**General Integrated Science UNIT 1**

**Task 3 – Factors affecting a body system investigation**

**Weighting – 12%**

**Name - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**The following investigation will have two parts:**

Part One - Design an investigation to see how changing a factor affects a person’s reflexes or rate of reaction. *This is a take home task.* (21 marks)

Part Two –Carrying out experiment and analysis of data from the experiments. (25 marks)

*This is carried out in class.*

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|  | **Marks Allocation** | **Your Total** |
| Experimental design | 21 |  |
| Conduction of Experiment | 4 |  |
| Processing of data | 8 |  |
| Discussion of results | 13 |  |
| **TOTAL** | **46** |  |

**Part One**

Design an investigation to show how changing the amount of exercise a person does can affect the person’s reflexes or rate of reaction.

You are to write up your investigation in normal scientific report format, therefore your report will include the following:

* An introduction covering the following:
* How does a reflex action work in a human.
* What factors affect a person’s reaction rates.
* How does exercise affect the human body.
* How does exercise affect a person’s reflexes or reaction times. *(5 marks)*
* A hypothesis. *(2 marks)*
* The Independent and Dependent variables– specified *(2 marks)*
* Controlled variables – all specified and explained. Also include how to minimise the effect of variables that are beyond your control. *(3 marks)*
* An equipment list. *(1 marks)*
* A step by step method of how to carry out your investigation which would include the following:
* Type of reflex or reaction test and how it is carried out
* Type and amount of exercise done.
* A risk analysis if needed.
* A description of how the data would be analysed and the type of graph that would be used to present your results. *(7 marks)*

*Some suggested examples:*

<https://faculty.washington.edu/chudler/java/redgreen.html>

<https://www.justpark.com/creative/reaction-time-test/>

<https://www.mathsisfun.com/games/reaction-time.html>

<http://freebrainagegames.com/pounce.html#>

<http://www.bbc.co.uk/blogs/theoneshow/consumer/2009/01/22/brain-training-how-fast-are-yo.html>

<http://www.freewebarcade.com/game/sheep-dash/>

**Method**

This is a group activity; all members of the group will carry out the following method then the results will be combined. *(4 marks)*

1. Open up the following website:

<https://www.psytoolkit.org/lessons/experiment_simple_choice_rts.html>

1. Have **one** practise go at the two reaction tests to understand what is expected during the test.
2. Carry out the Simple and Choice reaction tests and record your speed and accuracy.
3. Get yourself a partner. One of you is going to do the exercise; the other is going to stay resting (control).
4. Volunteer doing the exercise will carry out the following:

5 minutes of stepping exercise - Use two steps, one at a time, cycle of climbing and returning takes 2 seconds approximately – As soon as you have finished return and conduct the Reaction Tests again.

1. Record your results from the Reaction Tests.
2. Your resting partner also needs to conduct the test again after 5 minutes of resting.
3. All results will be recorded on a master table on the board.
4. In the space below draw a table to record the raw and processed results from the class experiment. *(3 marks)*

**Analysis of results**

1. On the graph paper supplied plot a graph showing:

* how reaction times changed before and after for both tests (these can be on the same graph. *(6 marks)*

**Discussion of results: (13 marks)**

Analyse your data. Describe any patterns, trends or relationships shown by the data and represented by the graph. Is your hypothesis supported by the data? *(3 Marks)*

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Using science concepts, explain any patterns, trends or relationships you can identify in your data. *(3 marks)*

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Were the results from this experiment reliable? Explain the reasons for your answer *(3 marks)*

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How could you improve the design of the investigation and state the reasons why the change would work? *(2 marks)*

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**Conclusion:**

What is your conclusion to the investigation? *(2 marks)*

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| **Description** | **Marks** |
| **Plan the investigation** | |
| Introduction –   * How does a reflex action work in a human. * What factors affect a person’s reaction rates. * How does exercise affect the human body. * How does exercise affect a person’s reflexes or reaction times. | 1  1  1  1 - 2 |
| Hypothesis – states relationship between independent and dependent variable | 1–2 |
| Variables   * independent * dependent * controlled – lists at least three to be kept the same with specifications | 1  1  3 |
| Procedures used to collect data   * equipment * step by step method * outlines method to change independent variable – what exercise and how keep the same * outlines method to measure dependent variable – what reflex test using and how carried out * outlines method to control variables * safety requirements * repeated trials included | 1  1 - 2  1 - 2  1  1  1 |
| **Total – Part A** | **/20** |

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| **Part B: Conducting** | |
| * safety procedures when exercising | 1 |
| * results for both reactions before and after recorded | 1 |
| * reflex test conducted immediately after exercise/5mins rest | 1 |
| * exercise done appropriately/resting and timing other person done correctly | 1 |
| **Total – Part B** | **/4** |
| **Part C: Processing and analysing results** |  |
| Appropriate table to record data, including headings, trials and averages | 1– 3 |
| **Graphing of Results** |  |
| * Averages used for each test | 1 |
| * Axis labelled correctly with units | 1 |
| * Scale correct | 1 |
| * Title including independent and dependent variables | 1 |
| * points plotted accurately | 1 |
| * bar graph | 1 |
| **Discussion of results** |  |
| * identifies patterns or trends in the data for simple reflex * identifies trend for complex reflex * states whether hypothesis supported by results and gives brief explanation | 1  1  1 |
| Explanation of results using science concepts   * identifies appropriate science concept/s * describes the science concept/s * explains how the science concept/s is/are applied in everyday life | 1  1  1 |
| Evaluation   * comments on reliability of results and gives a reason for comment * accounts for anomalous readings * suggests improvements in experimental design or method of data collection for accuracy and state why they would improve the experiment. | 1 - 2  1  1 - 2 |
| **Conclusion**   * states the relationship between the independent and dependent variable * states whether the hypothesis is supported | 1  1 |
| 1. **Total – Part C** | **/22** |
| 1. **Assessment total** | **/46** |