**Year 12 ATAR Human Biology Unit 3 2019**

**Assessment Task 4 – Scientific Investigation 1**

**Part A - The Brain & Temperature Laboratory Report**

**Name: \_\_\_\_\_\_\_\_ / 20**

**Part A: The effect of changing temperature on yeast activity**

Design and carry out an experiment to determine the effect of different temperature conditions on the activity of yeast.

Write a report on your experiment, describing what you did and what you found out. Use the report format described in “Writing a Lab Report” and the checklist provided to help you.

The following questions may help you in planning your experiment:

1. What is your hypothesis?

2. How will you know if yeast activity has changed?

3. How will you change the temperature?

4. How many different temperatures will you try?

5. How will you ensure the reliability of your results?

Consider the following questions in the discussion section of your laboratory report:

1. What effect does low temperature have on cells? Why might this be?

2. What effect does high temperature have on cells? Why might this be?

3. Why do multicellular organisms, like humans, have mechanisms to control their body temperature?

Writing a laboratory report

When writing a laboratory report you should include the following:

1. **Introduction:** This provides background information, defines key words, and discusses the need for, or relevance of the experiment you are carrying out. It may also pose questions to be answered by the experiment. You should refer to relevant research carried out by other people relating to the experiment.
2. **Hypothesis**: This describes the hypothesis to be tested. The hypothesis should be a testable statement, referring to a relationship between the independent and dependent variables.
3. **Materials or Equipment**: This is a list of equipment needed. A well-labelled diagram showing the setup of equipment to be used is usually included.
4. **Method**: This is a set of instructions; in point form, for carrying out the experiment. They should be sufficiently detailed that someone else could use them to carry out the same experiment. The instructions should include details of:
   * 1. What you are changing (independent variable), and how it is being changed
     2. What you are comparing your experimental set-up to (the control)
     3. What you are measuring (dependent variable), and how it is to be measured
     4. What things are being kept constant between the experimental and control groups (controlled variables)
     5. How you are increasing reliability of the experiment (sample size, replication, repetition, etc.)
5. **Results**: This shows the measurements and observations you have made. This should include tables and graphs of the data you collected where possible, as well as a written summary of the observations, and any patterns observed.
6. **Conclusion**: A statement as to whether the hypothesis has been supported or disproved (or neither).
7. **Discussion or Analysis**: This is where you discuss your conclusion(s) and the experiment as a whole. Your discussion should include any problems or errors in the experimental design, and suggest improvements or further experiments that could be carried out. You should be able to discuss the relevance or importance of your findings, especially in light of your introduction. This is where you answer any questions posed by the introduction (or teacher or lab manual).

# Checklist for writing laboratory reports

# Introduction:

|  |  |
| --- | --- |
| Does it state the purpose or relevance of the experiment? |  |
| Does it define key terms? |  |
| Does it provide relevant background information? |  |
| Does it make a prediction? |  |

**Hypothesis:**

|  |  |
| --- | --- |
| Does it identify the dependent variable? |  |
| Does it identify the independent variable? |  |
| Does it identify all the controlled variables? |  |
| Is it only one sentence long? |  |
| Does it contain only one idea? |  |
| Does it mention both independent and dependent variables? |  |
| Can it be measured? |  |
| Is it worded as a testable statement? |  |

**Equipment:**

|  |  |
| --- | --- |
| Is your equipment listed one under another? |  |
| Does it use numbers, sizes and units of measurement? |  |
| Does the diagram show how the equipment is arranged? |  |
| Is the diagram drawn in pencil? |  |
| Is the diagram labelled? |  |

**Method:**

|  |  |
| --- | --- |
| Is the method written in point form one under the other? |  |
| Does it tell how the experiment was conducted in correct order? |  |
| Is the method written in the third person? |  |
| Does it contain enough detail so that someone else can read your laboratory report and repeat the experiment exactly as you did it? |  |

**Results:**

|  |  |
| --- | --- |
| Does your table have a title? |  |
| Is the independent variable in the left-hand column of your table? |  |
| Have you selected the correct type of graph? |  |
| Have you placed the independent variable on the x-axis? |  |
| Have you placed the dependent variable on the y-axis? |  |
| Does your graph have a title? |  |
| Have you labelled your axes with the names of the variables? |  |
| Have stated the correct units of measurement on the axes? |  |
| Have you provided a key if needed? |  |
| Have you written a statement summarising your results? |  |
| Have you identified any patterns or trends in the data? |  |

**Conclusion:**

|  |  |
| --- | --- |
| Does the conclusion relate back the results back to the hypothesis? |  |
| Does it state whether the results supported or rejected the hypothesis? |  |
| Does it begin with the words “the results supported/did not support the hypothesis”? |  |
| Does it avoid using the word “prove”? |  |

**Discussion:**

|  |  |
| --- | --- |
| Does it discuss any difficulties or errors in the experimental procedure? |  |
| Does it state whether it was a fair test, and why it was/was not? |  |
| Does it make suggestions for improving the experimental procedure? |  |
| Does it identify anything that was unusual or unexpected? |  |
| Does it discuss the relevance of your findings, or answer the questions posed in the introduction? |  |

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**Assessment Task 4 – Scientific Investigation 1**

**Part B – Investigating the effects of changing temperature on human**

**Name: \_\_\_\_\_\_\_\_ / 20**

Yeasts, as unicellular organisms, lack complex mechanisms for controlling their temperature. Human, however, have a range of homeostatic mechanisms that allow them to keep their body temperature relatively stable.

A group of researches wishing to investigate the effects of long-term exposure to extremely cold conditions decided to look at people involved in Antarctic exploration. 80 scientists who regularly visit Antarctica volunteered to be part of the investigation.

1. The data obtained from one of their investigations, carried out before the scientists left for Antarctica, is shown below.

|  |  |
| --- | --- |
| Ambient temperature (°C) | Breathing rate after 1 hour (breaths per minute) |
| 5 | 24 |
| 15 | 17 |
| 18 | 18 |
| 22 | 20 |
| 25 | 20 |
| 35 | 30 |

a. Suggest the hypothesis they were testing [1]

b. Graph the data on the graph paper provided [3]

c. What conclusions could be made from this data? [1]

d. Name three other physiological changes they could have measured in this experiment. [3]

2. The scientists are interested in the long-term effects of extreme cold, particularly on metabolic rate. They plan to measure the cortisol levels of the Antarctic scientists before, during and after they return from Antarctica.

a. Name two other hormones they should also measure in order to look at changes in metabolic rate, and explain why they should be measured. [2]

b. Predict that they would expect to see happen to the levels of cortisol and the other two hormones during this study, and explain why you expect to see those changes. [3]

c. What other information should they collect from (or about) the scientists: [4]

i) Before they go to Antarctica

ii) While they are in Antarctica

iii) After they return from Antarctica

d. Describe two things about this study that increases its reliability. [1]

e. Describe two other things that the researchers should have done to increase the reliability of this study. [1]

f. Describe two things that should so to make sure that the study is carried out ethically. [1]