

# Ratio problems using multiplication and division

## National Curriculum attainment target

- Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts

## Lesson objective

- Solve missing value ratio problems using multiplication and division

### Previous related lessons

Unit 7, Week 2, Lesson 2; Unit 7, Week 2, Lesson 3;  
Unit 7, Week 2, Lesson 4

### Prerequisites for learning

Children need to:

- understand and use equivalent fractions
- use multiplication and division facts

### Vocabulary

ratio, 'to every', proportion symbol (:), simplify, compare

### Future related lesson

Unit 7, Week 2, Lesson 4

### Success criteria

Children can:

- use ratio notation
- simplify ratios to find the simplest form
- divide a quantity into two parts in a given ratio



## Getting Started

- Choose an activity from Number – Ratio and proportion.

**Collins**  
Connect

Year 6, Unit 11,  
Week 2

## Teach

### Resources

mini whiteboard, pen and eraser (per pair); 2 large 1–6 dice (per class)



- Ask: **If there are 3 red balls and 1 blue one, how many different ways can you express the ratio 3 : 1?** (for every 3 red balls there is 1 blue one;  $\frac{3}{4}$  red,  $\frac{1}{4}$  blue; 0.75 red, 0.25 blue; 75% red, 25% blue)



- Ask: **Can you write the ratio 2 : 3 in four different ways?** ( $2 : 3$ ;  $\frac{2}{5}$ ,  $\frac{3}{5}$ ; 0.4, 0.6; 40%, 60%)



- Ask a child to roll two dice to give a ratio. If the two numbers are the same, re-roll.
- Ask: **Can you write down three examples of numbers that fit this ratio?** Repeat until all the children are confident with this.



- Display: Slide 1. Ask: **If you have a ball pool with three different coloured balls in this ratio, what must the number of balls be a multiple of?** (6)

- Tell the children that a toy shop sells balls for a ball-pit in small packs of 100 or larger packs of 500.



- Ask: **Will this ratio work for these numbers?** (no, not for 100 or 500)



- Click to show new ratio 2 : 3 : 5. Ask: **Will this new ratio work?** (yes) **Can you explain why?** (the numbers add up to 10. Both 100 and 500 are multiples of 10)



- Click to show new ratio 4 : 1 : 5. Ask: **Will this ratio work?** (yes) **Why?** (the numbers add up to 10. Both 100 and 500 are multiples of 10)



- Ask: **Can you suggest other ratios that will work?** (the numbers need to add up to a factor of 10, i.e. 4, 10 or 25) Listen to the children's suggestions.

## Individualised Learning

Refer to Activity 3 from the Learning activities on page 437.

**Pupil Book 6C** – Page 64: Building and jewellery ratios  
**Progress Guide 6** – Extension, Year 6, Unit 11, Week 2, Lesson 3:  
 Theme park ratios

## Plenary



- To reinforce the strategies used in the lesson, look together at Challenge 2, Question 3 on building new homes.
- Ask the children to explain to each other how they tackled the question and the calculations they used. Choose one or two to explain their thinking to the class.
- Write the calculations on the board. Discuss any incorrect answers and method used. For example, we know  $D : T : S : A = 1 : 2 : 3 : 4$ .
- Emphasise the importance of re-reading the question to ensure the answer corresponds to the question.



### Homework Guide 6

Year 6, Unit 11, Week 2, Lesson 3:  
 Café ratios



For Phase 1, we know,  $x + 2x + 3x + 4x = 10x = 400$ . Therefore  $x = 40$ . Thus  $D : T : S : A = 40 : 80 : 120 : 160$ . We can check the answer by adding the number for each type of house to make sure it equals 400.

In Phase 2, we know  $T = 100 = 2 \times 50$ . Therefore  $D : T : S : A = 1 \times 50 : 2 \times 50 : 3 \times 50 : 4 \times 50 = 50 : 100 : 150 : 200$ . Total number of houses =  $50 + 100 + 150 + 200 = 500$ .

## Overcoming Barriers

- Continue to encourage the children to visualise problems. Recommend that when they read problems they look at numbers very carefully because they can often give clues as to the tables that might be involved. For example, the number 490 suggests 7 or 70 is likely and numbers like 220 or 660 point towards 11 or 110.
- Emphasise the importance of re-reading the question to ensure the answer corresponds to the question.