

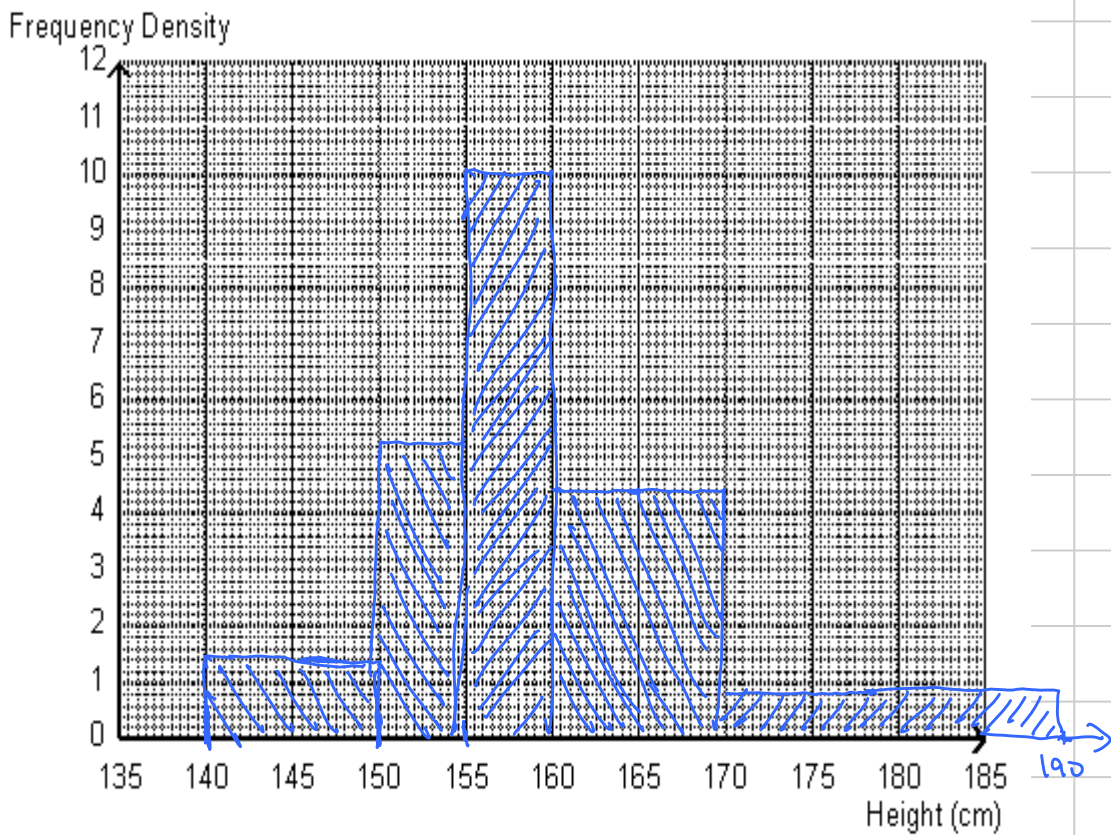
# Histograms

Note Title A histogram is used to illustrate a Grouped Frequency Table. The classes in the table may be of different widths. 12/02/2009

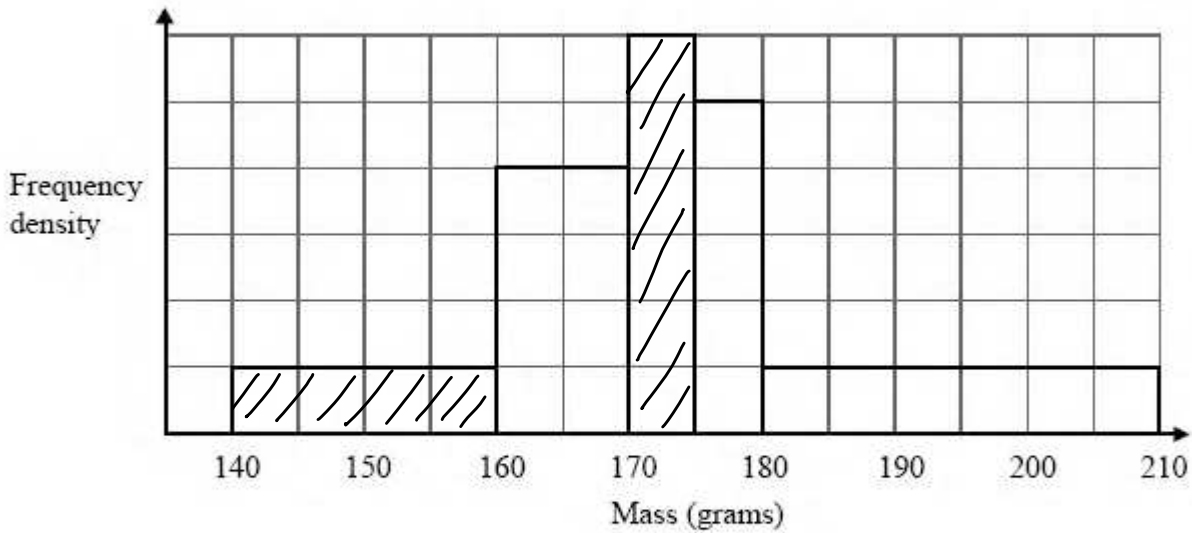
To compensate for this, we use the **area** of each bar to represent the frequency. To achieve this, the height of each bar should be the **frequency density**, where  $f = c \times h$

**Example 1:** The table below shows the heights (in cm) of 150 6<sup>th</sup> Form girls. Draw a histogram to illustrate this.

Height	Frequency	Class Width	Frequency Density
140 - 150	14	10	1.4
150 - 155	26	5	5.2
155 - 160	50	5	10
160 - 170	44	10	4.4
170 - 190	16	20	0.8



**EG 2** The histogram gives information about the masses of some stones.



The number of stones in the 170 g – 175 g class is 24 more than the number of stones in the 140 g – 160 g class.

Calculate the total number of stones.

$$\text{Area of } 170-175\text{g} = 6 \text{ squares}$$

$$\text{Area of } 140-160\text{g} = 4 \text{ squares}$$

$$\text{Difference} = 2 \text{ squares which we are told is } 24 \text{ stones}$$

$$\therefore \text{Area of each square represents } 12 \text{ stones}$$

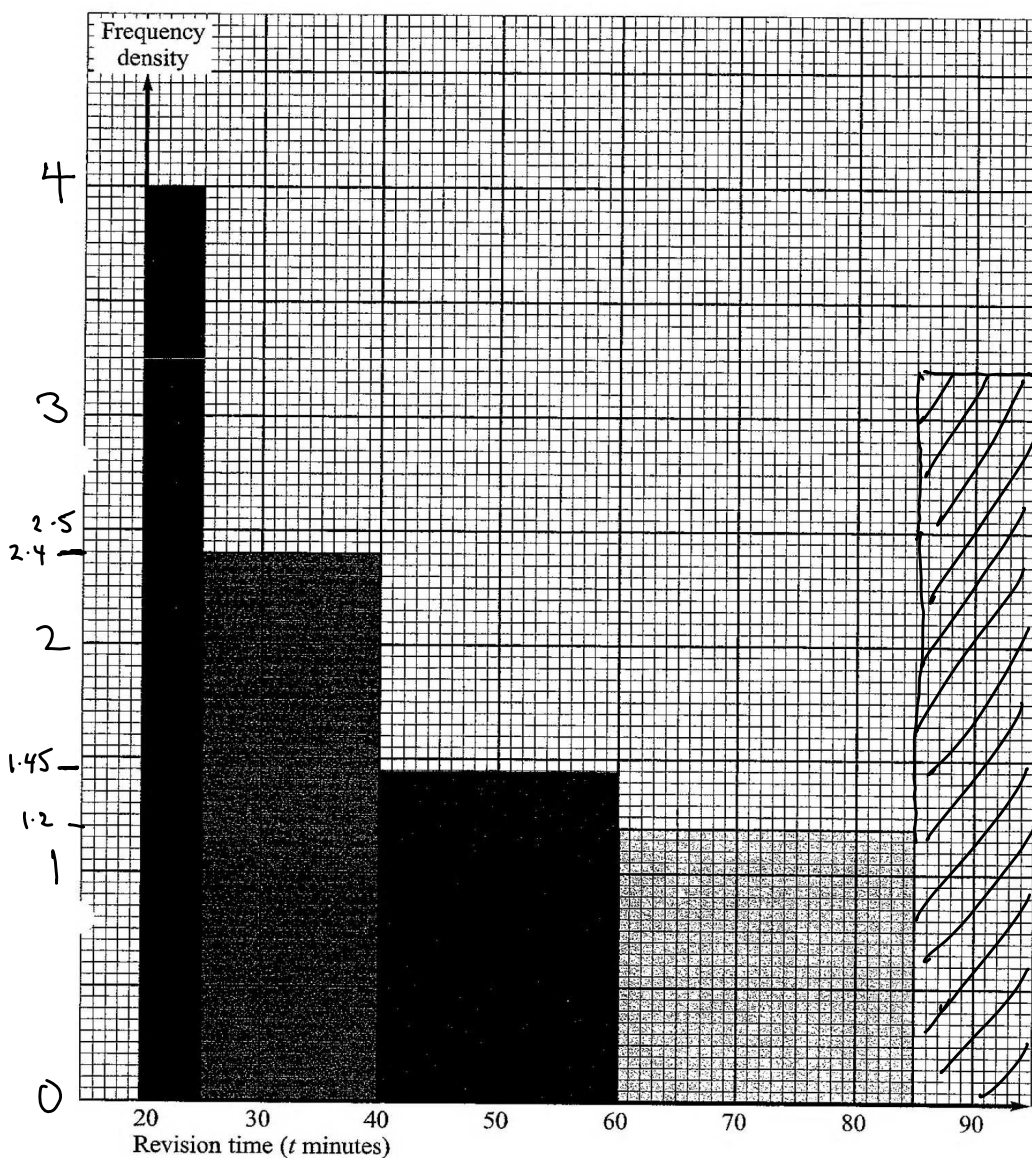
$$\text{Whole histogram has } 29 \text{ squares}$$

$$\text{so } 29 \times 12 = \underline{\underline{348}} \text{ stones}$$

**EG 3** Mrs Smith asked the Year 11 students at her school how long they had spent revising Maths the evening before their Maths exam.  
The unfinished histogram and frequency table give information about their responses.

Widths	Revision time ( $t$ minutes)	Frequency	Frequency Density
5	$20 \leq t < 25$	20	4
15	$25 \leq t < 40$	$15 \times 2.4 = 36$	2.4
20	$40 \leq t < 60$	$20 \times 1.45 = 29$	1.45
25	$60 \leq t < 85$	$25 \times 1.2 = 30$	1.2
10	$85 \leq t < 95$	32	3.2

Complete the table and the histogram



Notes:

- Horizontal axis has a **scale**, not a label under each bar
- No gap between bars
- Horizontal axis **need not** start at zero; vertical axis **must** start at zero