

Year 11 ATAR Human Biology

Task 1 – Carrot Osmosis

Investigation and Validation

Weighting: 10%

Lab Report

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Lab Report Title:

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Hypothesis:

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Variables:

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Diagram:

Results Table:

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Graph:

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Calendar

Description automatically generated

Analysis and Evaluation of Results:

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Marking Key

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| --- | --- |
| **Description** | **Marks** |
| **Introduction (7)**  Provides background information on cellular transport related to investigation.  Correctly states aim of experiment.  Correctly states hypothesis.  Identifies independent, dependent variables and controlled variables. | 1-2  1  1  1-3 |
| **Materials and Method (6)**  Outline how data was collected safely and ethically.  Lists all materials.  Describes in detail investigation method in a clear, logical manner.  Sequences the steps of method in a clear, logical manner. | 1  1  1-2  1-2 |
| **Processing of Data (9)**  Correct completion of table of results   * Appropriate title stating independent and dependent variables * Data recorded in appropriate format * Correct units of measurements * Calculation of mean values   Correct plotting and processing of data graphically   * Appropriate title stating independent and dependent variables * Correctly labelled axis * Axis labelled in correct units of measurement * Correct type of graph * Graph plotted correctly | 1-4  1-5 |
| **Analysis and Evaluation (16)**  Describes trends and patterns in data.  Refers to specific data when describing trends and patterns.  Relates trends in data to hypothesis  Explains data using scientific knowledge.  Comments on the reliability and accuracy of experiment.  States at least 2 limitations of experiment.  Suggests at least 2 improvements for experiment.  Summarise overall results. | 1-2  1-2  1-2  1-2  1-2  1-2  1-2  1-2 |
| **Total** | **/ 38** |



Year 11 ATAR Human Biology

Task 1 – Carrot Osmosis

Investigation and Validation

Weighting: 10%

Validation

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Investigation Report: Validation: Total Mark:

/ 38 / 39 / 77

**Please complete the following questions in full sentence answers using your knowledge from the Carrot Osmosis Investigation.**

1. The following question is in relation to the carrot osmosis report you have constructed and information which you have gathered.

a) Describe how saltwater affects osmosis. (2 marks)

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b) In hospitals saline solutions are typically used to help patients with dehydration, where the solutions range up to 0.9% of NaCl. Discuss why saline solutions are used compared to water saline? (2 marks)

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1. The membrane surrounding cells is described to be semipermeable.
2. State what the term **semipermeable** means in terms of transport.

(1 mark)

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1. State what type of bilayer the cell membrane is. (1 mark)

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1. Outline the **structure** of the hydrophobic and hydrophilic components of this bilayer. (2 marks)

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1. Describe the **function** of the hydrophobic and hydrophilic components of this bilayer. (2 marks)

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1. During the investigation, you would have observed the transport of water across the cell membrane of the carrot described as **osmosis**.
2. State whether or not this type of transport is **active** or **passive** and explain why in terms of concentration gradient. (2 marks)

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1. Describe an example where osmosis may occur in the digestive system. (2 marks)

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1. Outline the differences between a **hypertonic** and **hypotonic** cell, and identify which of the two the saltwater carrot adhered to. (3 marks)

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1. Whilst osmosis is a form of diffusion, it does not classify under the category of **active transport**.
2. Identify the 2 types of **vesicular transport**. (2 marks)

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1. Active transport requires the presence of energy, state the form of energy used in this transport. (1 mark)

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1. State an example where **pinocytosis** and **phagocytosis** may occur in the human body. (2 marks)

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1. **Carrier mediated** is one form of transport that may be classified as both active or passive.
   1. Outline what type of carrier mediated transport is **passive**.

(1 mark)

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* 1. Explain the role of **proteins** in the cell membrane of carrier mediated transport. (2 marks)

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* 1. Discuss what causes carriers to become **saturated.** (2 marks)

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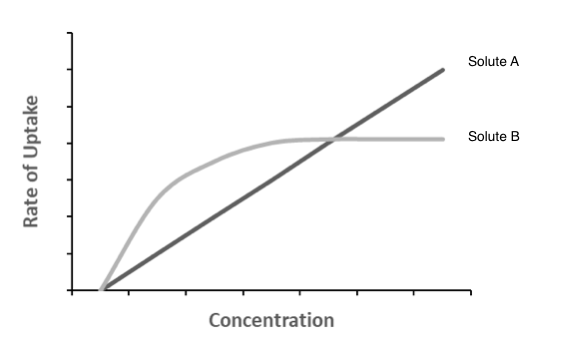
* 1. Transport of glucose is typically done via carrier mediated transport, explain why glucose cannot be transported via simple diffusion. (2 marks)

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1. The graph below shows the rate of uptake of two solutes via different forms of transport.



* 1. State which type of transport is represented by each solute and provide an example of two materials moved by each method.

(6 marks)

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* 1. Describe 4 potential chemical and/or physical differences of Solute A and Solute B in relation to their movement across the cell membrane. (4 marks)

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