**Year 11**

**ATAR**

**Human Biology**

|  |
| --- |
| Name: |
| Teacher: |

|  |  |  |  |
| --- | --- | --- | --- |
| **Task 1: Heart Rate Investigation Validation Test** | | | Weighting 5% |
|  | Marks Received | Marks Available | Percentage |
| Total |  | 30 |  |

Time Allocated:

Reading time: 5 minutes

Working time: 35 minutes

HEART RATE INVESTIGATION TEST

1. Write a hypothesis for your investigation. (2 marks)

1 mark – independent variable mentioned

1 mark – dependent variable mentioned

(must be written as prediction, if not, -1 mark)

2. For your investigation give; (3 marks)

The independent variable: 1 mark – correct independent variable

The dependent variable: 1 mark – correct dependent variable

3 controlled variables: 0.5 mark – 2 correct controlled variables

1 mark – 3 correct controlled variables

3. What is a control? Why is it necessary? (2 marks)

1 mark – A subject/group in an experiment where the independent variable is not being applied (standard for comparison)

1 mark – necessary to determine/see the impact of independent variable.

4. What is the control in your experiment? (1 mark)

1 mark – correct use and explanation of control in experiment (resting HR)

5. Describe two things in your investigation that you think might have made it invalid.

Explain how you could improve each of these. (4 marks)

1 mark – identifies one variable that could have made the investigation invalid

2 marks – identifies two variables that could have made the investigation invalid

1 mark – provides a valid improvement for one of the variables mentioned above

2 marks – provides valid improvements for both of the variables mentioned above

(did the experiment test what it was suppose to test)

6. Do you think your experiment was reliable? Explain. (1 mark)

1 mark – yes or no answer followed by a correct explanation justifying the yes or no (did the experiment measure what it was supposed to measure, requires repeated trials with similar results)

7. List two ways you could make it more reliable? (2 marks)

1 mark – provides one valid way to make the investigation more reliable

2 marks – provides two valid ways to make the investigation more reliable

(repeated trials, combining other groups data to attain averages, comparing results to other groups, reliable candidates / scorers / equipment)

8. Name the title and authors of previous research on your topic? (4 mark)

1 mark – one author mentioned

2 marks – two or more authors mentioned

1 mark – one title mentioned

2 marks – two or more titles mentioned

9. Describe your results and use correct scientific terminology to explain why you think these results occurred.

(5 marks)

1 mark – makes reference to findings attained in investigation

1 mark – makes reference to evidence supporting findings

1 mark – explain why/how the results were attained

1 mark – makes reference to any/lack of outliers/flaws

1 mark – use of scientific terminology (at least 2 terms)

1 mark – reference to hypothesis

1 mark – explains general trend using numbers from experiment

(explain: 1 mark – cells need more O2, remove CO2

1 mark – increased requirement for blood, therefore increased HR)

Question 10 and 11 refer to the information in the table below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Student | Heart Rate (BPM) | | | | |
| 1 min of Exercise | 2 min of Exercise | 3 min of Exercise | 4 min of Exercise | 5 min of Exercise |
| 1 | 88 | 98 | 103 | 110 | 125 |
| 2 | 92 | 96 | 105 | 115 | 123 |
| 3 | 87 | 100 | 109 | 112 | 123 |
| 4 | 93 | 109 | 114 | 120 | 130 |
| 5 | 90 | 101 | 111 | 119 | 122 |
| 6 | 93 | 108 | 116 | 124 | 135 |
| 7 | 87 | 99 | 104 | 109 | 120 |
| 8 | 91 | 106 | 110 | 116 | 127 |
| 9 | 91 | 107 | 112 | 119 | 128 |
| 10 | 88 | 94 | 102 | 110 | 114 |
| Average | 90 | 101.8 | 108.6 | 115.4 | 124.7 |

10. Draw a graph on the paper provided (on the next page) showing the relationship between the average heart rate and exercise duration. (5 marks)

1 mark – Title including independent and dependent variable

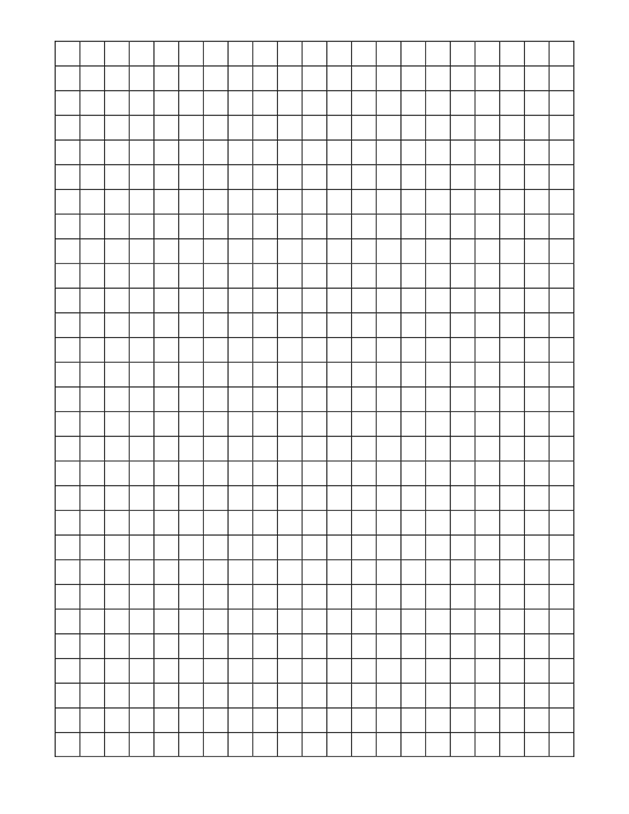
1 mark – X axis and Y axis labelled with units (independent variable)

1 mark – correct type of graph (line)

1 mark – data plotted correctly

1 mark – scale

(-1 mark if pencil / ruler not used)

11. What conclusion could you draw from the graph?

(1 mark)

1 mark – as exercise duration increases, average heart rate increases