**Investigation – Temperature regulation mechanisms of the human body (25 marks)**

Biology – ATAR Year 12 Unit 4 task 7 **Assessment type:** Science inquiry

**Conditions**

Time allowed for completion of the task:

• investigation planning – one half class period

• conduction of investigation – one class period

• completion of the introduction, materials and method sections of the scientific report – at home

• completion of the results, analysis and evaluation of data sections of the scientific report – one period under test conditions

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You will be required to plan, conduct and evaluate an investigation based on the temperature regulation mechanisms of the human body. You will write up your investigation as a scientific report. ( see your Textbook- Experiment 8.1)

**Plan the investigation**

Things to consider when planning your investigation:

• research and provide background information on temperature regulation mechanisms

• devise a hypothesis and choose dependent and independent variables for your investigation

• identify variables to control

• decide upon the appropriate sample size, trials and data collection methods

• describe, in detail, the methodology you will use during your investigation

• decide upon the data recording method.

**Conduct the investigation**

• set up times and places for the measurements to be taken

• carry out data collection from test subjects

**Commence writing the scientific report (5 marks)**

• include an introduction to the investigation

• include the background research on temperature regulation mechanisms

• write the hypothesis for the investigation

• identify the dependent and independent variables

**Materials and method (4 marks)**

• include a list of materials used in the investigation

• include details on the method used to collect the data

• include design features of the investigation that ensured reliability and validity

**Complete the remainder of the scientific report under test conditions. You must only bring your Scientific Report (as above) and a Results table to the Test.**

**Results (6 marks)**

• show processing of raw data by identifying any outliers and working out averages

• plot appropriate graphs by hand to show results

**Analysis and evaluation (8 marks)**

• describe the trend and/or pattern in your data

• state how your data relates to your hypothesis

• use your knowledge and understanding to explain the trend and/or pattern of your results

• comment on the reliability and accuracy of the data collected

• list **two** limitations in the data collection strategy that may have affected the reliability of your data and comment on how they would have affected it

• list **two** improvements you could make to the data collection strategy to improve your investigation

**Conclusion (2 marks)**

• summarise your findings and comment on the reliability and validity of the outcome of the investigation

**Marking key for assessment task 7 — Unit 4**

**Commence writing the scientific report.**

• include an introduction to the investigation

• include the background research on temperature regulation mechanisms

• write the hypothesis for the investigation

• identify the dependent and independent variables

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Succinctly writes a general introduction that summarises the aim of the investigation | 1 |
| Provides background information on temperature control mechanisms and the function of the following in maintaining constant body temperature:  • vasoconstriction/vasodilation  • shivering  • piloerection  • sweating  • importance of maintaining constant body temperature, optimal for reactions | 1 |
| Writes a hypothesis relating dependent and independent variables and stating direction of effect | 1 |
| Correctly identifies the dependent and independent variables | 2 |
| **Total** | **5** |

**Materials and method**

• include a list of materials used in the investigation

• include details on the method used to collect the data

• include design features of the investigation that ensured reliability and validity

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Clearly lists materials with quantities | 1 |
| Explains the method in detail, including how the sampling and data collection will be determined | 1 |
| Uses an appropriate sample size and number of trials to increase reliability | 1 |
| States how the effects of uncontrolled variables and other factors were minimised during data collection in order to increase validity | 1 |
| **Total** | **4** |

**Results**

• show processing of raw data by identifying any outliers and working out averages

• plot appropriate graphs by hand to show results

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Records raw data in an appropriate format  • uses headings  • groups relevant data  • records repeat trials | 1 |
| Carries out simple processing of raw data  • calculates mean values  • uses appropriate format for recording data | 1 |
| Identifies outliers in the raw data | 1 |
| Plots a/an appropriate graph/s of the processed data using correct conventions  • uses appropriate title, stating independent and dependent variables  • correctly labels axes with names  • labels axes with units  • uses correct type of graph  • plotted graph correctly | 3 |
| **Total** | **6** |

**Analysis and evaluation**

• describe the trend and/or pattern in your data

• state how your data relates to your hypothesis

• use your knowledge and understanding to explain the trend and/or pattern of your results

• comment on the reliability and validity of the data collected

• list **two** limitations in the data collection strategy that may have affected the reliability of your data and comment on how they would have affected it

• list **two** improvements you could make to the data collection strategy to improve your investigation

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Describes the trends and patterns in the processed data | 1 |
|  |  |
| Makes a valid statement about the trends and relates it to hypothesis | 1 |
| Explains data using scientific knowledge and understanding and provides detail on the changes to the body during exercise for temperature control, including breathing rate, circulation and sweating | 1 |
| Comments on the reliability of the raw data collected, using correct terminology, such as repeat trials or greater number of test subjects | 1 |
| Comments on the validity of the raw data collected, using correct terminology, such as variables being controlled to eliminate sources of error | 1 |
|  | Mark |
| Lists two limitations in the data collection strategy that may have affected the accuracy or precision of the raw data collected – one mark for each limitation | 1–2 |
| Suggests at least two improvements to the data collection strategy – one mark for each improvement | 1–2 |
| Total | 8 |

**Conclusion**

|  |  |
| --- | --- |
| • summarise your findings and comment on the reliability and validity of the outcome of the investigation  **Description** | **Mark** |
| Summarises results of the investigation with the use of data | 1 |
| Comments on the validity of the outcome of the investigation by relating it back to the hypothesis | 1 |
| **Total** | **2** |