**Stage 1 Biology**

**Topic 2: Infectious Disease**

Practical Investigation Task: Deconstruct a problem and
design a method for which the outcome is unknown.

Introduction and Purpose of this task:

Consider the question

“Does hand soap actually reduce the spread of bacteria?”

It is common to use hand soap when washing hands after going to the bathroom, preparing food or gardening. It has long been considered the best way to prevent bacteria spreading, but is this true?

There are many types of hand soaps available, some advertising that they are antibacterial or kill 99% of bacteria and others that are more concerned with how soft it will make your skin.

The purpose of this task is to

* deconstruct the problem by considering the factors that would indicate that hand soaps could prevent the spread of bacteria and how it could be investigated.
* design a detailed method to the test a hypothesis you have constructed based on the problem.
* complete a practical to analyse data and evaluate the method used, and make justified conclusions considering the limitations of the experiment.

Part A: Deconstruct and Design

Individually, you research the question and then do a deconstruction and design which includes the following:

* aim and hypothesis
* variables, factors that must be controlled, cannot be controlled
* safety and other risks,
* ethical considerations if applicable
* detailed method
* appropriate results table for the data to be collected
* suggest what the results would be if the hypothesis was supported
* any limitations of the experiment or the conclusions that could be drawn, with justification
* references

Annotate your design to explain why you have made decisions about controlled variables, quantities, measurements etc.

Part B: Conduct an experiment

Collaboratively, you will work in small groups to perform an experiment using one of the methods designed by yourself or a group member, or provided by your teacher.

You will work together safely and collaboratively to collect data.

Part C: Complete a report on the investigation

Individually, you will complete a report with the following:

* An introduction
* a hypothesis and variables
* materials used in Part B
* method (that was conducted in Part B)
* results (table and graph)
* discussion (analysis and evaluation)
* conclusion (justified and any limitations)

The evidence of the deconstruction and design component must be attached to the practical report.

Assessment conditions for this task:

Part A: Individual, supervised task. 4 lessons will be provided to complete the deconstruction and design of the investigation. Internet and other sources of information may be used. To be submitted on a maximum of 4 single sided A4 sheets.

Part B: Collaborative completion of the experiment to collect data.

Part C: Individual report with the results, discussion and conclusion. Maximum word count for Part C is 1000 words. Only the following sections are included in the word count: hypothesis and variables, discussion (analysis and evaluation), and conclusion (justified and any limitations)

Assessment Design Criteria

Investigation, Analysis and Evaluation: 1, 2, 3, 4

Knowledge and Application: 4

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|  | Investigation, Analysis and Evaluation | Knowledge and Application |
| A | Critically deconstructs a problem and designs a logical, coherent, and detailed biological investigation.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.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.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 deconstruction and 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. |