

Histograms

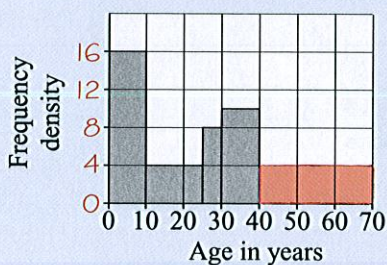
Histograms are usually used to represent grouped data with different class widths.

Worked example

The incomplete table and histogram give information about the ages of the people who live in a village.



Age (x) in years	Frequency
$0 < x \leq 10$	160
$10 < x \leq 25$	$4 \times 15 = 60$
$25 < x \leq 30$	$8 \times 5 = 40$
$30 < x \leq 40$	100
$40 < x \leq 70$	120



Everything in red is part of the answer.

Histogram facts

- No gaps between the bars. ✓
- Area of each bar is proportional to frequency. ✓
- Vertical axis is labelled 'Frequency density'. ✓
- Bars can be different widths. ✓
- Frequency density = $\frac{\text{frequency}}{\text{class width}}$ ✓

(a) Use the information in the histogram to complete the frequency table.

Frequency density of $0 < x \leq 10$ class
 $= \frac{160}{10} = 16$

(b) Complete the histogram.

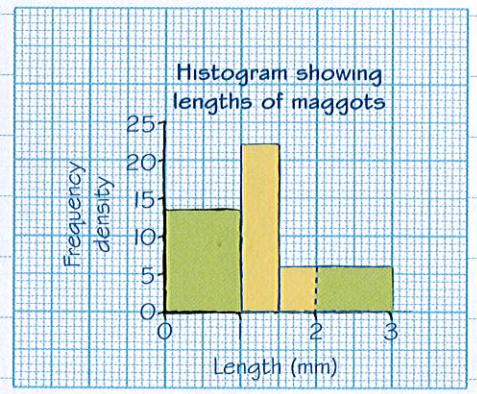
Frequency density of $40 < x \leq 70$ class
 $= \frac{120}{30} = 4$

- (a) You know the frequency for the $0 < x \leq 10$ class. Use this to work out the scale on the vertical axis. Use 'frequency = frequency density \times class width' to work out the missing frequencies.
- (b) Alternatively, you could also 'count squares' to complete the histogram. Work out how many people are represented by one square.

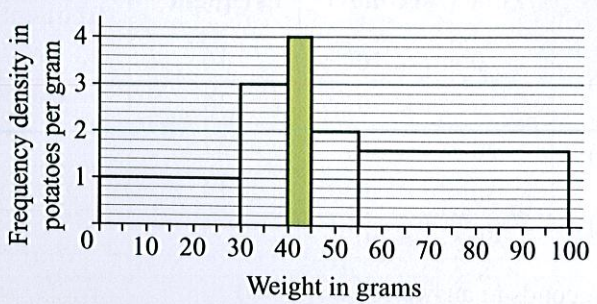
You can use the area under a histogram to estimate frequencies.

An estimate for the number of maggots between 1 mm and 2 mm long is:

$0.5 \times 22 + 0.5 \times 6 = 11 + 3 = 14$



Now try this



The histogram gives information about the weights of some potatoes. The shaded bar represents 20 potatoes.

- (a) Work out how many of the potatoes weigh 30 grams or less. (1 mark)
- (b) Estimate the number of potatoes which weigh more than 50 grams. (2 marks)

