# Lab report 1 - marking key - Investigating effects of temperature change

# Total 40 marks

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

**Introduction:** 1

**Hypothesis**: 1

**Materials or Equipment**: 1

**Method**: instructions in point form 2

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**: tables and graphs/diagrams & a written summary of the observations 4

**Conclusion**: hypothesis has been supported or disproved (or neither). 1

**Discussion or Analysis**: problems/improvements/relevance – questions 5

* What effect does low temperature have on cells?
* Why might this be?
* What effect does high temperature have on cells?
* Why might this be?
* Why do multicellular organisms, like humans, have mechanisms to control their body temperature?

[20 marks]

**Part B: Investigating effects of changing temperature on humans 20 marks**

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

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

1. Suggest the hypothesis they were testing. [1 mark]

Breathing rate will increase/decrease as temperature decrease/increase

1. Graph the data. [3 marks]

Line graph

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

Breathing rate increases as temp increases, & also if temp is extremely low

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

Heart rate, blood pressure, sweating, shivering, skin colour, body temperature, skin temperature

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

Thyroxin – increases metabolic rate

Insulin/glucagon – affects glucose metabolism

Adrenaline/noradrenaline – stress response

Leptin/appetite/hunger hormones – need for more food

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

Increase in hormones associated with stress (cortisol/adrenaline/noradrenaline)

Increase in thyroxine – metabolism increases to make more heat

Decrease in insulin – increased need for sugar

Increase in hormones increasing appetite and glucose release (leptin/glucagon)

* 1. What other information should they collect from (or about) the scientists
     1. Before they go to Antarctica?
     2. While they are in Antarctica?
     3. After they come back from Antarctica? [4 marks]

Before – age, sex & health status including HR, BP, weight, fat/BMI & normal hormone levels, normal appetite/food levels

During – hormone levels, appetite/food levels, health status including HR, BP, weight, fat/BMI

After - hormone levels, appetite/food levels, health status including HR, BP, weight, fat/BMI

Should collect data for several weeks before they go & several weeks after they get back

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

80 scientists, testing before & during Antarctica, all in same conditions,

* 1. Describe two other things that they should do to increase the reliability of this study. [1 mark]

Repeat, larger sample size, do study over several years, replicate by collecting data from similar area (eg Alaska), make sure mix of age/health/sexes

* 1. Describe two things that they should do to make sure that the study is carried out ethically. [1 mark]

Ensure confidentiality, get consent, inform of any dangers, stop study if person is sick/damaged by cold