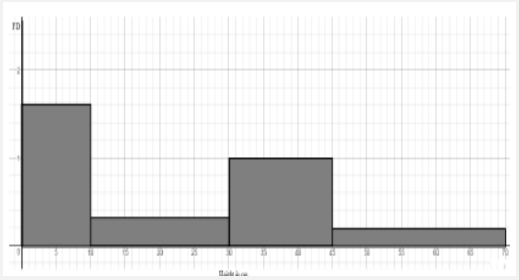
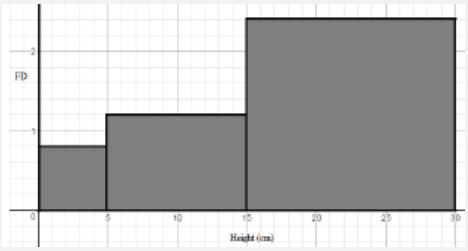
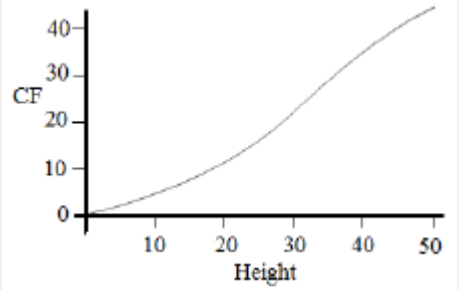
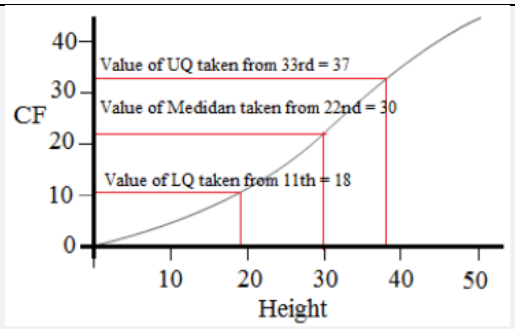
Topic: Histograms and Cumulative Frequency

Topic/Skill	Definition/Tips	Example
1. Histograms	A visual way to display frequency data using bars. Bars can be **unequal in width**. Histograms show **frequency density** on the **y-axis**, not frequency. $$\textbf{Frequency Density} = \frac{\textbf{Frequency}}{\textbf{Class Width}}$$ | Height(cm) | Frequency | | $0 < h \leq 10$ | 8 | | $10 < h \leq 30$ | 6 | | $30 < h \leq 45$ | 15 | | $45 < h \leq 70$ | 5 |	| Frequency Density (FD) | | $8 \div 5 = 1.6$ | | $6 \div 20 = 0.3$ | | $15 \div 15 = 1$ | | $5 \div 25 = 0.2$ | 
2. Interpreting Histograms	The **area** of the bar is proportional to the **frequency** of that class interval. $$\textbf{Frequency} = \textbf{Freq Density} \times \textbf{Class Width}$$	A histogram shows information about the heights of a number of plants. 4 plants were less than 5cm tall. Find the number of plants more than 5cm tall.  Above 5cm: 1.2 x 10 + 2.4 x 15 = 12 + 36 = 48
3. Cumulative Frequency	Cumulative Frequency is a **running total**. | Age | Frequency | | $0 < a \leq 10$ | 15 | | $10 < a \leq 40$ | 35 | | $40 < a \leq 50$ | 10 |	| Cumulative Frequency | | 15 | | $15 + 35 = 50$ | | $50 + 10 = 60$ |
4. Cumulative Frequency Diagram	A cumulative frequency diagram is a **curve that goes up**. It looks a little like a stretched-out **S shape**. Plot the cumulative frequencies at the **end-point** of each interval.	

5. Quartiles from Cumulative Frequency Diagram	**Lower Quartile** (Q1): **25%** of the data is less than the lower quartile. **Median** (Q2): **50%** of the data is less than the median. **Upper Quartile** (Q3): **75%** of the data is less than the upper quartile. **Interquartile Range (IQR)**: represents the **middle 50%** of the data.	 $IQR = 37 - 18 = 19$
6. Hypothesis	**A statement that might be true, which can be tested.**	Hypothesis: 'Large dogs are better at catching tennis balls than small dogs'. We can test this hypothesis by having hundreds of different sized dogs try to catch tennis balls.