***Background***:

In Biology this term we have been exploring cellular energy. If oxygen is not available organisms will obtain energy through an anaerobic process known as fermentation.

Yeast is a microorganism that conducts alcohol fermentation to obtain energy from glucose and consequently produces carbon dioxide and alcohol.

C6H12O6 🡪 2C2H5OH + 2CO2

***Objective:*** In teams of 2 or 3 you will investigate the affect of different amounts of yeast on the rate of fermentation.

You will be required to collect and interpret data to make conclusions.

You will need to include appropriate images, graphs and tables to support your conclusions.

***Hypothesis:*** If the amount of yeast is increased then\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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***Apparatus:***

* Yeast - 6 x Retort stand with clamp
* 6% Glucose solution - 6 x Test tube with stopper
* 6 x 200mL Beakers - Measuring Scales
* 6 x 50mL measuring cylinders - Spatula
* Pipette - Ceramic bowl
* Thermometer - 6x 10mL measuring cylinders

***Method:*** See p.53 of your Stage 2 Biology Practical Manual (Crierie and Greig, 2010).

***Task:*** Display the findings and conclusions from the experiment.

This will include:

HYPOTHESIS:

* Include your hypothesis for this experiment

RESULTS:

* Graphs and tables of the data
* Brief description of the results

DISCUSSION:

* A concise discussion of why the results occurred using biological terms and definitions
* Images, graphs and tables that support your conclusions
* Discussion of errors and suggestions on how these can be improved

PEER ASSESSMENT:

* An assessment sheet for your group members to provide evidence of safe and accurate use of apparatus.

|  | Investigation | Analysis and Evaluation | Application | Knowledge and Understanding |
| --- | --- | --- | --- | --- |
| A | Manipulates apparatus and technological tools carefully and highly effectively to implement well-organised, safe, and ethical investigation procedures.  Obtains, records, and displays findings of investigations, using appropriate conventions and formats accurately and highly effectively. | Critically and systematically analyses data and their connections with concepts, to formulate logical and perceptive conclusions and make relevant predictions.  Critically and logically evaluates procedures and suggests a range of appropriate improvements. | Applies biological concepts and evidence from investigations to suggest solutions to complex problems in new and familiar contexts.  Uses appropriate biological terms, conventions, formulae, and equations highly effectively.  Demonstrates initiative in applying constructive and focused individual and collaborative work skills. | Consistently demonstrates a deep and broad knowledge and understanding of a range of biological concepts.  Uses a variety of formats to communicate knowledge and understanding of biology coherently and highly effectively. |
| B | Manipulates apparatus and technological tools carefully and mostly effectively to implement organised, safe, and ethical investigation procedures.  Obtains, records, and displays findings of investigations, using appropriate conventions and formats mostly accurately and effectively. | Clearly and logically analyses data and their connections with concepts, to formulate consistent conclusions and make mostly relevant predictions.  Logically evaluates procedures and suggests some appropriate improvements. | Applies biological concepts and evidence from investigations to suggest solutions to problems in new and familiar contexts.  Uses appropriate biological terms, conventions, formulae, and equations effectively.  Applies mostly constructive and focused individual and collaborative work skills. | Demonstrates some depth and breadth of knowledge and understanding of a range of biological concepts.  Uses a variety of formats to communicate knowledge and understanding of biology coherently and effectively. |
| C | Manipulates apparatus and technological tools generally carefully and effectively to implement safe and ethical investigation procedures.  Obtains, records, and displays findings of investigations, using generally appropriate conventions and formats with some errors but generally accurately and effectively. | Analyses data and their connections with concepts, to formulate generally appropriate conclusions and make simple predictions, with some relevance.  Evaluates some procedures in biology and suggests some improvements that are generally appropriate. | Applies biological concepts and evidence from investigations to suggest some solutions to basic problems in new or familiar contexts.  Uses generally appropriate biological terms, conventions, formulae, and equations, with some general effectiveness.  Applies generally constructive individual and collaborative work skills. | Demonstrates knowledge and understanding of a general range of biological concepts.  Applies different formats to communicate knowledge and understanding of biology, with some general effectiveness. |
| D | Uses apparatus and technological tools with inconsistent care and effectiveness and attempts to implement safe and ethical investigation procedures.  Obtains, records, and displays findings of investigations, using conventions and formats inconsistently, with occasional accuracy and effectiveness. | Describes basic connections between some data and concepts, and attempts to formulate a conclusion and make a simple prediction that may be relevant.  For some procedures, identifies improvements that may be made. | Applies some evidence to describe some basic problems and identify one or more simple solutions, in familiar contexts.  Attempts to use some biological terms, conventions, formulae, and equations that may be appropriate.  Attempts individual work inconsistently, and contributes superficially to aspects of collaborative work. | Demonstrates some basic knowledge and partial understanding of biological concepts.  Communicates basic information to others, using one or more formats. |
| E | Attempts to use apparatus and technological tools with limited effectiveness or attention to safe or ethical investigation procedures.  Attempts to record and display some descriptive information about an investigation, with limited accuracy or effectiveness. | Attempts to connect data with concepts, formulate a conclusion, and make a prediction.  Acknowledges the need for improvements in one or more procedures. | Identifies a basic problem and attempts to identify a solution in a familiar context.  Uses some biological terms or formulae.  Shows emerging skills in individual and collaborative work. | Demonstrates some limited recognition and awareness of biological concepts.  Attempts to communicate information about biology. |