 Heart rates

The aim

To compare two sets of heart rates. The first set of heart rates will be taken with the person completely at rest. The second set of heart rates will be taken after the person has completed some sort of exercise for 2 minutes.

Collecting data

1. Lie still for two minutes.
2. By feeling the heart rate at your wrist, count how many beats occur in 15 seconds. Multiply this number by 4 and this is your resting heart rate per minute.
3. Complete some sort of exercise for two minutes. You could jog, step up and down off a chair or do jumping jacks.
4. At the end of the two minutes, record your heart rate again using the method as outlined in step 2.
5. Collect resting and exercise heart rates for as many people as you can (at least 10).

Analysing data

1. Organise your data into a back to back stem and leaf plot. Display the resting heart rates on one side of the back to back stem and leaf plot and the exercise heart rates on the other.
2. Find the mean, median and mode for each of the two sets of heart rates. Describe any similarities between the two sets of data.
3. Find the values of the median, quartile 1 (Q1), and quartile 3 (Q3) for each set of data and construct two boxplots (using the same scale) displaying the two sets of heart rates. Describe the differences and similarities between the two boxplots.
4. Set up a frequency table for each set of heart rates. Draw a frequency polygon for each using the same scale on the horizontal axis. Describe any similarities or differences between the two.
5. Calculate (using a calculator) the standard deviation for the two sets of heart rates. Are they similar? Would you expect them to be similar?
6. Describe the possible reasons for the outliers (values that are a lot higher or lower than the other values.)

Conclusion:

Are the two sets of data similar in any way? Would you expect them to be?

Outcomes

* **MA5.3-1WM** uses and interprets formal definitions and generalisations when explaining solutions and/or conjectures
* **MA5.3-2WM** generalises mathematical ideas and techniques to analyse and solve problems efficiently
* **MA5.3-3WM** uses deductive reasoning in presenting arguments and formal proofs
* **MA5.2-15SP** uses quartiles and box plots to compare sets of data, and evaluates sources of data
* **MA5.3-18SP** uses standard deviation to analyse data