

Reasoning and Problem Solving

Step 8: Add and Subtract Capacities

National Curriculum Objectives:

Mathematics Year 3: (3M9d) [Add and subtract volume/ capacity \(l/ ml\)](#)

Differentiation:

Questions 1, 4 and 7 (Problem Solving)

Developing Word problem involving three capacities where addition and subtraction is required to calculate two unknown capacities. Measures given in both ml and L, with no conversions. All in 100ml multiples.

Expected Word problem involving three capacities where addition and subtraction is required to calculate two unknown capacities. Measures given in both ml and L, in multiples of 50 and 100 with some exchanging and crossing tens or hundreds.

Greater Depth Word problem involving three capacities where addition and subtraction is required to calculate two unknown capacities. Measures given in both ml and L, of any number, with exchanging and crossing tens or hundreds.

Questions 2, 5 and 8 (Problem Solving)

Developing Adding three capacities to find a way through the maze to the target number. Measures given in both ml and L, with no conversions. All in 100ml multiples.

Expected Adding three capacities to find a way through the maze to the target number. Measures given in both ml and L, with some exchanging and crossing tens or hundreds; multiples of 50 and 100 where some measures are represented as fractions, for example $2\frac{1}{2}$ L.

Greater Depth Adding four capacities to find a way through the maze to the target number. Measures given in both ml and L, of any number, with exchanging and crossing tens or hundreds where some measures are represented as fractions, for example $2\frac{1}{2}$ L.

Questions 3, 6 and 9 (Reasoning)

Developing Word problem including two capacities where addition and subtraction is required to determine whether a statement is correct. Measures given in ml, with no conversions. All in 100ml multiples.

Expected Word problem including two capacities where addition and subtraction is required to determine whether a statement correct. Measures given in both ml and L, multiples of 50 or 100 with some exchanging and crossing tens or hundreds.

Greater Depth Word problem including two capacities where addition and subtraction is required to determine whether a statement is correct. Measures given in both ml and L, of any number with some exchanging and crossing tens or hundreds.

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Add and Subtract Capacities

Add and Subtract Capacities

1a. Pete the painter is sorting through his paint pots.

Pot A holds 400ml more than Pot C.
Pot C's capacity is 200ml less than Pot B's capacity.



Pot B's capacity =
1L and 300ml

What are the capacities of
Pot A and C?



PS

1b. Holly the hairdresser is sorting through her shampoo bottles.

Bottle B holds 100ml more than Bottle A.
Bottle C's capacity is 600ml less than
Bottle B's capacity.



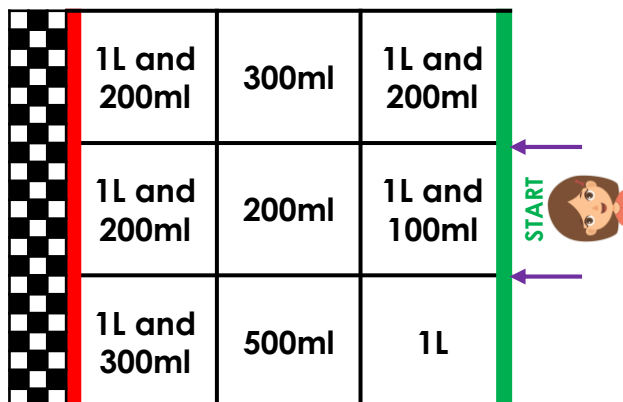
Bottle A's capacity =
2L and 700ml

What are the capacities of
Bottle B and C?



PS

2a. Find a way through the maze.

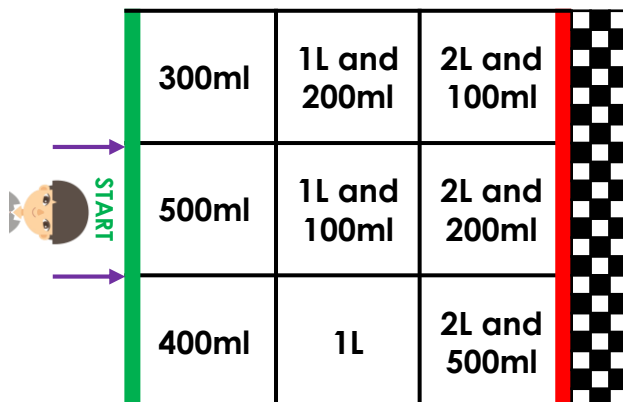


She drinks 2L and 500ml
in total.



PS

2b. Find a way through the maze.



He drinks 2L and 900ml
in total.



PS

3a. Jon says, 'The jug has a capacity
large enough to make 1 serving of
milkshake.'

Milkshake Recipe

500ml milk
400ml strawberry juice



800ml

Is he correct? Prove it.

What is the difference between the
capacity of the jug and the volume of
liquid?



R

3b. Millie says, 'The jug has a capacity
large enough to make 1 serving of juice.'

Juice Recipe

400ml water
300ml fresh orange



900ml

Is she correct? Prove it.

What is the difference between the
capacity of the jug and the volume of
liquid?



R

Add and Subtract Capacities

Add and Subtract Capacities

4a. Wendy the witch is sorting through her cauldrons.

Cauldron A holds 2L and 150ml more than Cauldron C. Cauldron B's capacity is half of Cauldron C's capacity.



Cauldron B's capacity
= 800ml

What are the capacities of
Cauldron A and C?



PS

4b. William the wizard is sorting through his potions.

Potion B holds 2L and 800ml more than Potion A. Potion C's capacity is half of Potion B's capacity.



Potion A's capacity =
2L and 300ml

What are the capacities of
Cauldron B and C?



PS

5a. Find a way through the maze.

350ml	2L and 750ml	$1\frac{1}{2}$ L
650ml	$2\frac{1}{4}$ L	$1\frac{1}{4}$ L
150ml	$2\frac{1}{2}$ L	1L and 125ml

She drinks 4L and 600ml
in total.



PS

5b. Find a way through the maze.

450ml	$1\frac{1}{4}$ L	1L and 500ml
500ml	$2\frac{1}{4}$ L	$2\frac{1}{2}$ L
250ml	1L 750ml	$3\frac{1}{2}$ L

He drinks 5L and 500ml
in total.



PS

6a. Lu says, 'The jug has a capacity large enough to make 2 lots of slime.'

Slime Recipe

1L and 100ml glue
1L and 600ml washing liquid



4L and 900ml

Is he correct? Prove it.

What is the difference between the
capacity of the jug and the volume of
liquid?



R

6b. Sam says, 'The jug has a capacity large enough to make 2 servings of smoothie.'

Smoothie Recipe

2L and 800ml tropical juice
1L and 100ml yoghurt



7L and 500ml

Is she correct? Prove it.

What is the difference between the
capacity of the jug and the volume of
liquid?



R

Add and Subtract Capacities

7a. Sal the shopkeeper is sorting through his fizzy drinks bottles.

Bottle A holds 3L and 650ml more than Bottle C. Bottle C's capacity is double Bottle B's capacity.



**Bottle B's capacity =
1L and 850ml**

What are the capacities of Bottle A and C?



PS

7b. Minnie the manicurist is sorting through her moisturiser bottles.

Bottle B holds 1L and 650ml less than Bottle A. Bottle C's capacity is 1L and 750ml more Bottle B's capacity.



**Bottle A's capacity =
2L and 350ml**

What are the capacities of Bottle B and C?



PS

8a. Find a way through the maze.

2 $\frac{3}{4}$ L	2 $\frac{3}{4}$ L	1L and 500ml
2 $\frac{1}{4}$ L	2L and 500ml	1 $\frac{1}{4}$ L
1L and 250ml	2 $\frac{3}{4}$ L	1 $\frac{2}{4}$ L

She drinks 9L in total.



PS

8b. Find a way through the maze.

1 $\frac{3}{4}$ L	2L and 750ml	4 $\frac{1}{2}$ L
2 $\frac{1}{4}$ L	3 $\frac{1}{2}$ L	5L and 250ml
3L and 500ml	1 $\frac{3}{4}$ L	3 $\frac{2}{3}$ L

He drinks 14L in total.



PS

9a. Joe says, 'The jug has a capacity large enough to make 2 lots of bubbles.'

Bubbles Recipe

1L and 650ml water
2L and 350ml liquid soap



6L and 100ml

Is he correct? Prove it.

What is the difference between the capacity of the jug and the volume of liquid?



R

9b. Flo says, 'The jug has a capacity large enough to make half a batch of slime.'

Slime Recipe

5L and 750ml glue
1L and 50ml washing liquid



3L and 700ml

Is she correct? Prove it.

What is the difference between the capacity of the jug and the volume of liquid?



R

Reasoning and Problem Solving

Add and Subtract Capacities

Developing

1a. A = 1L and 500ml; C = 1L and 100ml

2a.

1L 200ml	300ml	1L 200ml
1L 200ml	200ml	1L 100ml
1L 300ml	500ml	1L

3a. Jon is not correct because $500\text{ml} + 400\text{ml} = 900\text{ml}$. This is greater than the capacity of the jug. The difference between the capacity and the volume = 100ml

Expected

4a. A = 3L and 750ml; C = 1L 600ml

5a.

350ml	2L and 750ml	$1\frac{1}{2}\text{L}$
650ml	$2\frac{1}{4}\text{L}$	$1\frac{1}{4}\text{L}$
150ml	$2\frac{1}{2}\text{L}$	1L and 125ml

6a. Lu is not correct because two portions of slime would have a total volume of 5L and 400ml.

($1\text{L and } 100\text{ml} + 1\text{L and } 600\text{ml} = 2\text{L and } 700\text{ml}$. $2\text{L and } 700\text{ml} \times 2 = 5\text{L and } 400\text{ml}$) The difference between the capacity and the volume = 500ml

Greater Depth

7a. A = 7L and 350ml; C = 3L and 700ml

8a.

$2\frac{3}{4}\text{L}$	$2\frac{3}{4}\text{L}$	1L and 500ml
$2\frac{1}{4}\text{L}$	2L and 500ml	$1\frac{1}{4}\text{L}$
1L and 250ml	$2\frac{1}{4}\text{L}$	$1\frac{2}{4}\text{L}$

9a. Joe is incorrect because the total volume of the bubbles is 8L ($1\text{L and } 650\text{ml} + 2\text{L and } 350\text{ml} = 4\text{L}$. $4\text{L} \times 2 = 8\text{L}$) The difference between the capacity and the volume = 1L and 900ml.

Reasoning and Problem Solving

Add and Subtract Capacities

Developing

1b. B = 2L and 800ml; C = 2L and 200ml

2b.

300ml	1L 200ml	2L 100ml
500ml	1L 100ml	2L 200ml
400ml	1L	2L 500ml

3b. Millie is correct because the total volume of the juice is $400\text{ml} + 300\text{ml} = 700\text{ml}$. The difference between the capacity and the volume = 200ml

Expected

4b. B = 5L and 100ml; C = 2L and 600ml

5b.

450ml	$1\frac{1}{4}\text{L}$	1L and 500ml
500ml	$2\frac{1}{4}\text{L}$	$2\frac{1}{2}\text{L}$
250ml	1L 750ml	$3\frac{1}{2}\text{L}$

6b. Sam is incorrect because two servings of smoothie would have a total volume of 7L and 800ml. ($2\text{L and } 800\text{ml} + 1\text{L and } 100\text{ml} = 3\text{L and } 900\text{ml}$. $3\text{L and } 900\text{ml} \times 2 = 7\text{L and } 800\text{ml}$.) The difference between the capacity and the volume = 300ml

Greater Depth

7b. B = 700ml; C = 2L and 450ml

8b.

$1\frac{3}{4}\text{L}$	2L and 750ml	$4\frac{1}{2}\text{L}$
$2\frac{1}{4}\text{L}$	$3\frac{1}{2}\text{L}$	5L and 250ml
3L and 500ml	$1\frac{3}{4}\text{L}$	$3\frac{1}{4}\text{L}$

9b. Flo is correct because the volume of half a batch of slime is 3L and 400ml. ($5\text{L and } 750\text{ml} + 1\text{L and } 50\text{ml} = 6\text{L and } 800\text{ml}$. $6\text{L and } 800\text{ml} \div 2 = 3\text{L and } 400\text{ml}$. The difference between the capacity and the volume = 300ml