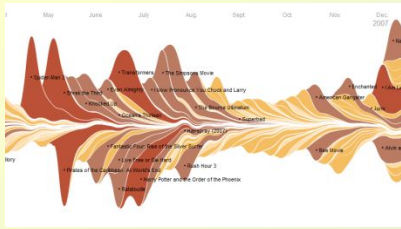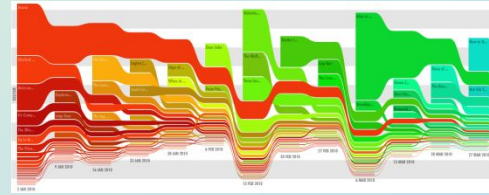# Histograms
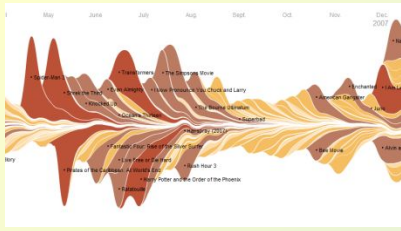
Starter

- In the back of your book, draw a Bar Chart to show the following information;

Height (cm)	Frequency
100 < x ≤ 120	20
120 < x ≤ 140	25
140 < x ≤ 150	30
150 < x ≤ 160	25
160 < x ≤ 200	20

Starter

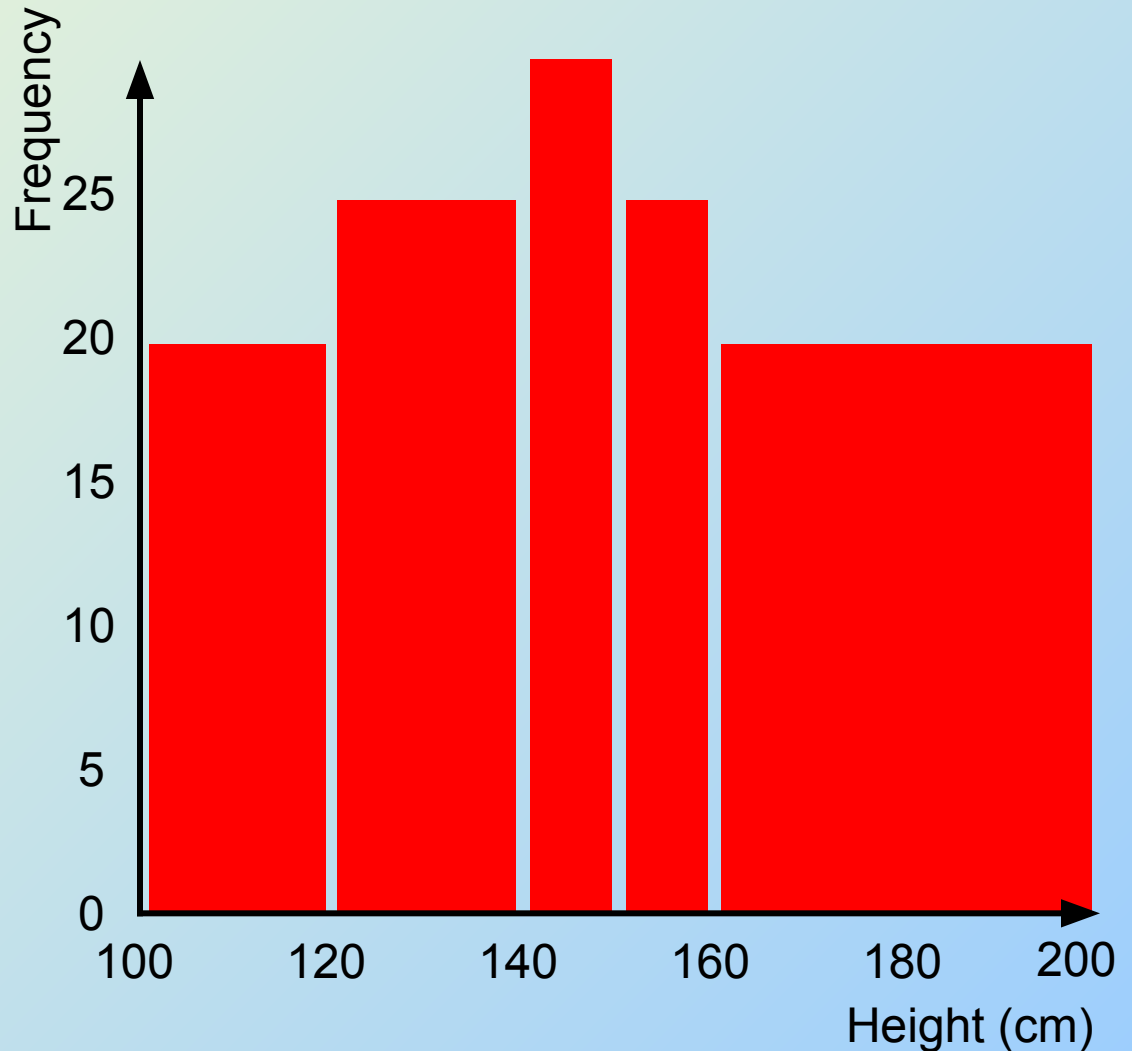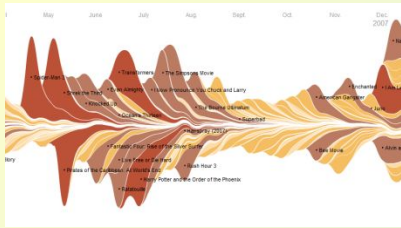| Height (cm)	Frequency
100 < x ≤ 120	20
120 < x ≤ 140	25
140 < x ≤ 150	30
150 < x ≤ 160	25
160 < x ≤ 200	20

Starter
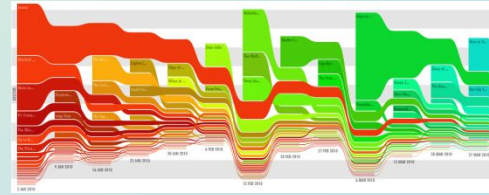
- <u>Problems</u>
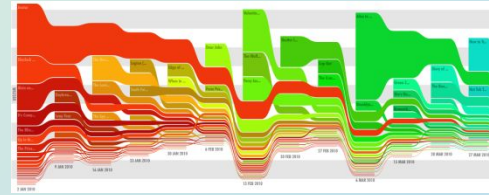
  1) The data is continuous so there should be no gaps

  2) 150 – 160 has the same height as 120 – 140, even though it represents a smaller range

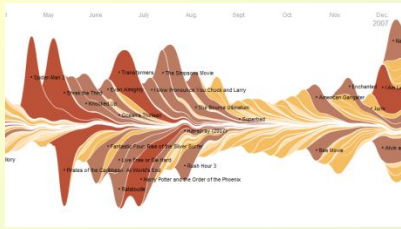 A Histogram will correct both of these problems!

Histograms

Height (cm)	Frequency	Frequency Density
100 < x ≤ 120	20	1
120 < x ≤ 140	25	1.25
140 < x ≤ 150	30	3
150 < x ≤ 160	25	2.5
160 < x ≤ 200	20	0.5

To take into account the size of the group, we calculate 'Frequency Density'
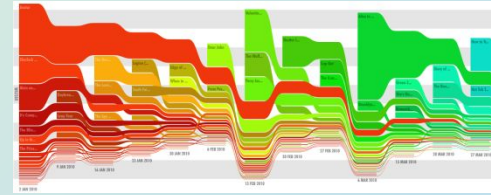
$$\text{Frequency Density} = \frac{\text{Frequency}}{\text{Classwidth}}$$

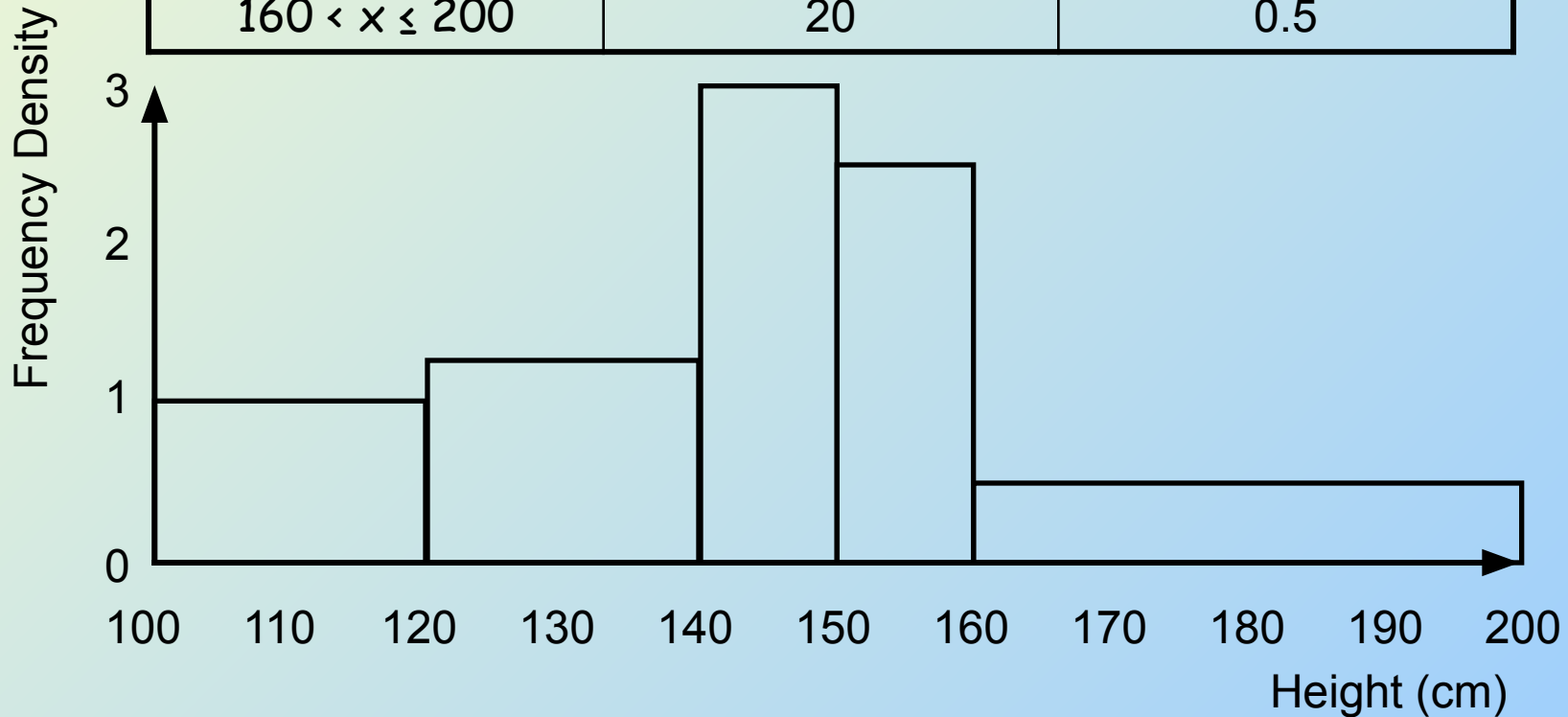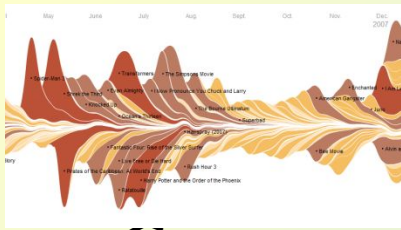$$\text{Frequency Density} = \frac{20}{40}$$

$$= 0.5$$

Histograms

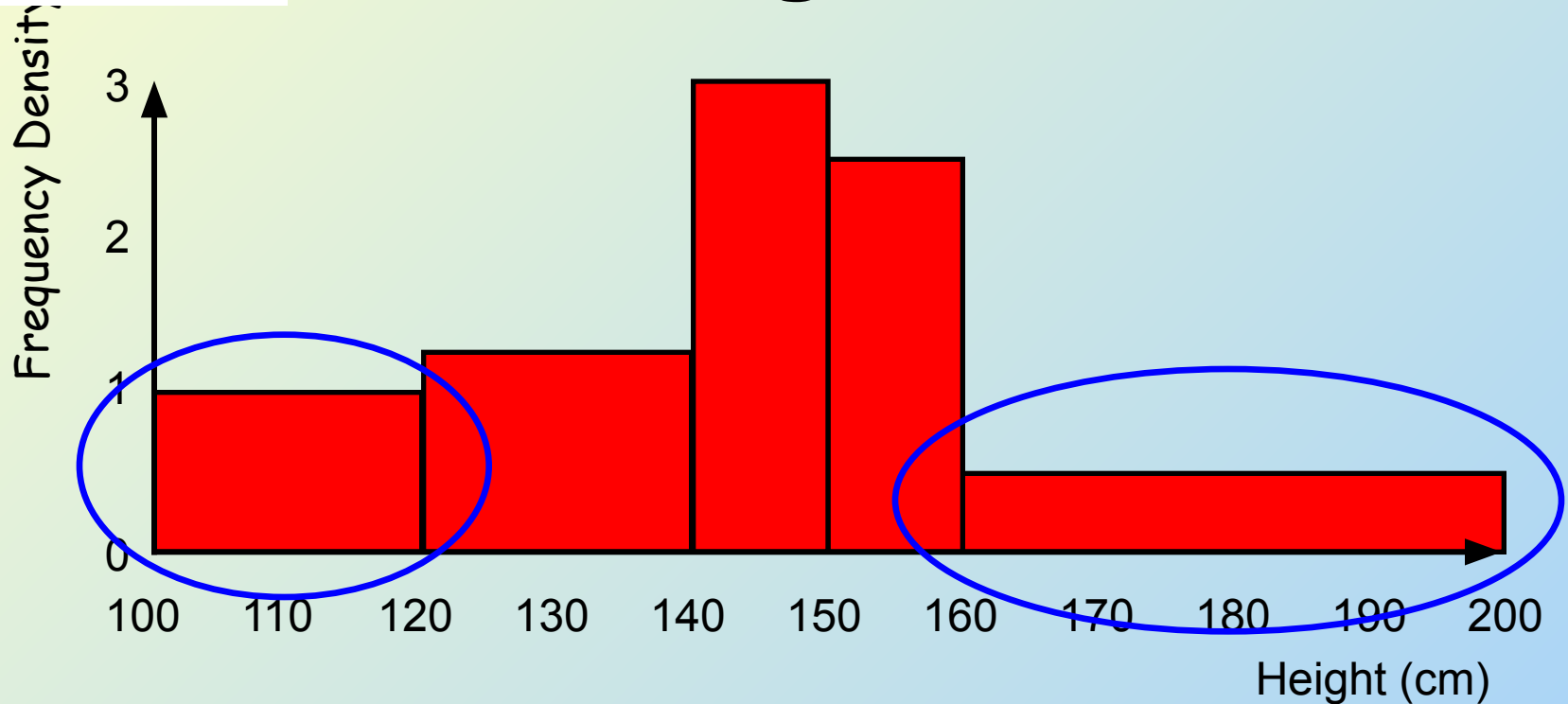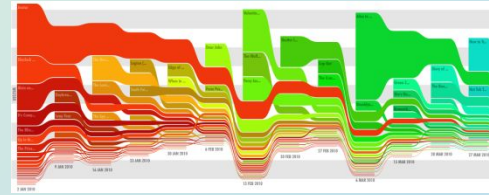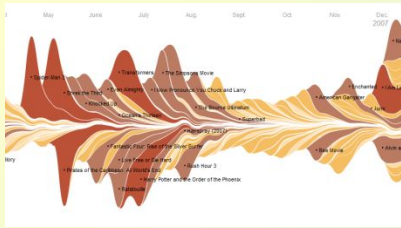| Height (cm)	Frequency	Frequency Density
100 < x ≤ 120	20	1
120 < x ≤ 140	25	1.25
140 < x ≤ 150	30	3
150 < x ≤ 160	25	2.5
160 < x ≤ 200	20	0.5

Histograms
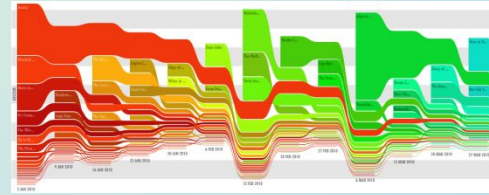

With a Histogram, area represents Frequency, not the height

eg) The first group is a rectangle measuring 40 by 0.5

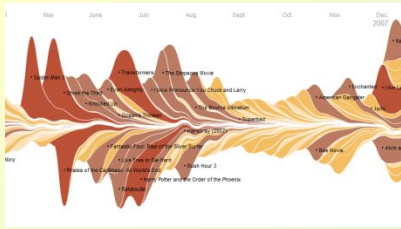40 x 0.5 = 20 So there were 20 people in the group

Histograms

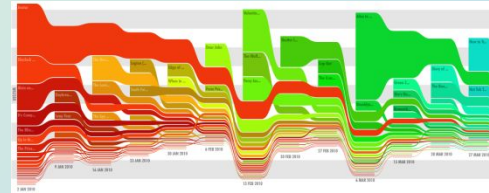| Speed (mph)	Frequency	Frequency Density
$0 < x \leq 40$	10	0.25
$40 < x \leq 50$	15	1.5
$50 < x \leq 60$	18	1.8
$60 < x \leq 65$	20	4
$65 < x \leq 70$	35	7
$70 < x \leq 80$	20	2

To take into account the size of the group, we calculate 'Frequency Density'

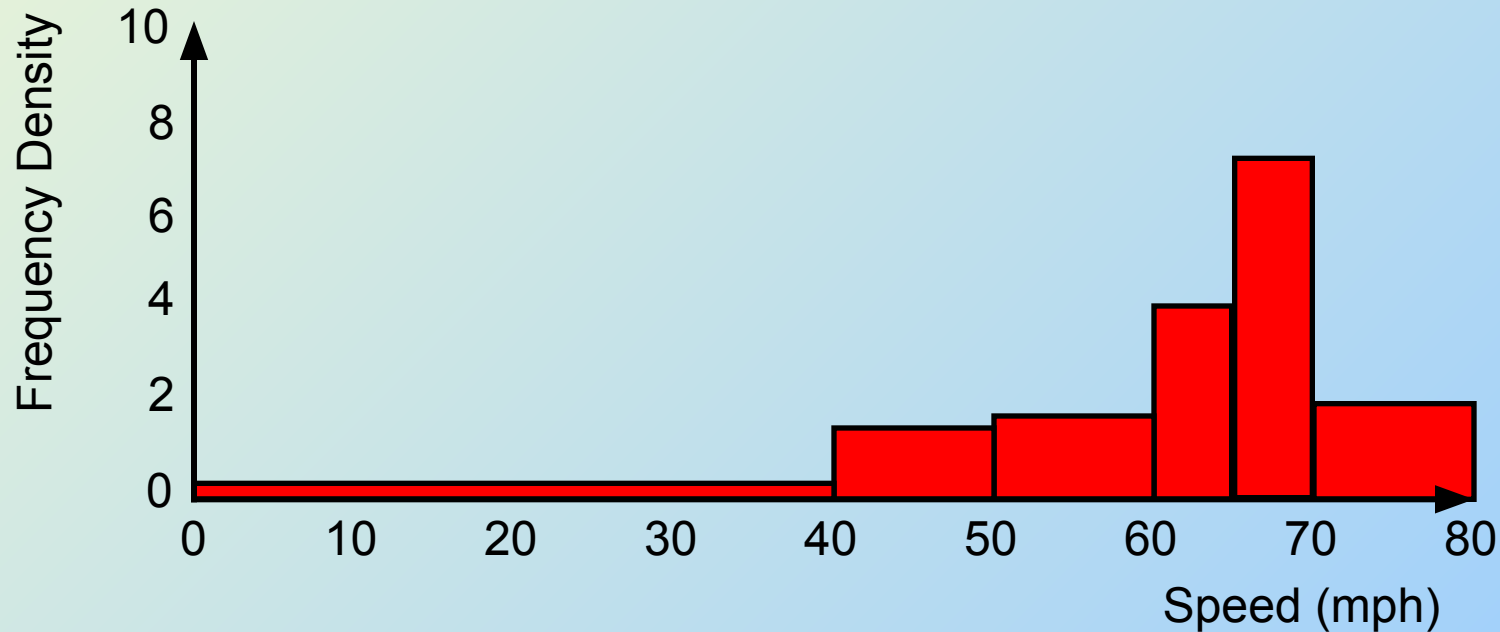$$\text{Frequency Density} = \frac{\text{Frequency}}{\text{Classwidth}}$$

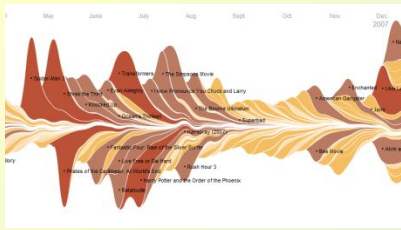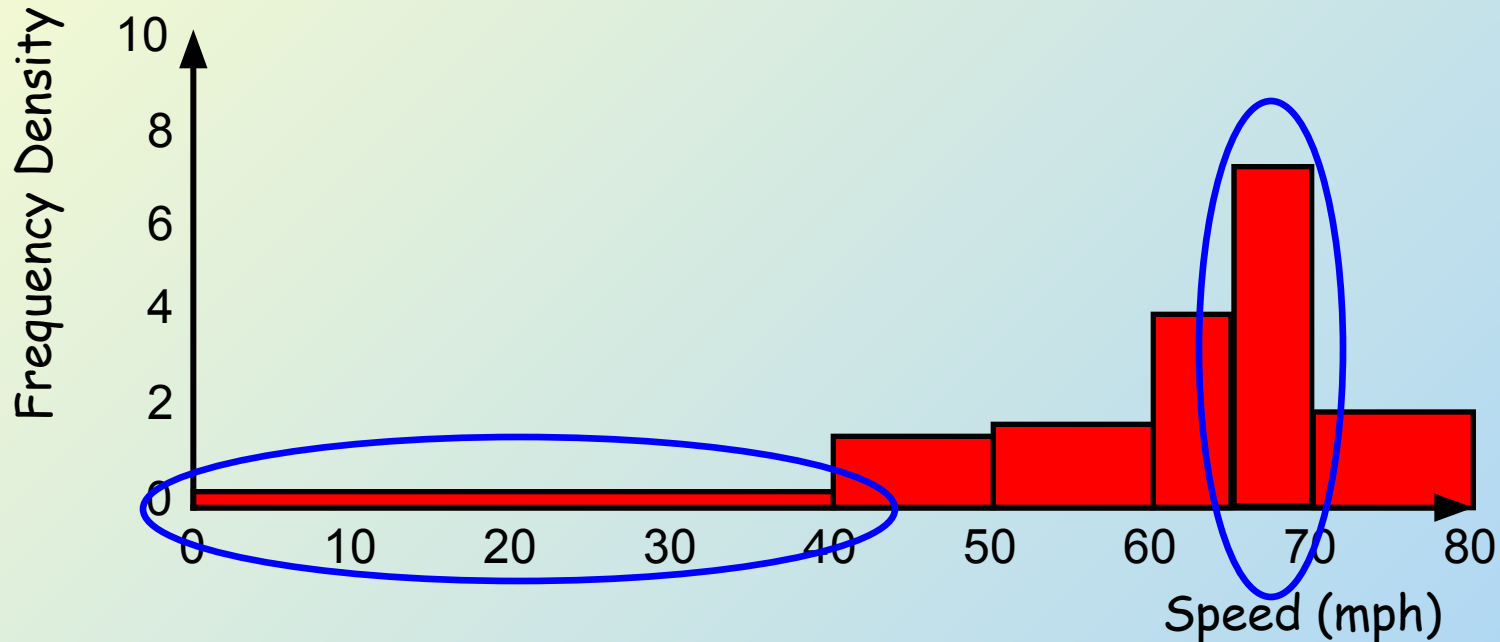$$\text{Frequency Density} = \frac{35}{40}$$
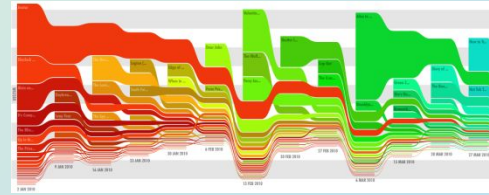
$$= 0.25$$

Histograms

Speed (mph)	Frequency	Frequency Density
0 < x ≤ 40	10	0.25
40 < x ≤ 50	15	1.5
50 < x ≤ 60	18	1.8
60 < x ≤ 65	20	4
65 < x ≤ 70	35	7
70 < x ≤ 80	20	2

Histograms
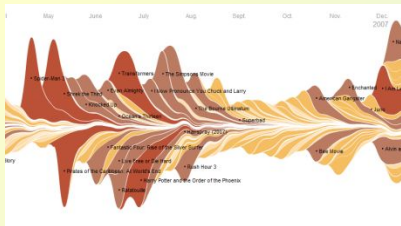

Remember that <u>Area</u> represents Frequency!
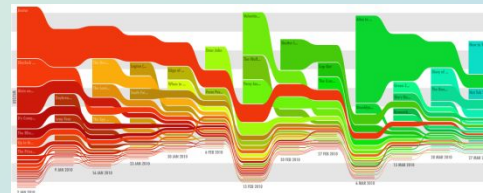
Group 5 is a 40 by 70.25 rectangle

50 x 0.25 = 10

So 35 people in the group

Plenary

10 (a) The table shows information about the size of eggs and percentages of eggs sold in a supermarket in the UK.

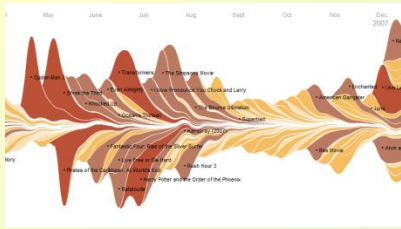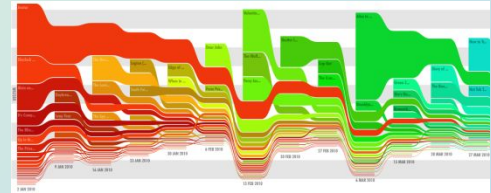| Classification of Eggs UK				Frequency Density
Size	**Minimum weight**	**Maximum weight**	**Percentage of sales**	
Small	33g	53g	10	0.5
Medium	53g	63g	22	2.2
Large	63g	73g	53	5.3
Extra Large	73g	103g	15	0.5

You may assume no eggs are less than 33g or more than 103g.

Draw a fully labelled histogram to show the data.

(4)
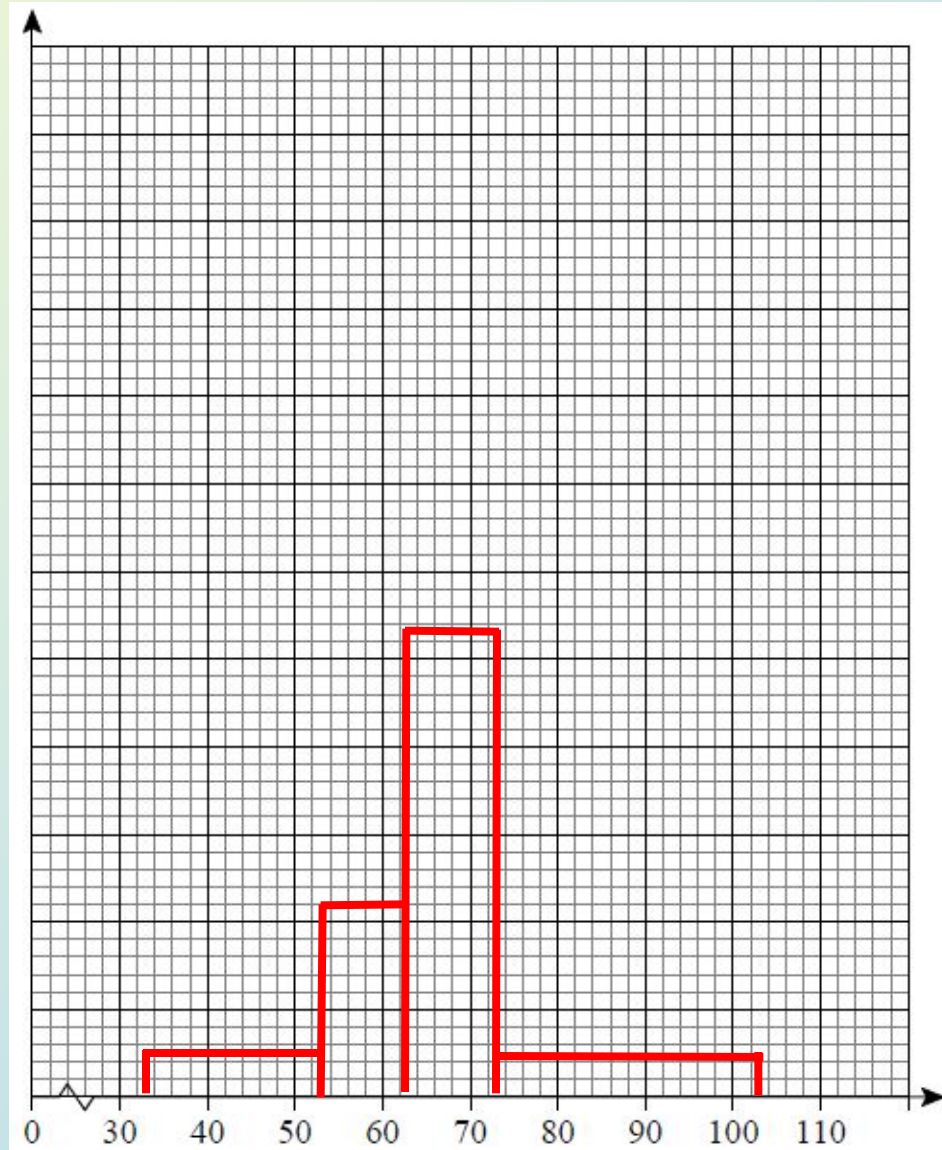
Plenary
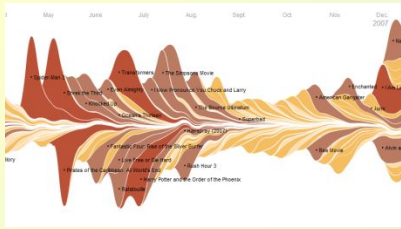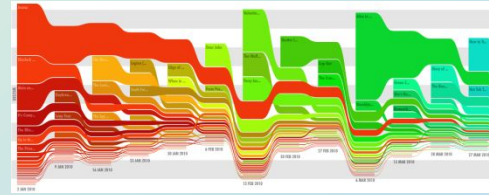

Frequency Density

Egg Weight (g)

Summary

- We have learnt how to plot **Histograms** of sets of data

- We have seen how they are different to **Bar Charts**

- We have learnt what is meant by '**Frequency Density**'

- We have shown that on a **Histogram**, <u>area</u> represents **Frequency**, not height!