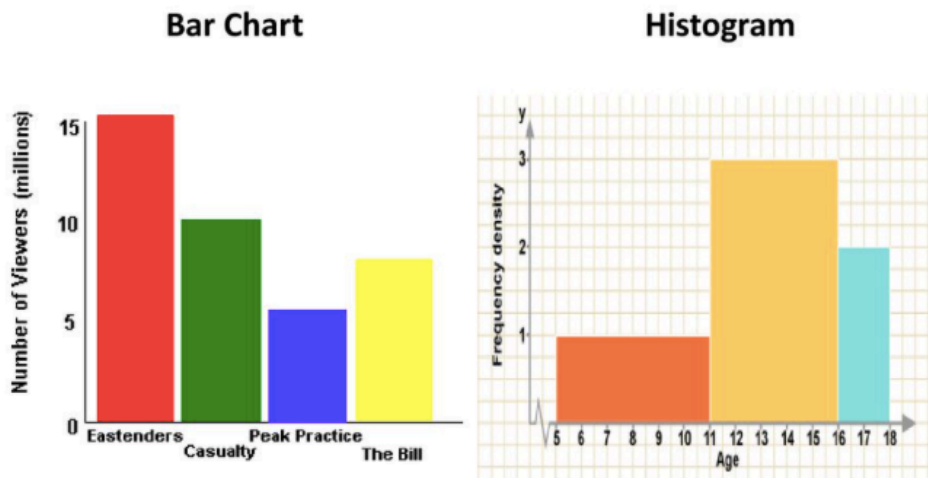


## Drawing histograms

### Starter

1. In pairs, compare the bar chart and histogram below. Write down the similarities and differences between a bar chart and a histogram



### Differences

- The histogram has *no gaps* between the bars
- The bars on a histogram may be of *different widths*.
- The horizontal axis on a histogram has a *continuous scale*, whereas a bar chart has categories
- The vertical axes on a histogram is *frequency density*, not frequency

### Similarities

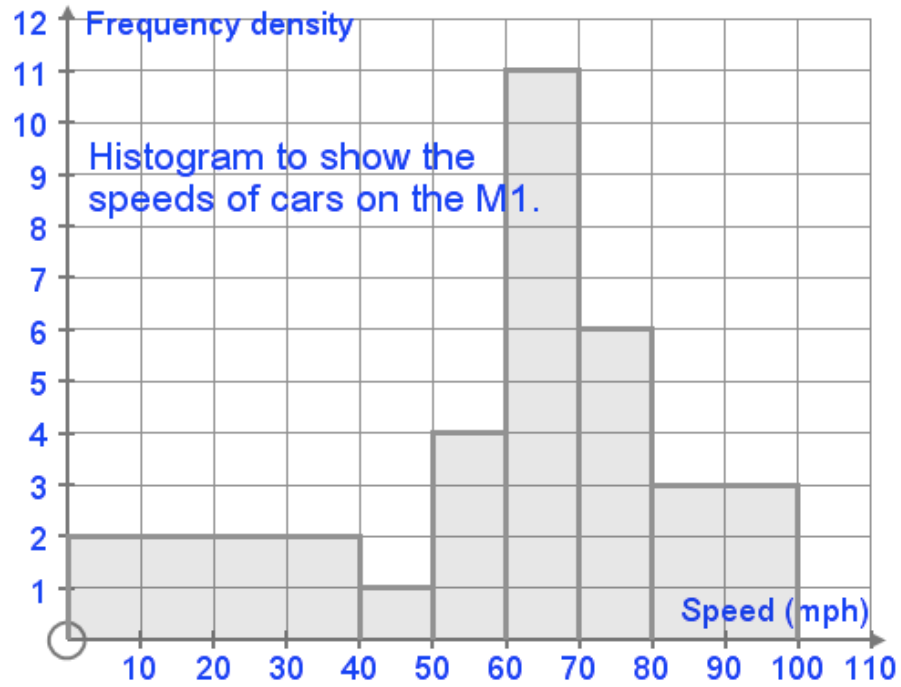
- Axes on both graphs have titles
- Bars are rectangles

**E.g. 1** The speeds of cars passing a particular point on the M1 was carried out. Draw a histogram to show the data.

<b>Speed, v (mph)</b>	$0 < v \leq 40$	$40 < v \leq 50$	$50 < v \leq 60$	$60 < v \leq 70$	$70 < v \leq 80$	$80 < v \leq 100$
<b>Frequency</b>	80	10	40	110	60	60

**Working:** Draw an extra row to the table as we need to calculate frequency densities  
 Use the formula  $\text{Frequency density} = \frac{\text{Frequency}}{\text{Class width}}$

<b>Speed, v (mph)</b>	$0 < v \leq 40$	$40 < v \leq 50$	$50 < v \leq 60$	$60 < v \leq 70$	$70 < v \leq 80$	$80 < v \leq 100$
<b>Frequency</b>	80	10	40	110	60	60
<b>Frequency density</b>	2	1	4	11	6	3



**E.g. 2** The heights of a group of girls were measured to the nearest centimetre. Draw a histogram to represent the data. *Include 4 more columns with your table.*

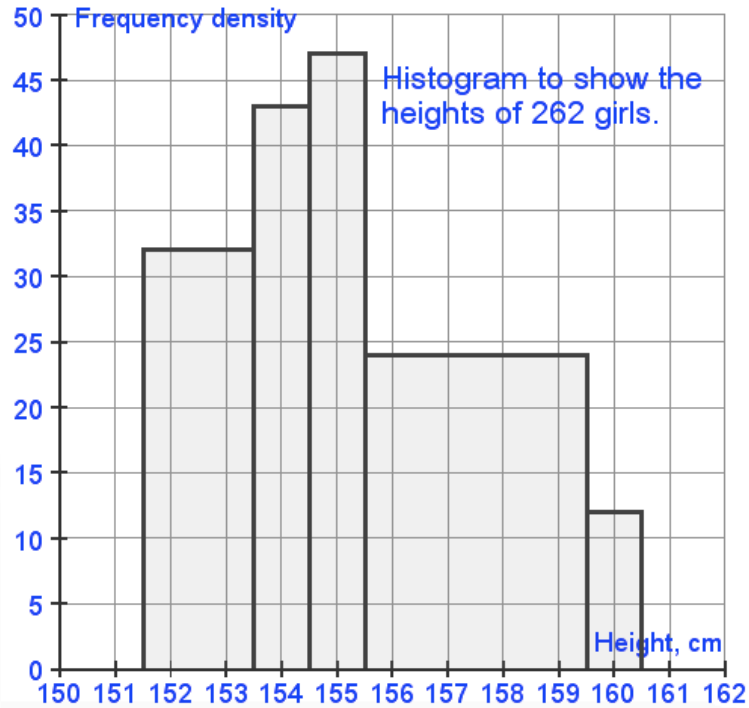
Height (h, cm)	Frequency
152-153	64
154	43
155	47
156-159	96
160	12

**Working:** This histogram is much harder to draw because the class widths are not continuous — how can we draw a rectangle for class width 154? The heights are measure to the nearest cm.  
 152–153 means 151.5–153.5  
 154 means 153.5–154.5  
 Fill in the rest of the table

Height (h, cm)	Frequency	Lower bound	Upper bound	Interval width	Frequency density
152-153	64	151.5	153.5	2	
154	43	153.5	154.5	1	
155	47				
156-159	96				
160	12				

Height (h, cm)	Frequency	Lower bound	Upper bound	Interval width	Frequency density
152-153	64	151.5	153.5	2	32
154	43	153.5	154.5	1	43
155	47	154.5	155.5	1	47
156-159	96	155.5	159.5	4	24
160	12	159.5	160.5	1	12

**N.B.** Start the horizontal axis at 150, not 151.5



Video: [Drawing histograms](#)

[Solutions to Starter and E.g.s](#)

**Exercise**

- 9-1 class textbook: p486 E14.4 Qu 1-6
- A\*-G class textbook: p442 E14.1 Qu 1-6
- 9-1 homework book: p167 E14.4 Qu 1-3
- A\*-G homework book: p125 E14.1 Qu 1-3

[Homework book answers \(only available during a lockdown\)](#)