

# Reasoning and Problem Solving

## Ratio – Year 6

### About This Resource

This resource is aimed at Year 6 Expected and has been designed to give children the opportunity to consolidate the skills they have learned in the White Rose Maths Guidance and Examples Spring Block 6 – Ratio.

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

Using ratio language  
Ratio and fractions  
Introducing the ratio symbol  
Calculating ratio  
Using scale factors  
Calculating scale factors  
Ratio and proportion problems

### National Curriculum Objectives

Mathematics Year 6: (6R1) [Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.](#)

Mathematics Year 6: (6R3) [Solve problems involving similar shapes where the scale factor is known or can be found.](#)

Mathematics Year 6: (6R4) [Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.](#)

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# Vintage Car Festival

Your school are planning to run a vintage car festival to raise funds over the summer. Year 6 have been asked to help out with planning and running the event.



There's plenty of work to do and lots of mathematical thinking needed to get the festival off the ground – read on and rise to the challenge.

The school have looked into the council rules regarding the number of people and cars they will be allowed to have on site. The Head Teacher has given you a link to a website which gives guidance and she wants you to calculate how many tickets they can sell for cars and visitors.

1. The school site is  $250\text{m}^2$ . How many people and cars can attend the festival?

You need to inform the local police as they have to provide 2 officers for every 50 visitors who attend, to help with traffic and security. We can assume each car will have 2 people with it and these must be counted in the policing figures.

2. How many police officers can we expect to be in attendance?

3. There is a fundraising target of £2500 for ticket sales. Taking this into account, how much should you charge per ticket to meet the target?

The ratio of adult to children's tickets is likely to be 2:1.

4. If you set your children's tickets at £5, how much will your adult tickets need to be to ensure you make enough money? Round your ticket price to the nearest 50p.

Quick Links

[Festival search](#)
[Police contact](#)
[Resources](#)
[Refuse support](#)
[Gallery](#)
[Contact Us](#)

Health and Safety: community projects

Attendance & Tickets

*For every  $5\text{m}^2$  of the site, you can sell 4 tickets.*

*For every  $10\text{m}^2$ , you are able to host 3 cars.*

## Reasoning and Problem Solving – Ratio – Year 6

The Year 5 children and their parents have decided to run a car wash at the event and will need plenty of water and soap to do a really good job. There are rolling barrels which can hold 40 litres of water. The children have calculated that they will use soap and water in the ratio of 1:19.



5. If they plan to wash 50 cars, and each car needs 15 litres of soapy water, how many barrels will they fill and transport? How much soap will they need?

We need to advertise the event to car owner clubs and visitors. The school produce two flyers: one for car owners and one for visitors.

6. Using the information in question 2, what ratio should they print the flyers for owners to visitors? Write the ratio in its simplest form.

Looking at previous events, the printers advise that you deliver more flyers than the number of people you expect to attend. Their suggested ratio is 4:1 (4 flyers for every 1 expected attendee).

7. How many flyers should the school order for car owners and visitors?

Year 4 decide to raise money by selling photos of people in their favourite car. They canvas the owners who have signed up and  $\frac{4}{5}$  of the replies agree to take part.

8. What ratio of owners agreed?



The cost of photo paper varies widely from one shop to another.

9. Which of the following represents the best value for money?



To staff the event, school will be relying on volunteers. All parents in school are asked whether they can help out.  $\frac{3}{8}$  of the 400 parents reply and the ratio of yes to no is 3:2.

10. How many parents have agreed to help?

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## Reasoning and Problem Solving – Ratio – Year 6

To book a place at the event, vintage car owners must complete a form giving details of their car's make, model and colour. There have been so many entries that you now need to manage how to display the cars. To ensure the festival looks inviting, a good mix of colours will need to be parked along side each other. The school council devise a ratio to ensure each arena is enticing to visitors. So far red, green and black cars have all entered. The ratio is 4:2:1.

11. You have space for 48 red cars, how many green and black spaces are there?

At the last minute, an influx of yellow cars applications arrive. The council decide there should be as many yellow cars as green and black put together.

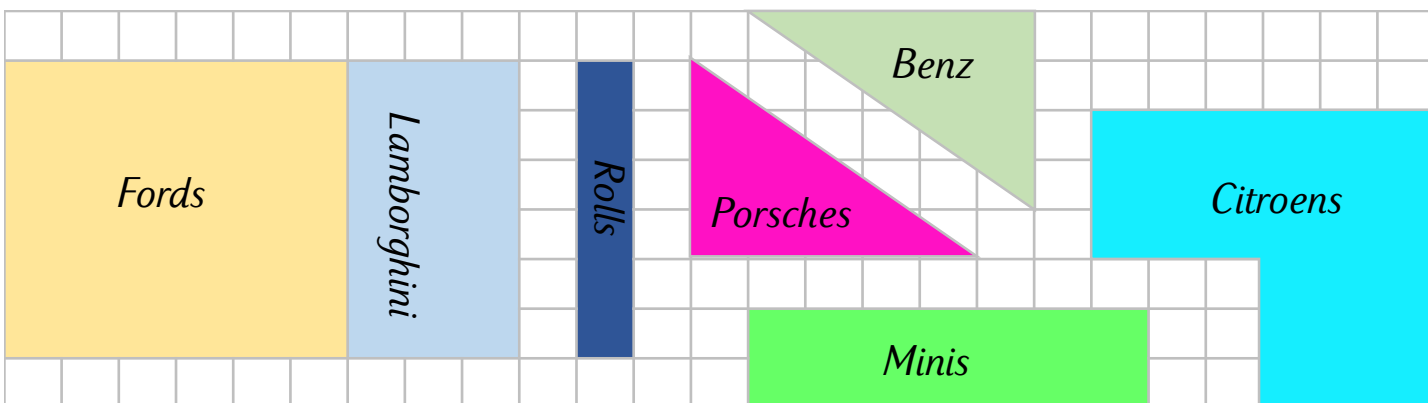


12. Write the new ratio for red, green, black and yellow entries.

13. How many cars do we have altogether now? By how much

will the school have to increase their space? (use Qu 1. to help)

A plan of the different car displays is created so that the areas can be marked out before the day. See the original plan below.



Due to an increase in the number of Porsches, Benz, Minis and Rolls vintage vehicles, the fields need to be made larger by a scale factor of 1.5. There have been less Ford, Lamborghini and Citroen entries than expected so they will need to be reduced by a scale factor of  $\frac{1}{3}$ .

14. Use the grid on the next page to redraw the plan. You may need to rotate the grid to complete the task. Remember to label your parking areas.

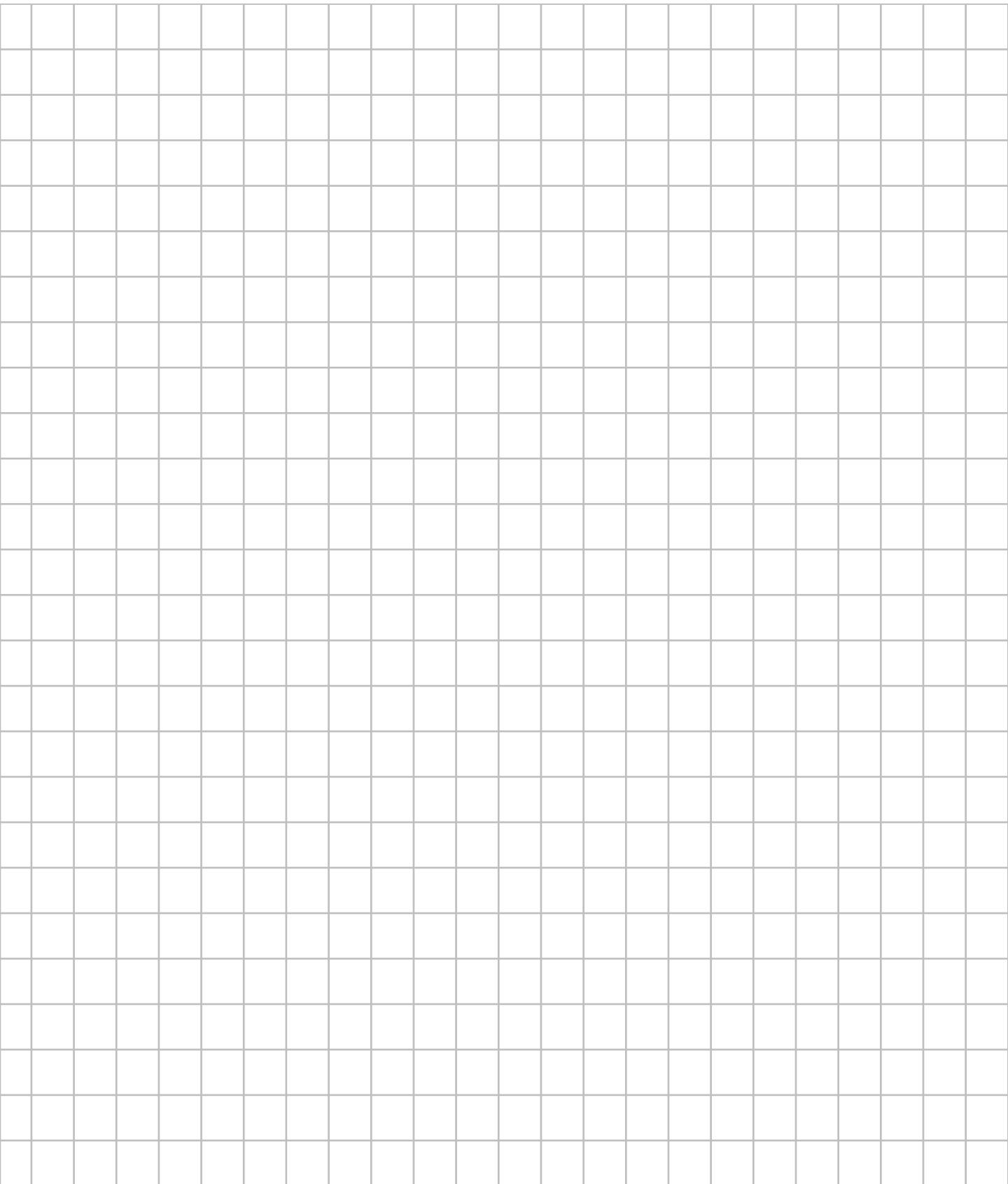
The festival is underway and your help has been invaluable in ensuring the day runs smoothly.

All that is left to do is decide which car is your favourite and go get a photo!!



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Final Map of Parking for Car Festival.



1. 200 visitors tickets can be sold, 75 cars can be invited.
2. 200 visitors + 150 car owners = 350 people, therefore at 2 officers per 50 people we can expect 14 police officers.
3.  $£2500 \div 200 = £12.50$
4. If a child ticket is £5, an adult ticket will need to be £16.50.  
Of 200 visitors one third will be children, one third of 200 is 66 and a third rounded up to 67.  $67 \times £5 = £335$ , leaving £2165 to come from the remaining 133 adults attending, that is £16.28 (to 2dp) each, rounded to nearest 50p = £16.50 per adult.
5. They will need 19 barrels transported.  
 $50 \times 15 = 750\text{l}$  of soapy water needed. Each barrel holds 40l so they will need  $750 \div 40 = 18.75$  so need to round up to 19.  
They will need 3.7 l of soap.  
750 l needed as calculated above, in a ratio of 1:19 is 20 parts.  $750\text{l} \div 20 = 37.5\text{l}$ , as soap is one part to nineteen parts water, then the soap needed is 37.5l.
6. Ratio of 4:3
7. We need to scale the number of attendees by 4. So that means 800 visitor flyers and 600 car owner flyers.
8. 4:1 agreed to take part in the photos.
9.  $10.80 \div 120 = 0.09$ , so 9p per sheet.  $9.45 \div 90 = 0.105$ , so rounds to 11p per sheet.  $20 \div 250 = 0.08$ , so 8p per sheet and the best value.
10. 90 parents agreed to help.  
 $\frac{3}{8}$  of 400 = 150 replies. 3:2 is 5 parts altogether so each part is  $150 \div 5 = 30$ . 3 parts said yes so  $3 \times 30 = 90$  parents.
11. In a ratio of 4:2:1, red:green:black.  
48 red cars = 4 parts, so one part is  $48 \div 4 = 12$ , green cars are 2 parts:  $12 \times 2 = 24$ , and black cars are 1 part, so 12 cars.
12. 4:2:1:3
13. There are now 120 cars. 45 more than planned so an extra  $150\text{m}^2$  is needed.

14. Children may position the shapes anywhere on the grid so long as the proportions are as below.

