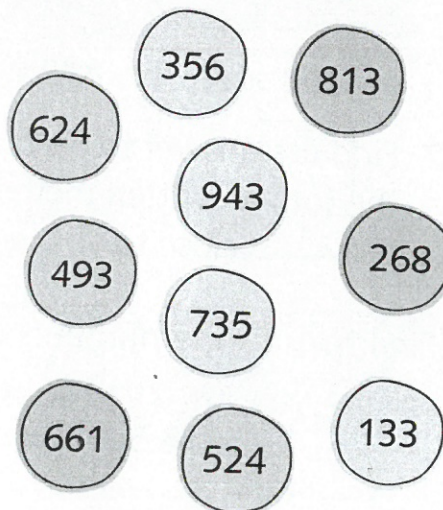
- roll the dice
- multiply the number on the dice by your chosen number
- choose the most appropriate method to calculate the answer, mental or written.

If you choose a written method, write the estimated answer first and then show your working out.

Compare your answers each time. The player with the largest answer scores one point. The first player to score five points is the winner.

You will need:

- 0-9 dice



# Solving word problems (3)

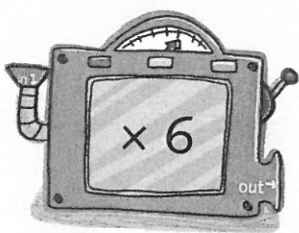
Solve problems and reason mathematically



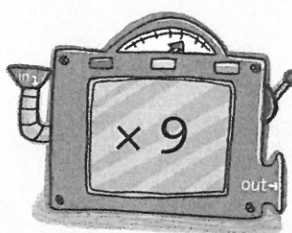
## Challenge 1

Write the multiplication facts for each number coming out of the machine.

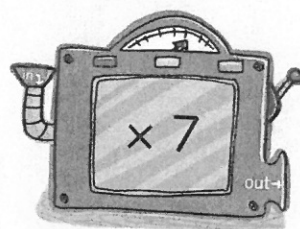
1 4  
8  
7  
9



2 6  
9  
7  
8



3 9  
8  
6  
7



## Challenge 2

Use the information in the pictures to answer the questions.

a The school buys 6 clarinets. What is the total cost?

b The music teacher buys 6 guitars. How much do they cost altogether?

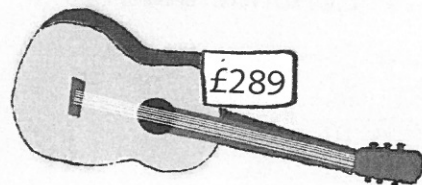
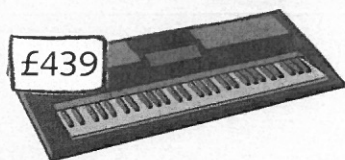
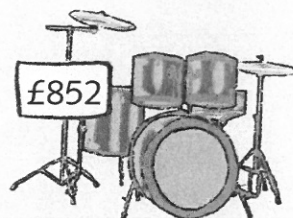
c The school buys 3 keyboards and 3 drum kits. How much do they spend?

d How much more does a drum kit cost than a keyboard?

e If the school bought 1 of each of the string instruments what is the total cost?

f The music club want to buy 1 of each item. How much money will they need?

g How much change from £1000 do you get if you buy 5 violins?



## Challenge 3

Write your own word problems for these calculations. Swap them with a friend to solve.

a  $439 \times 4$

b  $1000 - 289$

c  $852 + 289 + 168$

d  $852 \times 6$



# Equivalent fractions (3)

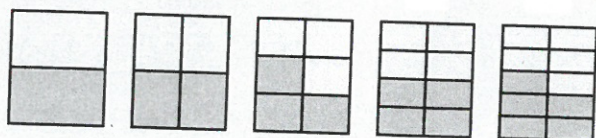
Use factors and multiples to recognise equivalent fractions and simplify fractions



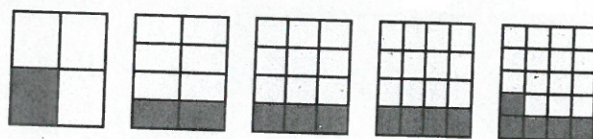
Challenge

1 Continue the equivalent fraction pattern.

a  $\frac{1}{2} = \frac{\quad}{4} = \frac{\quad}{6} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$



b  $\frac{1}{4} = \frac{\quad}{8} = \frac{\quad}{12} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$



2 Explain what an equivalent fraction is.

Challenge

1 Continue the equivalent fraction pattern.

a  $\frac{1}{5} = \frac{\quad}{10} = \frac{\quad}{\quad} = \frac{\quad}{\quad} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$

b  $\frac{1}{6} = \frac{\quad}{12} = \frac{\quad}{\quad} = \frac{\quad}{\quad} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$

c  $\frac{1}{7} = \frac{\quad}{14} = \frac{\quad}{\quad} = \frac{\quad}{\quad} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$

d  $\frac{1}{8} = \frac{\quad}{16} = \frac{\quad}{\quad} = \frac{\quad}{\quad} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$

2 Simplify these fractions.

a  $\frac{9}{18}$

b  $\frac{6}{24}$

c  $\frac{7}{28}$

d  $\frac{8}{40}$

e  $\frac{9}{54}$

f  $\frac{6}{18}$

g  $\frac{8}{56}$

h  $\frac{6}{60}$

i  $\frac{4}{48}$

j  $\frac{9}{45}$

k  $\frac{7}{77}$

l  $\frac{20}{70}$

Challenge

3

1 Continue the equivalent fraction pattern for these non-unit fractions.

a  $\frac{2}{3} = \frac{\quad}{6} = \frac{\quad}{9} = \frac{\quad}{12} = \frac{\quad}{15} = \frac{\quad}{18}$

b  $\frac{3}{5} = \frac{\quad}{6} = \frac{\quad}{\quad} = \frac{\quad}{\quad} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$

2 Simplify these fractions.

a  $\frac{12}{60}$

b  $\frac{10}{18}$

c  $\frac{15}{25}$

d  $\frac{36}{42}$

e  $\frac{20}{50}$

f  $\frac{32}{36}$

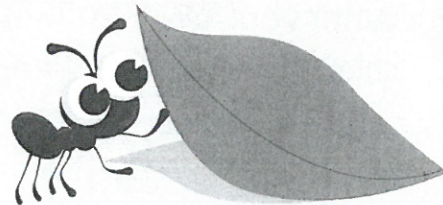
g  $\frac{54}{90}$

h  $\frac{44}{99}$

i  $\frac{12}{21}$

j  $\frac{14}{35}$

3 Explain why  $\frac{12}{25}$  cannot be simplified?





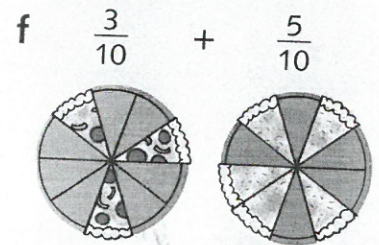
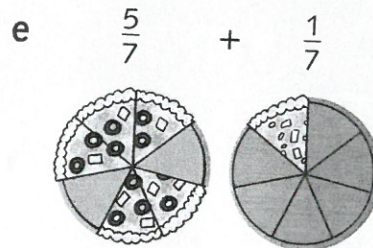
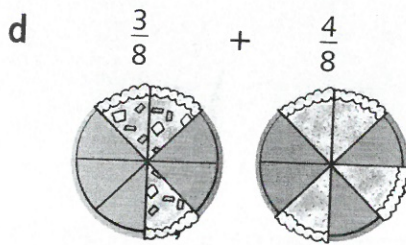
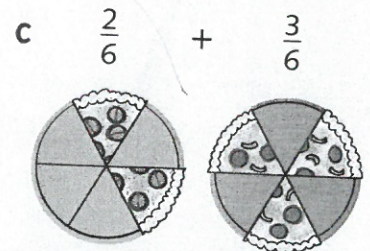
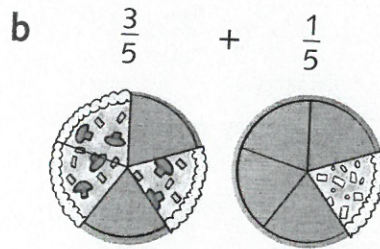
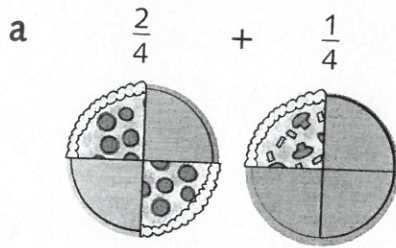
# Adding fractions

Add fractions with the same denominator



Challenge

1 Add these fractions. Use the pizzas to help you.



Challenge

2

Add these fractions.

a  $\frac{3}{7} + \frac{1}{7}$

b  $\frac{5}{8} + \frac{2}{8}$

c  $\frac{3}{9} + \frac{4}{9}$

d  $\frac{2}{10} + \frac{7}{10}$

e  $\frac{5}{7} + \frac{2}{7}$

f  $\frac{3}{12} + \frac{6}{12}$

g  $\frac{6}{10} + \frac{7}{10}$

h  $\frac{8}{9} + \frac{4}{9}$

i  $\frac{3}{3} + \frac{2}{3}$

j  $\frac{8}{12} + \frac{5}{12}$

Challenge

3

1 Add these fractions.

a  $\frac{11}{14} + \frac{2}{14}$

b  $\frac{8}{13} + \frac{5}{13}$

c  $\frac{9}{15} + \frac{7}{15}$

d  $\frac{12}{100} + \frac{25}{100}$

e  $\frac{13}{16} + \frac{5}{16}$

f  $\frac{9}{14} + \frac{7}{14}$

g  $\frac{5}{17} + \frac{15}{17}$

h  $\frac{16}{100} + \frac{30}{100}$

i  $\frac{15}{20} + \frac{8}{20}$

j  $\frac{10}{18} + \frac{10}{18}$

2 Write these improper fractions as mixed numbers.

a  $\frac{8}{6}$

b  $\frac{12}{7}$

c  $\frac{13}{9}$

d  $\frac{8}{5}$

e  $\frac{16}{10}$

f  $\frac{14}{12}$

g  $\frac{5}{4}$

h  $\frac{11}{8}$

i  $\frac{17}{11}$

j  $\frac{16}{9}$

Example

$$\frac{11}{8} = \frac{8}{8} + \frac{3}{8} = 1\frac{3}{8}$$





# Subtracting fractions

Subtract fractions with the same denominator



Challenge 1

Subtract these fractions.

a  $\frac{4}{6} - \frac{1}{6}$

b  $\frac{6}{7} - \frac{2}{7}$

c  $\frac{8}{8} - \frac{5}{8}$

d  $\frac{4}{5} - \frac{3}{5}$

e  $\frac{7}{9} - \frac{5}{9}$

f  $\frac{8}{10} - \frac{6}{10}$

g  $\frac{3}{4} - \frac{1}{4}$

h  $\frac{6}{8} - \frac{3}{8}$

i  $\frac{8}{10} - \frac{7}{10}$

j  $\frac{9}{12} - \frac{5}{12}$

Challenge 2

Subtract these fractions.

a  $\frac{8}{9} - \frac{3}{9}$

b  $\frac{11}{13} - \frac{8}{13}$

c  $\frac{9}{10} - \frac{5}{10}$

d  $\frac{7}{7} - \frac{5}{7}$

e  $\frac{10}{12} - \frac{3}{12}$

f  $\frac{9}{6} - \frac{4}{6}$

g  $\frac{7}{5} - \frac{3}{5}$

h  $\frac{10}{8} - \frac{6}{8}$

i  $\frac{16}{15} - \frac{4}{15}$

j  $\frac{11}{9} - \frac{10}{9}$

Challenge 3

1 Subtract these fractions.

a  $\frac{11}{6} - \frac{4}{6}$

b  $\frac{9}{8} - \frac{5}{8}$

c  $\frac{15}{13} - \frac{7}{13}$

d  $\frac{12}{10} - \frac{8}{10}$

e  $\frac{14}{14} - \frac{12}{14}$

f  $\frac{18}{10} - \frac{8}{10}$

g  $\frac{113}{100} - \frac{20}{100}$

h  $\frac{22}{20} - \frac{18}{20}$



2 Write these improper fractions as mixed numbers.

a  $\frac{14}{6}$

b  $\frac{13}{5}$

c  $\frac{15}{14}$

d  $\frac{11}{4}$

e  $\frac{26}{10}$

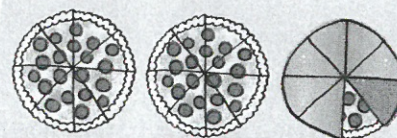
f  $\frac{7}{3}$

g  $\frac{19}{8}$

h  $\frac{9}{4}$

i  $\frac{16}{7}$

Example



$$\frac{17}{8} = \frac{8}{8} + \frac{8}{8} + \frac{1}{8} = 2 \frac{1}{8}$$



# Table fractions

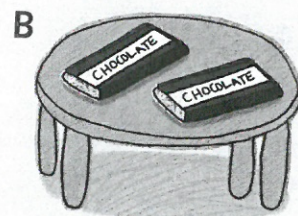
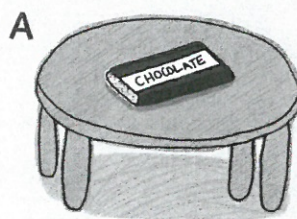
Solve simple measure and money problems involving fractions



## Challenge 1

What fraction of each chocolate bar will each child get if there are:

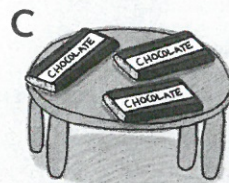
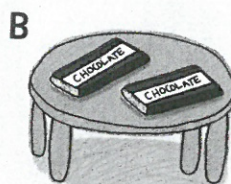
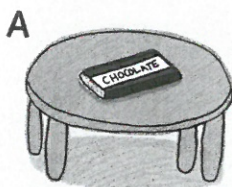
- 1 a 2 children at table A?  
b 6 children at table B?
- 2 a 3 children at table A?  
b 5 children at table B?
- 3 a 4 children at table A?  
b 4 children at table B?



## Challenge 2

What fraction of each chocolate bar will each child get if there are:

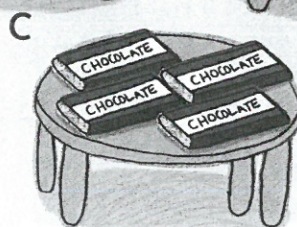
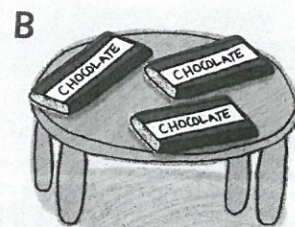
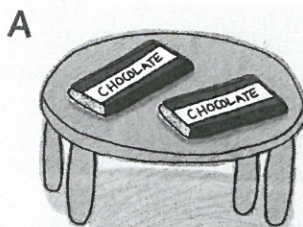
- 1 a 2 children at table A?  
b 4 children at table B?  
c 4 children at table C?
- 2 a 3 children at table A? b 2 children at table B? c 5 children at table C?
- 3 a 1 child at table A? b 3 children at table B? c 6 children at table C?



## Challenge 3

What fraction of each chocolate bar will each child get if there are:

- 1 a 4 children at table A?  
b 2 children at table B?  
c 6 children at table C?
- 2 a 5 children at table A?  
b 4 children at table B?  
c 3 children at table C?





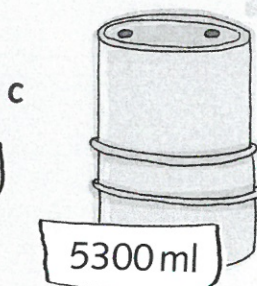
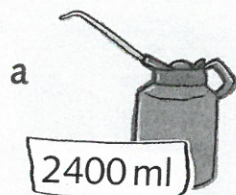
# Filling station litres

Use the relationships between litres and millilitres to record capacity using decimals



Challenge

Write the capacity of each container in four different ways.



Example

$$\begin{aligned} 7600 \text{ ml} &= 7000 \text{ ml} + 600 \text{ ml} \\ &= 7 \text{ l } 600 \text{ ml} \\ &= 7.6 \text{ l} \\ &= 7 \frac{6}{10} \text{ l} \end{aligned}$$

Challenge 2

1 Write these amounts in litres.

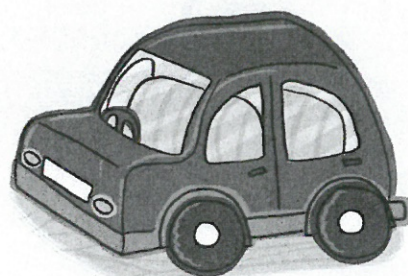
- |           |           |           |
|-----------|-----------|-----------|
| a 3500 ml | b 2700 ml | c 4200 ml |
| d 1900 ml | e 5600 ml | f 6800 ml |

Example

$$\begin{aligned} 4300 \text{ ml} &= 4000 \text{ ml} + 300 \text{ ml} \\ &= 4.3 \text{ l} \end{aligned}$$

2 Write these amounts in litres.

- |           |           |            |
|-----------|-----------|------------|
| a 6250 ml | b 9750 ml | c 6510 ml  |
| d 8980 ml | e 7020 ml | f 10050 ml |



3 Write these capacities in millilitres.

- |          |          |           |
|----------|----------|-----------|
| a 7.47 l | b 5.82 l | c 6.09 l  |
| d 5.13 l | e 9.95 l | f 10.66 l |

Challenge 3

The car mechanic has three metal jugs. The first jug will hold 3 litres. The second jug will hold 5 litres. The third jug is much larger than the other two jugs. Explain how the mechanic can use the three jugs to measure exactly 4 litres of brake fluid.





# Science lab litres

Use multiplication to convert from larger to smaller units

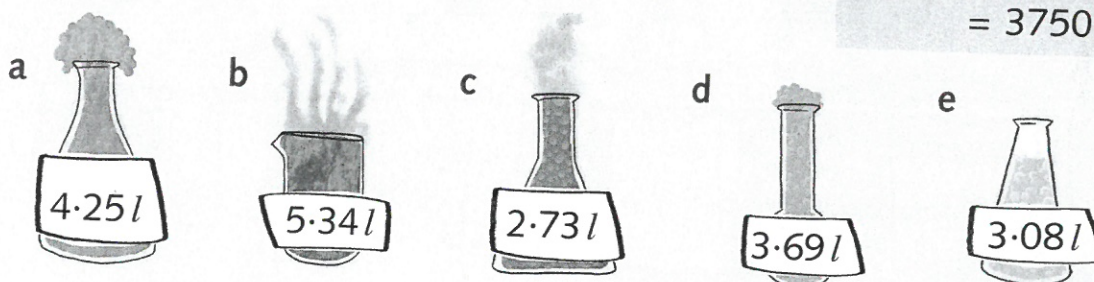


Challenge

1

Write the capacity of each flask in millilitres.

**Example**  
 $3.75\text{ l} = 3000\text{ ml} + 750\text{ ml}$   
 $= 3750\text{ ml}$



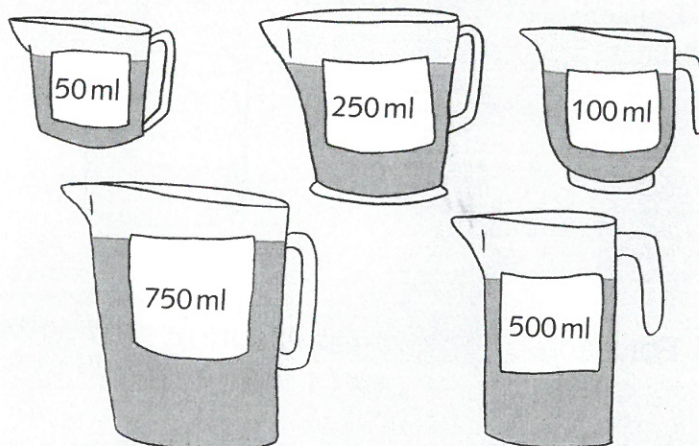
Challenge

2

Professor Mack has five measuring jugs and an empty container.

He has mislaid his other measuring jugs but he can use these jugs more than once.

Explain how he can pour 1 litre of water into an empty container using:



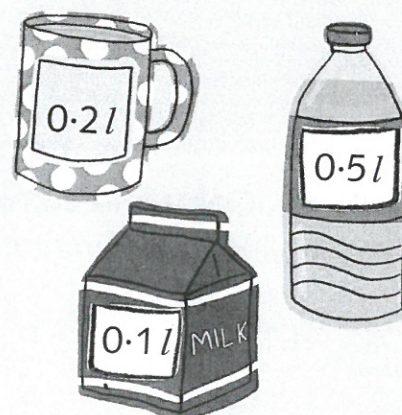
- a 2 measures      b 3 measures      c 4 measures      d 5 measures

Challenge

3

The table shows the amount of water, tea and milk a science student had each day. Use the information in the pictures to work out how many millilitres of liquid he drank each day.

Day	Bottles of water	Mugs of tea	Small cartons of milk
Monday	3	2	1
Tuesday	2	3	2
Wednesday	1	4	3
Thursday	3	3	4
Friday	2	1	5





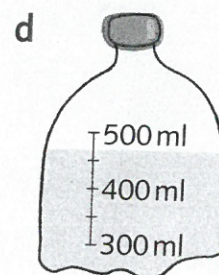
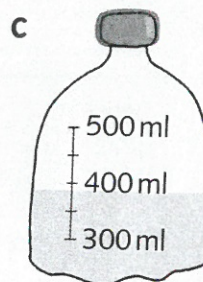
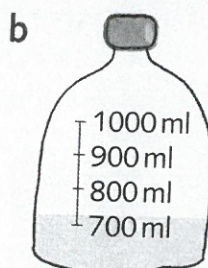
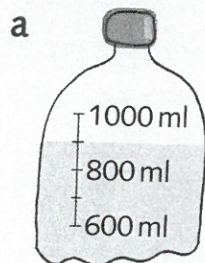
# Estimating and rounding capacity

Estimate and compare capacity and round numbers on measuring jugs

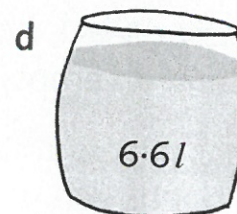
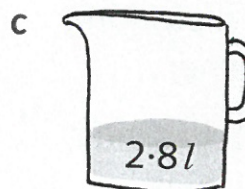
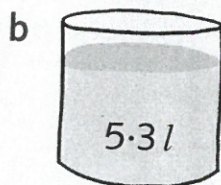
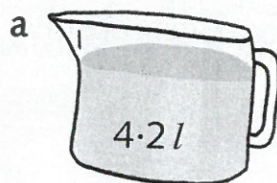


Challenge  
2

1 Estimate the amount of liquid in each bottle to the nearest 100 ml.



2 Round the amount of liquid in each container to the nearest litre.

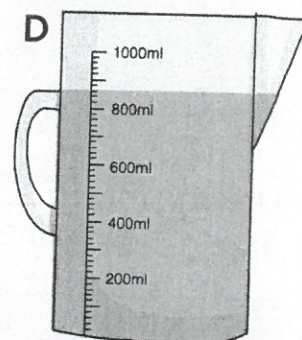
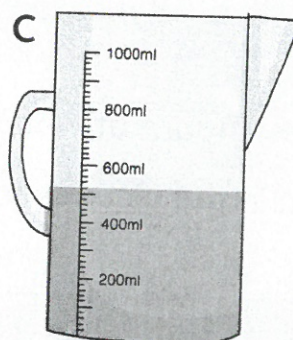
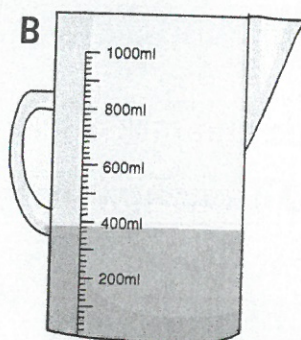
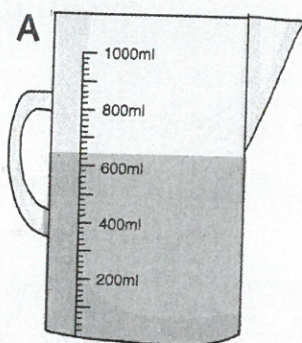


Challenge  
2

For each of the four measuring jugs write the amount of liquid:

a in millilitres

b rounded to the nearest 100 ml



Challenge  
3

The table shows the engine capacity of a family car. Copy and complete the table for cars with these engine capacities.

a 1612 ml

b 1775 ml

c 1990 ml

d 2235 ml

Capacity in ml	Rounded to nearest:		Capacity in litres
	10 ml	100 ml	
1385	1390	1400	1.4



# Litres of juice

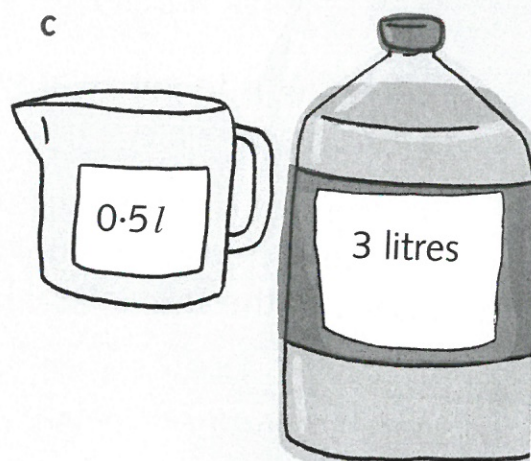
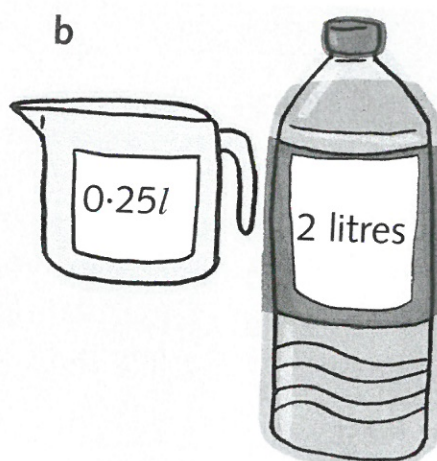
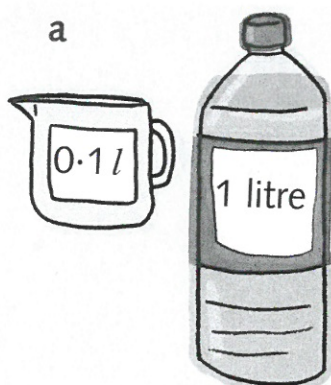
Calculate different measures of capacity using decimals to 2 places



Challenge

1

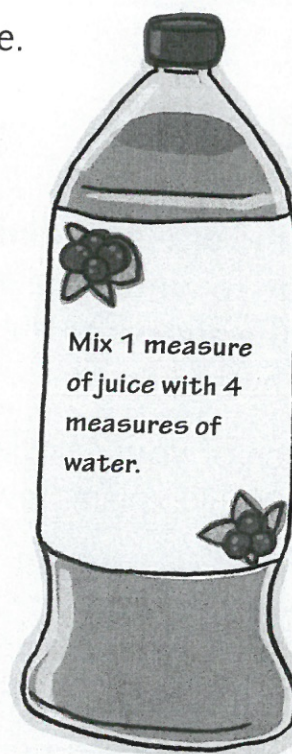
Find the number of times you can fill the measuring jug from the bottle beside it.



Challenges  
2,3

Look at the instructions on the bottle of blackcurrant juice. Copy and complete the table.

Blackcurrant juice	Water	Amount of drink made
0.1l	0.4l	0.5l
0.15l		
0.25l		
0.33l		
	2l	
0.67l		
	3l	
1.5l		



Challenge  
3

The blackcurrant juice is also sold in 0.33l cartons. How many litres are there in:

- 1 pack of 6 cartons?
- 10 packs of 6 cartons?



# Meet the target (1)

- Add numbers with up to 4 digits using the formal written method of columnar addition
- Estimate and use inverse operations to check answers to a calculation



Challenge 1

- 1 Your target is to get an answer as close to 1000 as possible.

Roll the dice six times and decide where to write each digit. Then work out the answer to the calculation. Do this ten times.

- 2 Which of your calculations is closest to 1000?

You will need:  
• 0–9 dice

Rule

Record your calculations like this:

	H	T	O
	<input type="text"/>	<input type="text"/>	<input type="text"/>
+	<input type="text"/>	<input type="text"/>	<input type="text"/>

Challenge 2

- 1 Your target is to get an answer as close to 8000 as possible.

Roll the dice eight times and decide where to write each digit. Then work out the answer to the calculation. Do this ten times.

- 2 Which of your calculations is closest to 8000? Explain how you know.

Rule

Record your calculations like this:

	Th	H	T	O
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
+	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Challenge 3

- 1 Your target is to get an answer as close to 12 000 as possible.

Roll the dice eight times and decide where to write each digit. Then work out the answer to the calculation. Do this ten times.

- 2 Which of your calculations is closest to 12 000? Explain how you know.

Rule

Record your calculations like this:

	Th	H	T	O
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
+	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>





## Meet the target (2)

- Subtract numbers with up to 4 digits using the formal written method of columnar subtraction
- Estimate and use inverse operations to check answers to a calculation



### Challenge 1

- 1 Your target is to get an answer as close to 400 as possible.

Roll the dice six times and decide where to write each digit. Then work out the answer to the calculation. Do this ten times.

- 2 Which of your calculations is closest to 400?

You will need:

- 0–9 dice

### Rule

Record your calculations like this:

	H	T	O
	<input type="text"/>	<input type="text"/>	<input type="text"/>
–	<input type="text"/>	<input type="text"/>	<input type="text"/>

### Challenge 2

- 1 Your target is to get an answer as close to 4000 as possible.

Roll the dice eight times and decide where to write each digit. Then work out the answer to the calculation. Do this ten times.

- 2 Which of your calculations is closest to 4000? Explain how you know.

### Rule

Record your calculations like this:

	Th	H	T	O
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
–	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

### Challenge 3

- 1 Your target is to get an answer as close to 5000 as possible.

Roll the dice eight times and decide where to write each digit. Then work out the answer to the calculation. Do this ten times.

- 2 Which of your calculations is closest to 5000? Explain how you know.

### Rule

Record your calculations like this:

	Th	H	T	O
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
–	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>