**Stage 1 Biology**

**Skills and Applications Task**

**Topic 1: Cells and Microorganisms and Topic 4: Biodiversity and Ecosystem Dynamics**

**Purpose and Background Information of the Assessment Task:**

To write a report on the Biology you have learnt from your visit to a waste water treatment plant.

This task will enable you to discuss the biology of recycling of materials, the role of microbes in this process, and the uses of products formed from the treatment of sewage. There will also be scope to evaluate the processes used to treat the water and ensure no dangerous microbial contamination is present.

Key concepts of Science as a Human Endeavour are also addressed in this task by investigating the application and limitations of this waste water treatment and associated technologies.

**Task Description:**

In an individual report, in a format of your choice, you will respond to a series of questions to demonstrate your ability to analyse and evaluate information, and propose justified conclusions. The use of appropriate biological terminology will be assessed. Time allowed for this task is 2 weeks. The word count for this task is 1000 words, or equivalent in multimodal

Assessment Design Criteria: IAE 3, 4 and KA 1, 3, 4

**The Task:**

In a report prepared to inform the general public, you will provide information on the processes associated with waste water treatment and the use of the resulting products. You will need to ensure you explain key biological terms and processes. Diagrams or photographs may assist your explanation. A reference list and appropriate in-text referencing is required.

The aim of the report is not only to inform the public of waste water treatment processes but also to convince them that protecting the waterways by limiting waste input is essential for the preservation of this vital resource. The report should also highlight the benefits that science can provide to humans through the products produced from waste treatment, and that processes are put in place to minimise any potential risks. This should have a Science as a Human Endeavour focus related to the key concept of Application and Limitation.

***Questions to explore:***

1. Describe the biological processes used in the treatment of waste water.
2. Investigate the growth requirements for the different types of microbes in these processes.
3. Evaluate the effectiveness of the treatment processes.

*The next three questions should relate to the SHE key concept of Application and Limitation- and should explore the interaction between science and society.*

1. Explain how the products of the treatment process are used for the benefit of humans.
2. Explain why the techniques used to ensure these products are safe to be used by humans and not have consequences on human health and/or the environment.
3. Consider the situation when the process may fail (e.g. flood, microorganisms all die). Discuss the potential consequences if the treatment processes failed and contaminated materials were released?

**Performance Standards:**

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|  | Investigation, Analysis and Evaluation | Knowledge and Application |
| A | Critically deconstructs a problem and designs a logical and coherent biological investigation with detailed justification.  Obtains, records, and represents data, using appropriate conventions and formats accurately and highly effectively.  Systematically analyses and interprets data and evidence to formulate logical conclusions with detailed justification.  Critically and logically evaluates procedures and their effect on data. | Demonstrates deep and broad knowledge and understanding of a range of biological concepts.  Applies biological concepts highly effectively in new and familiar contexts.  Critically explores and understands in depth the interaction between science and society.  Communicates knowledge and understanding of biology coherently, with highly effective use of appropriate terms, conventions, and representations. |
| B | Logically deconstructs a problem and designs a well-considered and clear biological investigation with reasonable justification.  Obtains, records, and represents data, using appropriate conventions and formats mostly accurately and effectively.  Logically analyses and interprets data and evidence to formulate suitable conclusions with reasonable justification.  Logically evaluates procedures and their effect on data. | Demonstrates some depth and breadth of knowledge and understanding of a range of biological concepts.  Applies biological concepts mostly effectively in new and familiar contexts.  Logically explores and understands in some depth the interaction between science and society.  Communicates knowledge and understanding of biology mostly coherently, with effective use of appropriate terms, conventions, and representations. |
| C | Deconstructs a problem and designs a considered and generally clear biological investigation with some justification.  Obtains, records, and represents data, using generally appropriate conventions and formats, with some errors but generally accurately and effectively.  Undertakes some analysis and interpretation of data and evidence to formulate generally appropriate conclusions with some justification.  Evaluates procedures and some of their effect on data. | Demonstrates knowledge and understanding of a general range of biological concepts.  Applies biological concepts generally effectively in new or familiar contexts.  Explores and understands aspects of the interaction between science and society.  Communicates knowledge and understanding of biology generally effectively, using some appropriate terms, conventions, and representations. |
| D | Prepares a basic deconstruction of a problem and an outline of a biological investigation.  Obtains, records, and represents data, using conventions and formats inconsistently, with occasional accuracy and effectiveness.  Describes data and undertakes some basic interpretation to formulate a basic conclusion.  Attempts to evaluate procedures or suggest an effect on data. | Demonstrates some basic knowledge and partial understanding of biological concepts.  Applies some biological concepts in familiar contexts.  Partially explores and recognises aspects of the interaction between science and society.  Communicates basic biological information, using some appropriate terms, conventions, and/or representations. |
| E | Attempts a simple deconstruction of a problem and a procedure for a biological investigation.  Attempts to record and represent some data, with limited accuracy or effectiveness.  Attempts to describe results and/or interpret data to formulate a basic conclusion.  Acknowledges that procedures affect data. | Demonstrates limited recognition and awareness of biological concepts.  Attempts to apply biological concepts in familiar contexts.  Attempts to explore and identify an aspect of the interaction between science and society.  Attempts to communicate information about biology. |