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|  | **Year 11 ATAR Human Biology**  **Task 1 – The exchange of materials** |

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| **Name:** | **Teacher:** | **Date:** | **Score:**  /12 |

**Assessment type:** Science Inquiry - Practical

**Conditions**

Time for the task:

* **Part A: Practical activity (carried out in groups in prior lesson to Part B)**
* Part B: 50 minutes in class validation assessment

**Task weighting** – 5%

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**Part A:** Practical investigation

**Background information**

In order for a cell to function effectively it must have an adequate method of obtaining its needs from its surroundings and removing wastes produced from the cell. In this activity you will investigate the process of diffusion and osmosis.

**Purpose**: To observe how materials move into and out of the cell.

**Materials per group:**

* Safety glasses
* 1 beaker
* Cellulose tubing
* Capillary tube
* Rubber band, marker
* Starch suspension, pipette
* Iodine solution (iodine-potassium-iodide)
* Retort stand, Boss head and clamp

**Procedure:**

1. Cut a piece of cellulose tubing, approximately 10cm in length.
2. Hold the tubing under running water to separate the layers and form a tube.
3. Tie a knot in one end of the cellulose tubing.
4. Using a pipette, fill the cellulose bag three quarters full with starch suspension.
5. Insert the capillary tube into the cellulose bag and secure it using a rubber band.
6. Rinse the cellulose bag well with water to remove any solution from the outside.
7. Mark the height of the solution in the capillary tube with a marker.
8. Fill the beaker three quarters full with water.
9. Add iodine solution to the water until it is a pale yellow colour.
10. Position the filled cellulose bag into the iodine solution so that it is almost submerged.
11. Wait 30 minutes then begin to record your observations

**Answer the questions on the following page while you wait the 30 minutes.**

1. Draw a labelled diagram of your set-up. (2 marks)
2. Formulate a hypothesis for each of the following while you wait to record your observations. Remember to explain your predictions.
3. The movement of starch

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1. mark)
2. The movement of iodine

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1. mark)
2. The colour of the solution in the bag after 30 minutes

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1. mark)
2. The colour of the solution in the beaker after 30 minutes

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(1 mark)

Following the 30 minutes, record your observations in the table below and answer the questions that follow.

**Table 1: Cellulose tubing data**

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|  | **Beaker contents** | **Cellulose tubing contents** |
| **Pre-experiment contents** | Iodine solution | Starch solution |
| **Pre-experiment colour** |  |  |
| **Post-experiment colour** |  |  |

(2 marks)

Answer the following questions based on your observations and understanding of this activity.

1. Is there evidence of diffusion of the starch molecules? If so, in which direction?

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1. mark)
2. Is there evidence of the diffusion of iodine molecules? If so, in which direction?

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1. mark)
2. What conclusions can you make from your data collected in relation to the movement of molecules across the partially permeable membrane of the cellulose tubing, relating your findings to your earlier predictions?

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(2 marks)

**End of Part A**