

Exercise Intensity and Heart Rate

Introduction

A heart pumps blood around the body via a circulatory system composed of arteries, capillaries and veins. Blood delivers substances required for metabolic reactions to the cells (e.g. glucose, oxygen) and removes waste products (e.g. carbon dioxide, urea, heat). When exercising, metabolic demands of the muscles increase, requiring greater blood flow to maintain cell activity. The change in physical intensity is relayed to the brain, which signals the heart rate to increase. A basal heart rate is roughly 60 – 100 bpm, while the maximal heart rate is approximately $220 \text{ bpm} - \text{age}$.

Aim

To write an experimental report on this activity that conforms to the grading requirements for the internal assessment. This report is not expected to be of the standard of a final IA report and will not include all sections. But the following sections *should* be included as part of your final report:

Research Question:

- Include a focused research question that includes all relevant details (timings, amounts, etc.)

Introduction:

- Summarise the relevant scientific theory and provide a context for the investigation

Hypothesis:

- Predict a trend between exercise intensity and heart rate – include a relevant control group

Variables:

- Identify the independent and dependent variables, along with all relevant control variables
- Identify relevant uncontrolled variables and identify measures taken to reduce their impact

Materials / Method:

- Include a list of all materials and a step-by-step method outlining the experimental protocol

Results:

- Include qualitative observations and quantitative data (both raw and processed)
- Include a line graph of the processed data (with trendline, error bars and correlation coefficient)

Discussion:

- Describe trends seen in the data (include the shape of trendline and justification for patterns)
- Assess the validity of the data (comment on precision, accuracy and statistical significance)

Evaluation

- Identify weakness and limitations in the methodology (suggesting realistic improvements)