

Reasoning and Problem Solving – Length and Perimeter Consolidation – Year 3

About This Resource

This resource is aimed at Year 3 Expected and has been designed to give children the opportunity to consolidate the skills they have learned in Spring Block 4 Length and Perimeter.

The questions are based on a selection of the same ‘small steps’ that are addressed in the block, but are presented in a different way so children can work through the pack independently and demonstrate their understanding and skills.

Small Steps

Measure length

Equivalent lengths - m and cm

Equivalent lengths - mm and cm

Compare lengths

Add lengths

Subtract lengths

Measure perimeter

Calculate perimeter

National Curriculum Objectives

Mathematics Year 3: (3M1a) [Compare lengths \(m/cm/mm\)](#)

Mathematics Year 3: (3M2a) [Measure lengths \(m/cm/mm\)](#)

Mathematics Year 3: (3M9b) [Add and subtract lengths \(m/cm/mm\)](#)

Mathematics Year 3: (3M7) [Measure the perimeter of simple 2-D shapes](#)

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Vulf is a beast hunter. When a town or village has a problem with a monster, they find him. He always sorts the monsters out.

Today he is bored. It seems that no monsters feel like terrorising villagers at the moment. That’s a shame for Vulf. He wanted something to do, so he is visiting his friend, Wizard Sigrunn.

“Don’t touch anything!” she tells him. “If you *must* do something, use the new measuring sticks I’ve made to measure your hunting gear. Just don’t break them!”

Sigrunn has made three measuring sticks. One of them measures metres, one measures centimetres and the last one measures millimetres.

1. Which stick should Vulf use to measure each of the 6 things below? Vulf is 2m tall.



Ring of light	Spear	Shrinking potion	Sword	Growing potion	Eric the snail

2. Estimate the height of each of the 6 things. Use the units you chose for question 1.

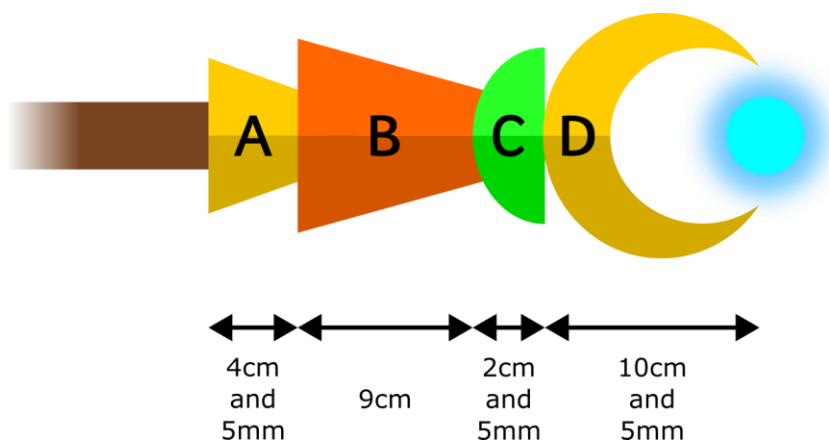
Ring of light	Spear	Shrinking potion	Sword	Growing potion	Eric the snail

Even after the measuring, Vulf is still bored. He decides to practise his sword fighting. He lunges, swings, cuts and... breaks the millimetre and centimetre measuring sticks by hitting them together.

“I *told* you not to break them!” shouts Sigrunn when she sees what Vulf has done. “I needed those to find out how long the magic parts of my new staff are to be! I’ve only got the measurements in centimetres! I want them in millimetres!”

3. Help Sigrunn by finding out how long each part of the staff is in millimetres.

How long will the magic part of her staff be altogether? Give the total in millimetres, and in centimetres and millimetres.




Part A (mm)	Part B (mm)	Part C (mm)	Part D (mm)	Total (mm)	Total (cm and mm)

Sigrunn has made other magic wands and staffs. She needs to send them to The Assembly of Wizards to be checked and sold.

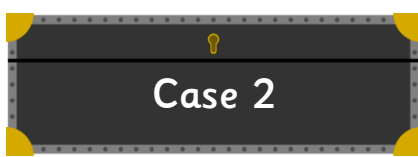
“I need to put them into these cases,” says Sigrunn, “so could you work out how to fit them in perfectly? I don’t want any gaps!”

4. Work out which wands and staffs will go into each case to fit perfectly end-to-end.




Case 1

2m and
20cm



Case 2

5m and
79cm



Case 3

$7\frac{1}{2}$ m

Wand 1	Wand 2	Wand 3	Wand 4	Staff 1	Staff 2	Staff 3	Staff 4
107cm	1m and 13cm	$1\frac{1}{4}$ m	1m and 4cm	308cm	2m and 61cm	2m and 14cm	3m and 17cm









Vulf and Sigrunn load the cases onto a cart, ready to take them to The Assembly of Wizards. Suddenly a little boy bursts out of the forest!

“Vulf! Vulf! Come quickly! A monster has been creeping around our village! We have found its footprints by the river!”

Vulf, Sigrunn and the boy rush to the river. The footprints have been washed away!

“They were here, I promise!” says the boy. “If I remember correctly, they were somewhere between 45cm and 50mm long and 1m and 22cm long. We tried to measure them but I can’t remember exactly how long they were.”

5. Using Vulf's hunting chart, work out which monsters the footprints could belong to.

			
<u>The Blue Crested Grobber</u> Foot length: 303mm	<u>The Snot-gargling Manitog</u> Foot length: $85\frac{1}{2}$ cm	<u>The Great and Terrible Flunge</u> Foot length: 1218mm	<u>The Five-toed Farnwalla</u> Foot length: 1m and 9mm
			
<u>The Club-pawed Chock-Chock</u> Foot length: $1\frac{1}{2}$ m	<u>The Slice-clawed Slibby</u> Foot length: 6cm and 6mm	<u>The Sobbling Podgefoot</u> Foot length: 56cm and 1mm	<u>The Hackchaddler</u> Foot length: 3m and 35mm

“Now we know which monsters it might be, I've put their heights in order from shortest to tallest. That will help if someone's seen it.”

6. Has Vulf got his order right? Explain any mistakes.

<u>Shortest</u>	3560mm	3m and 52cm	6m and 125mm	606cm	<u>Tallest</u>
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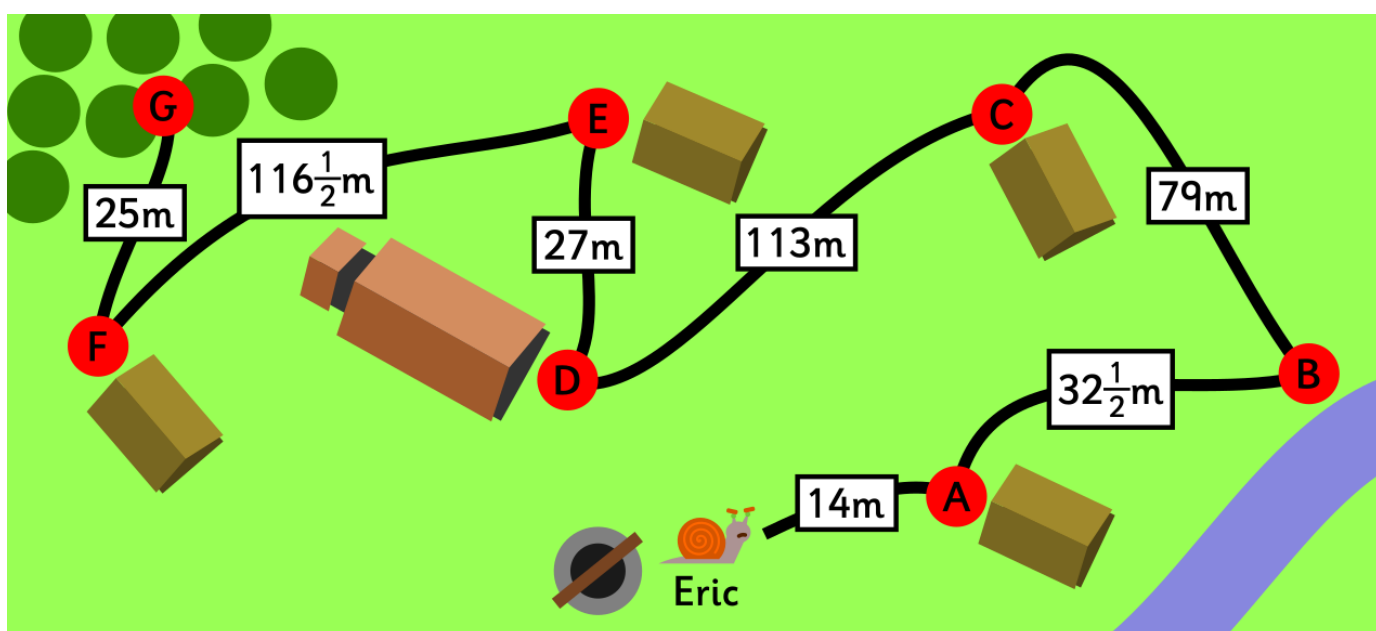
“I saw the monster,” called an old woman by the well, “it was so tall! It disappeared around the back of those huts!”

“We need Eric!” Vulf shouts. “He may only be a snail but he’s got the best sense of smell in the kingdom!”

Vulf gets Eric the snail out of his pocket and lets him sniff the air.

“He’s onto something!” Vulf grins. “Look at him go!”

Eric follows the scent of the monster all through the village. It has been everywhere!



7a. What is the total distance Eric travelled?

7b. How far did Eric travel from the start to point C?

7c. How far did Eric travel from point B to point F?

Eric leads Vulf, Sigrunn the boy and the old woman into forest. They see a claw stuck in the top of a tree. It's a clue!

8. If the 4 of them stand on top of each other will they be able to reach the claw? Show how you worked your answer out.



Sigrunn
1m and
68cm



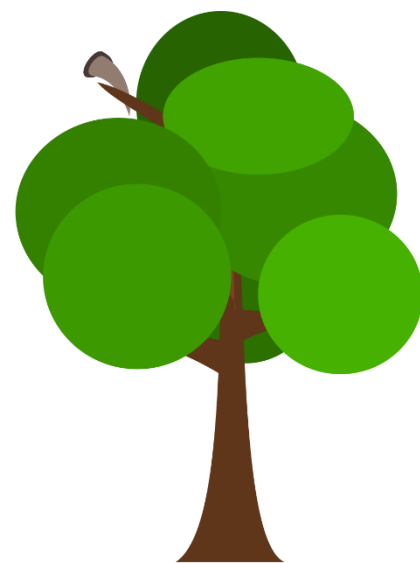
Boy
100cm and
70mm



Vulf
200cm



Old woman
1m and
35cm



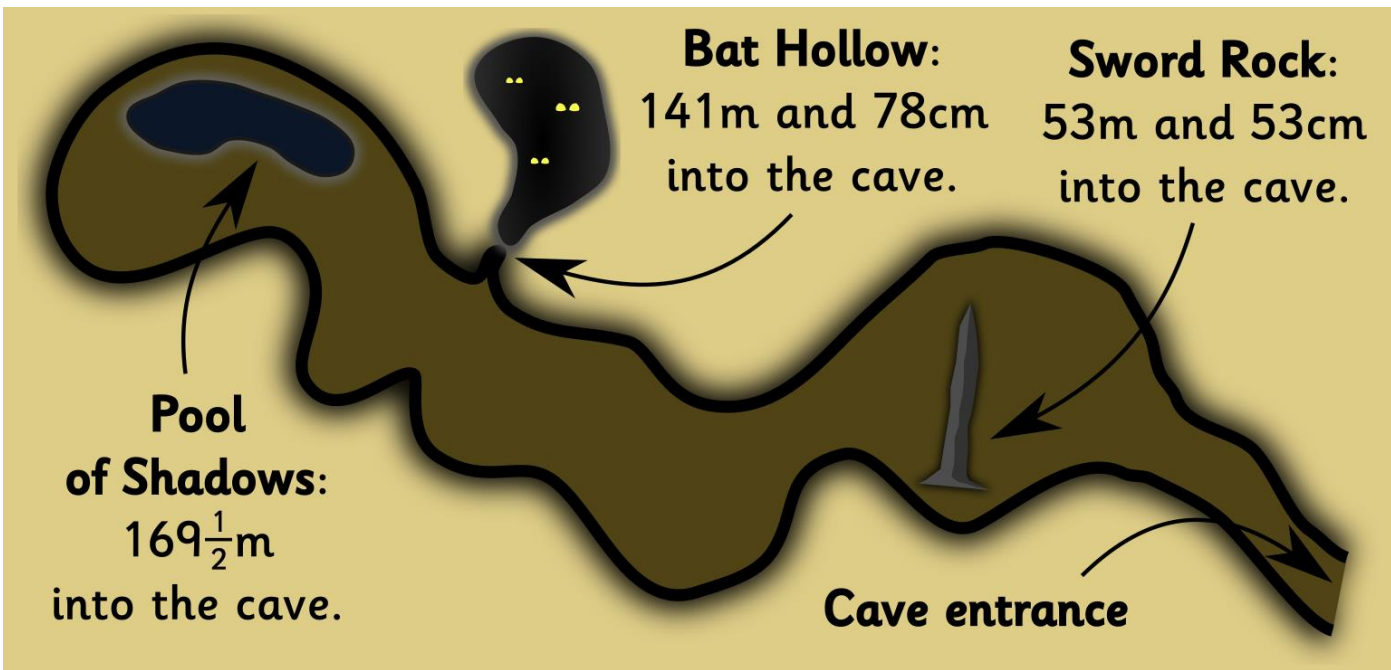
The claw is stuck
6m and 90mm
up the tree

As the boy's fingers gripped the claw, his foot slips. Everyone falls to the ground in a heap. Thankfully they are all fine, and now they have a clue!

“Only one monster has claws like this!” says Vulf. “We’re hunting a Snot-Gargling Manitog! It’s a big one too! There’s only one place large enough for it to hide in around here. We’ve got to go to the Caves of Langkeld!”

When they get to the caves Vulf puts on his ring of light. It will help them to see in the dark.

“We’ve got to make sure we know how far into the caves we go,” says Vulf, “so look out for the landmarks on this map! If I know anything about Manitogs, this one will be in the Pool of Shadows at the back of the caves.”



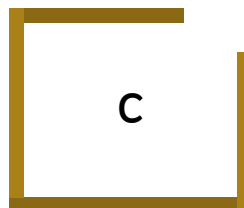
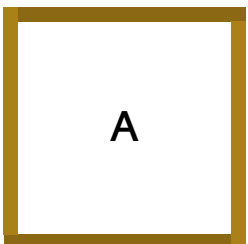
The group needs to reach the Pool of Shadows. Using the map, work out:

9a. How far the group will have left to go when they reach Sword Rock.

9b. How far the group will have left to go when they reach Bat Hollow.

The water of the Pool of Shadows bubbles and froths. With a mighty roar, the Snot-Gargling Manitog explodes from its hiding place! Bright green snot bubbles in its mouth as it runs at Vulf. It raises its huge claws to strike!

Vulf does not seem bothered. He takes out his bottle of shrinking potion and smashes it right on the Manitog's head! The massive monster squeaks and shrinks to the size of a mouse! Vulf picks it up in one hand. He has brought a few boxes with him which he can put the monster in.

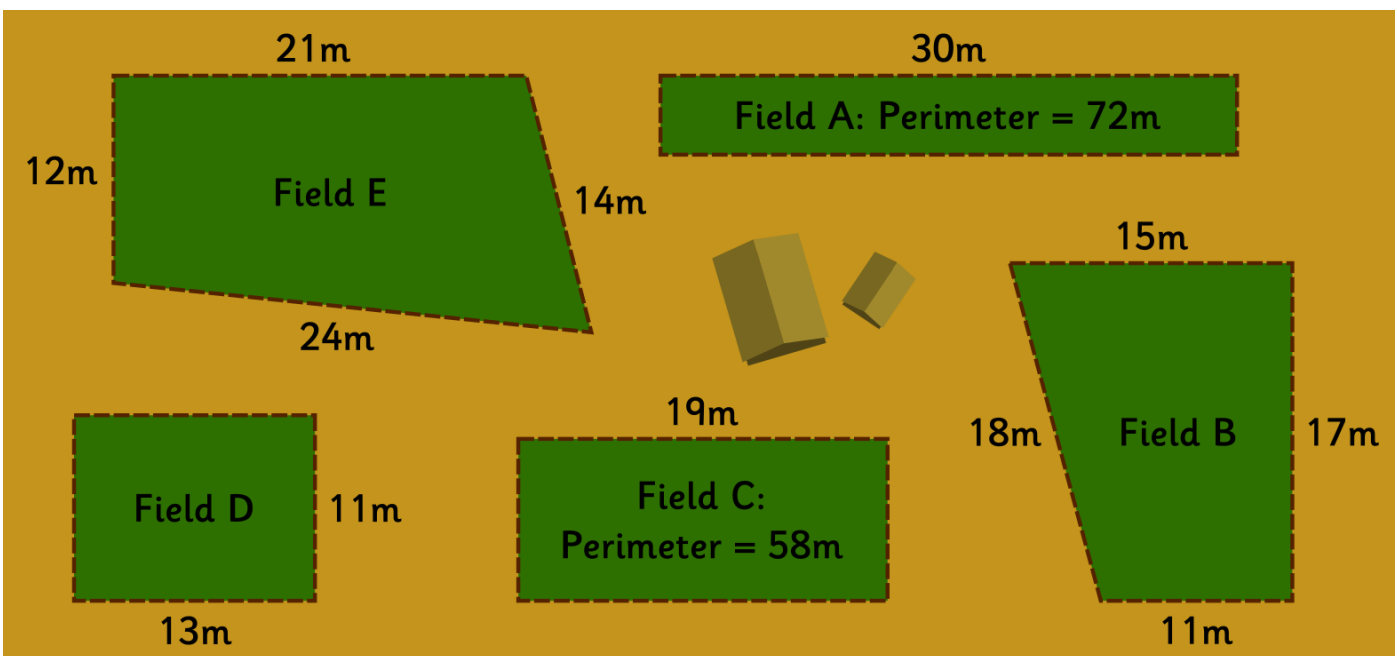


10. Put them in the right places in the table below. Explain the reasons for your choices.

Longest perimeter	Middle-length perimeter	Shortest perimeter	Cannot measure perimeter

Vulf and Sigrunn say goodbye to the villagers. They go back to Vulf's farm. When Vulf uses his growing potion to bring the Snot-Gargling Manitog back to its proper size, he will need to put it in a field which has a perimeter of at least 55m. The field he chooses cannot have sides of 10m or shorter. The right sized field will give the Manitog a good place to live.

11. Which fields might Vulf use? Explain your answers.



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1.

Ring of light	Spear	Shrinking potion	Sword	Growing potion	Eric the snail
Millimetres	Metres	Centimetres	Metres	Centimetres	Millimetres

2. Any reasonable estimates using correct units should be considered correct. Exact answers given below for reference.

Ring of light	Spear	Shrinking potion	Sword	Growing potion	Eric the snail
100mm	2.95m	41.7cm	1.5m	62.5cm	83mm

3.

Part A (mm)	Part B (mm)	Part C (mm)	Part D (mm)	Total (mm)	Total (cm and mm)
45mm	90mm	25mm	105mm	265mm	26cm and 5mm

4. Case 1: Wand 1 and Wand 2.

Case 2: Wand 4, Staff 2 and Staff 3.

Case 3: Wand 3, Staff 1 and Staff 4.

5. The footprints could belong to the Snot-gargling Manitog, the Great and Terrible Flunge, the Five-toed Farnwalla or the Sobbling Podgefoot.

6. No, Vulf has not got the order right. 3560mm is taller than 3m and 52cm, and 6m and 125mm is taller than 606cm. It should read: 3m and 52cm, 3560mm, 606cm, 6m and 125mm.

7a. 407m

7b. 125.5m

7c. 335.5m

8. Yes, they will be able to reach the claw. Children will need to show they have converted the different heights to one unit of measurement.

Millimetres: $1680\text{mm} + 1070\text{mm} + 2000\text{mm} + 1350\text{mm} = 6100\text{mm}$. The claw is at 6090mm.

Centimetres: $168\text{cm} + 107\text{cm} + 200\text{cm} + 135\text{cm} = 610\text{cm}$. The claw is at 609cm.

Metres: $1.68\text{m} + 1.07\text{m} + 2\text{m} + 1.35\text{m} = 6.1\text{m}$. The claw is at 6.09m.

9a. 115m and 97cm.

9b. 27m and 72cm.

10.

Longest perimeter	Middle-length perimeter	Shortest perimeter	Cannot measure perimeter
A Its top and bottom are the same length as the other boxes, but its sides are the longest.	D Its top and bottom are the same length as the other boxes, and its side lengths are between the side lengths of A and B.	B Its top and bottom are the same length as the other boxes, but its sides are the shortest.	C Its sides do not join up, so it has an incomplete perimeter.

11.

<u>Field</u>	<u>Side lengths</u>	<u>Perimeter</u>	<u>Could Vulf use it?</u>
A	30m, 6m, 30m, 6m	72m	No. Two of the sides are 10m or shorter.
B	15m, 17m, 11m, 18m	61m	Yes.
C	19m, 10m, 19m, 10m	58m	No. Two of the sides are 10m or shorter.
D	13m, 11m, 13m, 11m	48m	No. The perimeter is shorter than 55m.
E	21m, 14m, 24m, 12m	71m	Yes