**Heart rate and exercise – Validation Test - key**

**Marks Available: /30**

1. What variable were you measuring (dependent variable)? Include the unit you used. (2m)

Breath rate in beats per minute

1. Give two variables that you kept the same during this experiment. (2m)

Something valid

1. Describe two safety risks that you identified in your investigation. In your response, describe how you overcame this issue. (4m)

|  |  |
| --- | --- |
| Safety issue | Minimised by: |
| 1. Something valid |  |
|  |  |

A student conducted a similar investigation. They looked at their breathing rates after exercising. Unfortunately, they did not understand the value of a good data table, and so they recorded their data below.

*Just before going for a run, two students measured their resting breathing rate. Student A recorded a breathing rate of 57 bpm while Student B recorded a breathing rate of 58 bpm.*

*After the run, for the 1st reading, Subject A was at 100bpm, Student B was recorded 95 bpm.*

*The next time they checked their breathing rate, both students recorded 82 bpm.*

*They recorded their breathing rate every minute for 10 minutes after going for a run.*

*At 5 minutes, they both had a breathing rate of 60 bpm.*

*Their breathing rate did not change after 5 minutes.*

*Minute 4 = Student A was 64, B = 65*

*Student A = 68, Student B = 70 @ 3 minutes*

1. Construct a table to display this information. (7m)

Title

Headers in top of column

Data entered correctly

Units in header only

Two separate columns for Student A and Student B

Column gives time after exercise 1 min, 2 min etc

Table has a 0 minute for their resting breathing rate

1. On the grid below, draw a **line** graph using Student A’s data from Question 4. (2m)

Title (1 for a poor one, 2 for a good one)

Axis labelled

Units (1 for just one, 2 for both)

Line graph is correct, only A

1. Referring to your graph, describe the effect of exercise on the heart rate of Student A? Use two pieces of evidence from your graph to support your answer. (3m)

Exercise increases heart rate, student uses two pieces of evidence from graph.

1. During your experiment, you would have been asked to calculate an average heart rate. Find the average of the numbers given below. Show your working. (2m)

17 15 18 15 13 15 18 17

Add up to 128

Average of 16

1. Explain how the circulatory and respiratory systems work together to supply the cells of the body with oxygen during exercise. (6 marks)

As we exercise we require more energy

Must do more cellular respiration

To make the energy, we require more oxygen

This means that our lungs will need to take in more oxygen

So our breathing rate increases

Which the heart will need to push out to our body

So our heart rate increases

1. Predict what would happen to your breathing rate after 3 minutes of exercise. Explain your answer. (3 marks)

After three minutes of exercise our breathing rate would increase.

The need for oxygen has increased

The need to rid the body of more carbon dioxide

Lungs will need to do gas exchange more frequently