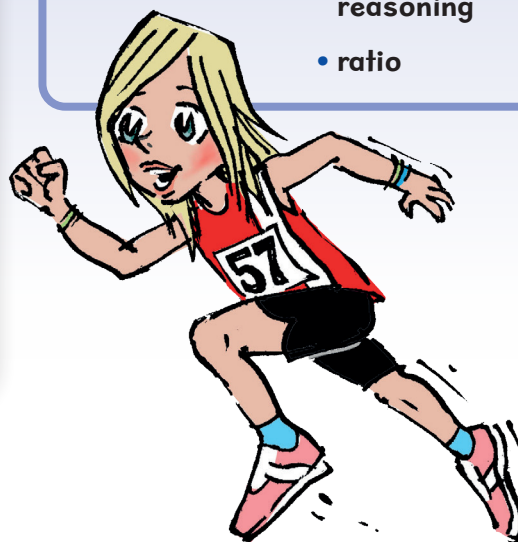


### We are learning to...

- Use our understanding of proportional reasoning to explore multiplicative relationships.
- Solve problems using proportional reasoning.
- Divide a quantity into two parts given the part : part or part : whole.
- Express the division of a quantity into two parts as a ratio.

### VOCABULARY

- proportion
- proportional reasoning
- ratio



### Getting started

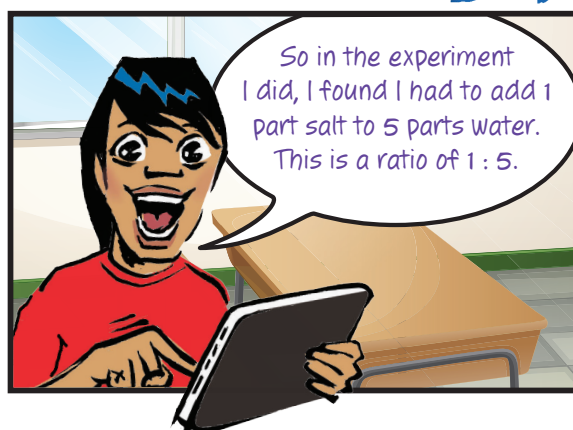


The teacher to student ratio at my school is 1 : 25.

What does Jess mean?

What is the teacher to student ratio at your school?

- What was the adult to student ratio on your last school outing or camp?
- Does your school have any policies on this?



Think of some other examples of ratios.



Last time we went on school camp the adult to student ratio was 1 : 5.

## Rich tasks for this chapter

You might do these at the start, middle, or end of the chapter, or as homework or extension.



1

## GEARS

- If the front chain wheel (the toothed wheel that the chain goes around) on a bike has 40 teeth and the rear cog has 10 teeth, the rear cog will go round four times faster than the chain wheel.

The gear ratio is 4 : 1.

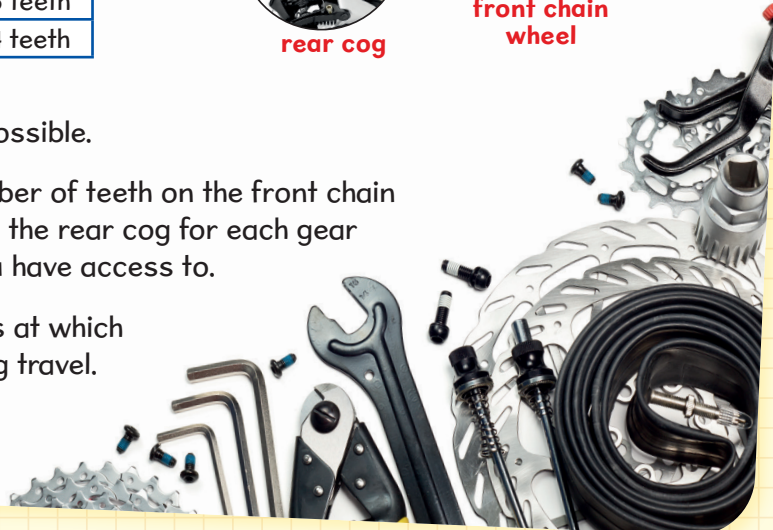
This chart gives the number of teeth on the three front chain wheels and six rear cogs of an 18 speed bike.

| Front chain wheels |          |
|--------------------|----------|
| Big                | 48 teeth |
| Medium             | 38 teeth |
| Small              | 28 teeth |

| Rear cogs |          |
|-----------|----------|
| 1         | 28 teeth |
| 2         | 24 teeth |
| 3         | 21 teeth |
| 4         | 18 teeth |
| 5         | 16 teeth |
| 6         | 14 teeth |



- Write down the 18 gear ratios possible.
- Write down the ratio of the number of teeth on the front chain wheel to the number of teeth on the rear cog for each gear on either your bike or a bike you have access to.
- Work out the ratio of the speeds at which the chain wheel and the rear cog travel.
- Where else are gears used?



2

## SHADOWS



- Investigate the heights of objects and their shadows at four or five different times of the day.
- Is the ratio **object height : shadow length** always the same at a particular time of the day?
- Does the ratio change as the day progresses?
- Can shadows be used to tell the time? Explain why or why not.
- Present your findings in an interesting way with explanations to accompany them.