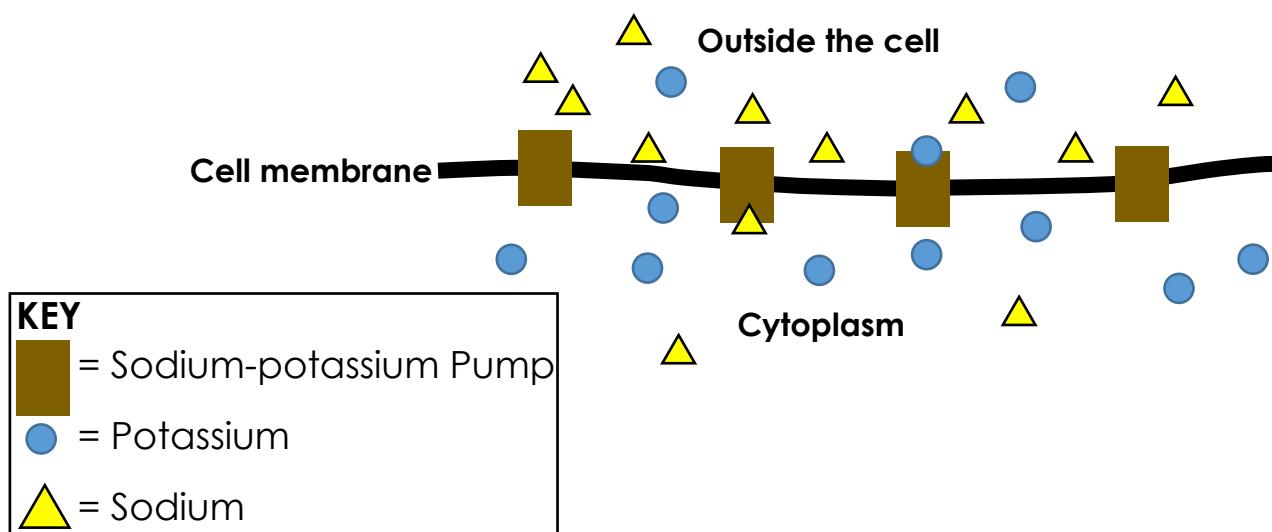


Cell Transport

The diagram shows a section of the cell membrane containing sodium-potassium pumps. Sodium-potassium pumps are specialised transport proteins found in cell membranes and are crucial to a number of processes in the body, including the transmission of nerve impulses, heart contractions and kidney functions. The pump allows the concentrations of sodium and potassium to remain relatively constant, with potassium ions moving into the cell and sodium ions moving out of the cell.

1. Does the sodium-potassium pump work by diffusion or active transport? Use information from the diagram to explain your answer.
2. Explain the possible consequences of this pump malfunctioning.





Name _____ Date _____



Science **Mastery**

B3.1.11 – Cell Transport Teacher Guidance

Purpose of this activity

This task presents an opportunity for pupils to

- write an extended response, demonstrating the depth of their understanding of the current topic.
- apply their knowledge in an unfamiliar context.

Pupils should be encouraged to think about the structure of their response. It may be beneficial for pupils to plan their answer in pairs or groups by drawing mind maps or flow charts. Pupils should also be mindful of spelling and grammar in their writing.

Scaffolding this Task

- Break up the answer into some simple steps on the board.
- Underline and define the words in the question which may lead to confusion; transport protein, transmission.
- Supply sentence starters or writing frames to help students structure their response.
- Model part of an answer on the board.
- Give students words that you would like them to include in their answer, such as concentration, concentration gradient, energy

Running this Activity

This activity can be run in a number of ways, including;

- Have students plan out the answer together in small groups. They can sketch out a plan for the answer in the form of a mind map or flow chart. They can then go away and write their own response individually or in pairs.
- As an independent formative assessment task or activity
- As a paired activity, where students take turns describing what is shown in the diagram to help them determine the process

Assessing this question

Credit can be awarded for any of the statements below (or words to this effect).

Part 1

- Concentration of sodium is higher outside the cell than inside the cytoplasm
- Concentration of potassium is higher inside the cytoplasm than outside the cell
- The ions are travelling against the concentration gradient
- This process would require energy from respiration
- Give partial credit for an annotated diagram that shows valid points.

Part 2

- Nerve impulses would be interrupted which would...
- affect sensory response and muscle movement
- Heart contractions would be interrupted which would...
- affect oxygen transport by red blood cells would, preventing oxygen delivery to cells and aerobic respiration so organisms would not be able to release energy
- Kidney function would be interrupted so...
- kidneys would not be able to filter blood and remove waste (urea), which would build up in the body and become toxic