Year 9 Science  
Changes to the human body during and after exercise

Name_________________________________________  Class set____________

PURPOSE: To design an experiment to investigate how the body changes during and/or after exercise.

ACARA ACHIEVEMENT STANDARD:
Students analyse how biological systems function and respond to external changes with reference to interdependencies, energy transfers and flows of matter. Students design questions that can be investigated. They design methods that include the control and accurate measurement of variables and systematic collection of data and describe how they considered ethics and safety. They analyse trends in data, identify relationships between variables and reveal inconsistencies in results. They analyse their methods and the quality of their data, and explain specific actions to improve the quality of their evidence. They evaluate others’ methods and explanations from a scientific perspective and use appropriate language and representations when communicating their findings and ideas to specific audiences.

Part 1
Formulate **question** and **hypothesis** that can be investigated  
Scientifically (p3,5)  

**Plan**, select and use appropriate investigation types (p3-5, 17-20)  

**Assess risk** associated with these methods (p9-12)  

Part 2
Select and use appropriate equipment to **collect and record data** systematically and accurately (p25-27)  

Part 3
**Analyse patterns** and trends in data, including **describing relationships** between variables and **identifying inconsistencies** (p28)  
Describe, explain and apply **science knowledge**.

**Identify sources of uncertainty** (p30-31)  

Describe specific ways to **improve the quality of the data** (p31)  

Critically analyse the **validity** of information  

Draw a **conclusion** that is consistent with evidence (p31)  

**Overall**  
Communicate scientific ideas and information using appropriate scientific language, conventions and representations  

OVERALL GRADE
PART 1: Pre-Investigation Design Planning

Your body reacts and changes during and/or after exercise. What changes are actually occurring? Can you measure them? Can you explain them?

Your task is to work in a cooperative group to plan and carry out an investigation into how the human body reacts and recovers to stress caused by exercise.

What is the independent variable in this investigation?
____________________________________________________

How will the independent variable be changed in the experiment?
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What is the dependent variable?
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How will the dependent variable be measured?
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What variables are to be controlled to make this a fair test?
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Propose the question that will be investigated.
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Write a hypothesis for the investigation.
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Create a procedure for completing the investigation.

Describe any possible safety risks that may be encountered during the investigation, and suggest any precautions that will be taken to minimise these risks.

<table>
<thead>
<tr>
<th>Possible risk</th>
<th>Safety precaution</th>
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Plan checked by teacher (*signed*) ____________________________________________________________________________
PART 2: Investigation

Collect and record the data required to complete the investigation. Draw a table of results below:

Title of Table:

___________________________________________________________________________

Graph:
Place time on the x-axis and dependant variable on the y-axis

Title of Graph:

___________________________________________________________________________
PART 3: Data analysis and evaluation

1. With reference to specific data, are there any patterns or trends in the data? What, if any, is the relationship between the variables investigated? Are there any inconsistencies?

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2. What science ideas help explain the patterns, trends or relationships in the results?

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3. Mistakes can be avoided with care, but errors are unavoidable. What are the possible sources of error? If possible, explain the effect of these errors on the results. As extension, classify these errors as random or systematic.

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4. Suggest specific ways that the design of the experiment could be improved to reduce the effect of possible errors. As extension, do each of these improvements make the results more accurate or precise?

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5. The validity of an investigation is:

*The extent to which a test measures what was intended; the extent to which data and conclusions produced from tests and other processes are accurate.*

Comment on the validity of the data.

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6. Conclusion

*(provide a carefully considered response to the research question based on the results, restate the main results, state whether or not they support the hypothesis).*

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