



## Aspley State High School Science Department

**Subject:** Year 12 Biological Science **Date Due:** Week beginning 2<sup>th</sup> of June 2008  
**Task 7:** Extended Experimental Investigation  
**Topic:** Responding to the Environment **Time:** 6 weeks  
**Term:** 2 2008  
**Key Concepts:** 1,2,5  
**Name:** \_\_\_\_\_ **Class:** \_\_\_\_\_ **Teacher:** \_\_\_\_\_

### Result Summary

Part	Component	A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E+	E	E-
A	Understanding															
B	Investigating															

All organisms must be able to monitor their environment. The ability to detect chemical or physical changes in their internal and external environment is vital to the organism's ability to survive. A *stimulus* is something in the environment which causes or triggers certain behavior or a *response*. Stimuli may include light, temperature, colour, detection of food, smell, touch, sound, hormones etc. The response may be growth, direction of growth, movement, bonding, etc. The organism must be able to detect stimulus and respond to changes in their environment to ensure survival.

### Task

Your task is to design and carry out an investigation which involves an organism's response to a particular stimulus in the environment. You may choose animals or plants as your organism though particular care must be taken that your investigation falls within the animal ethics guidelines.

Your investigation requires that you:

1. Formulate and justify a suitable research question (This leads to a hypothesis. In the investigation you will find evidence to support or not support the hypothesis)
2. Record the processes of the investigation in a scientific journal.
3. Plan and design an investigation.
4. Draw conclusions from your data with regard to the posed research question.

TASK No	Task	Due Date	Signature
Task One	Scientific Idea , Hypothesis	Thursday 24 <sup>th</sup> April	
Task Two	Experimental design, variables	Fri 9 <sup>th</sup> May	
Task Three	Draft of Experiment	Wed 28 <sup>th</sup> May	
Task Four	Assignment and Scientific Journal due	Week of 2 <sup>nd</sup> June	

## **Extended Experimental Task – Scientific Journal**

Your scientific journal **must be presented in an A4** exercise book.

1. **Page One – Title Page** - has details of your name, your class and your teacher
2. **Page Two – Criteria Sheet must be glued in**
3. **Page Three – Task Sheet must be glued in.**

The following sections must be completed in your journal and submitted by the due dates:

### **PART ONE: Research Questions and Hypothesis 24<sup>th</sup> April**

1. Determine the possible research questions that relate to this topic
2. Select ONE question that you would like to investigate in more detail
3. Briefly explain in one paragraph why you have chosen this research question to investigate.
4. Formulate a testable hypothesis from your chosen research question.

### **PART TWO: Designing the Experiment 9<sup>th</sup> May**

1. Identify the variables must be used to test your hypothesis
  - Independent
  - Dependent – both qualitative and quantitative
  - Experimental Variables – list some of things to consider making this an unbiased and fair test.
  - Controlled variable – Is there a controlled variable for this experiment?
2. How will your experiment be set up? Draw a detailed, labeled diagram of how your experiment will be set up. Do you need to consider cost\$\$\$\$ or time?
3. Safety/Ethical Issues – Discuss any safety issues or ethical issues that may arise in the experiment and how you will prevent these from occurring.
4. Write the method of your experiment.

### **PART THREE: Conducting the Experiment 28<sup>th</sup> May**

1. Determine how the data you collect from this experiment will be presented. Draw up data tables in your journal. Remember you must have qualitative and quantitative results.
2. Conduct your experiment and record your results.
3. Make a list of possible errors that occurred while the experiment is being conducted
4. Make an honest judgment of how reliable you think your results are.
5. Reflect on how your experimental design could be improved, or any other changes that could be made if you were to do it all over again.

### **PART FOUR: Extended Experimental Investigation 2<sup>th</sup> June**

Will be in the following format (It **MUST** have headings)

- Title
- Abstract: A summary of what you found in your report (Approx 100 words)
- Introduction: Outlining any background information, or research needed for your report.
- Aim
- Hypothesis
- Materials
- Method
- Results - Data Tables and graphs
- Discussion
- Conclusion
- Bibliography(refer to the School's Home Page on referencing and bibliographies)
- Appendix (Photographic evidence)

# Notes for your EEI Presentation

## Ownership of Work

It is the responsibility of every student to ensure the work is your own work. In biology you will often be doing experiments in groups and sharing results however the analysis must be completely your own. You must not copy another student's work and submit this as your own.

## Plagiarism

Plagiarism is copying directly (word for word) from a reference source like a textbook, encyclopedia or from a website. Plagiarism is not permitted. Instead you are asked to re-arrange the information and put it into your own words. You must still acknowledge the source of your information by referencing.

The **Bibliography** contains an alphabetical list of all the resources you actually used in the assignment. The correct way to reference a text or other source of information in your bibliography is given below.

### Examples

Book	Brown, J (1999) <i>Science and Society</i> , Sydney: McGraw- Hill
Journal Article	Sparks, M (2001) Science Pracs" QST, University of Queensland Press
Encyclopaedia	"Archeology" (1998) <i>The World Book Encyclopaedia</i> pp556-557.
CD Rom	<i>Insects</i> (cd rom) (1997) Canberra: CSIRO
Internet	<i>Tools of Exploration</i> [On-line] <a href="http://www.nasa.edu/ceps/">http://www.nasa.edu/ceps/</a> (1998)

**Referencing:** Any resource listed in the bibliography should be cross-referenced by footnoting. Please use following footnoting method for referencing. Use " quotation marks " for direct quotes.

"The pH of a solution is the negative logarithm of the hydrogen-ion concentration."<sup>1</sup>

(And at the bottom of the page:)

<sup>1</sup>Wilbraham, A.C., Staley, D.D. and Matta, M.S. 1997, *Chemistry*, Addison-Wesley Publishing Company, New York.

### Student Ownership Statement.

#### I declare that:

This assignment is my own work and I have not copied other student's work or directly from textbooks or other sources. I have not gained unfair assistance from other students, parents or guardians.

STUDENT SIGNATURE \_\_\_\_\_ DATE SUBMITTED: \_\_\_\_\_

Carefully cut along the dotted line when you are ready to hand in your assignment.

### Assignment Receipt

#### Year 12 Assessment Task 7. Extended Experimental Investigation Responding to the Environment

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Received: \_\_\_\_\_  
(Teacher)

Criteria	A	B	C
<b>Understanding Biology</b>	<b>The student is able to acquire, construct, and communicate knowledge and understanding of concepts and theories of Biology</b>		
1. Describe biological ideas as they pertain to this investigation (Introduction Information)	Makes <b>links</b> between <b>related</b> ideas and <b>identifies</b> organism response to the environment to <b>thoroughly</b> reveal all meaningful interrelationships; <b>explains</b> all background information for inclusion in the introduction.	<b>Thoroughly explains</b> most ideas relating to organism response to the environment and <b>describes</b> interrelationships related to background information for inclusion in the introduction.	<b>Describes</b> ideas relating to organism response to the environment and <b>describes</b> interrelationships and some background information for inclusion in the introduction.
3. Apply and link ideas concepts and theories to explain phenomena in a range of situations (Discussion Information)	<b>Applying</b> knowledge and understanding about organism response to the environment to <b>link</b> the interpretation of the results to the theory, to demonstrate an <b>excellent</b> understanding of the concepts in the discussion.	<b>Applying</b> knowledge and understanding about organism response to the environment to <b>link</b> the interpretation of the results to the theory, demonstrates a <b>good</b> understanding of the concepts in the discussion.	<b>Applies</b> knowledge and understanding about organism response to the environment to discuss the results in relation to the theory, demonstrates a <b>sound</b> understanding of the concepts (In discussion)

Criteria	A	B	C
<b>Investigating Biology</b>	<b>The student is able to collect biological data, make choices, analyse data, make decisions and solve problems to demonstrate p</b>		
1. Identify and formulate questions and hypothesis for investigations. (Researchable question, aim and hypothesis)	<b>Formulates a justifiable</b> research question about organisms' responses to the environment. Aim is <b>clearly described</b> . <b>Develops</b> a well worded testable hypotheses <b>showing</b> the expected <b>relationship</b> between two variables.	<b>Formulates a</b> researchable question about organisms' responses to the environment. Aim is <b>clear</b> . Hypothesis is <b>clear and testable</b> proposed <b>showing</b> the expected <b>relationship</b> between two variables.	Identifies a <b>researchable</b> question about organisms' responses to the environment. Aim is <b>clear</b> . The hypothesis is <b>testable</b> but the wording is <b>unclear</b> .
2. Design, manage and carry out experimental investigation. (Method, Scientific journal)	<b>Designs, modifies and implements</b> investigation to test hypothesis. <b>Identifies</b> all variables to test hypothesis. <b>Identifies and addresses</b> safety/ethical issues. <b>Demonstrates</b> planning, timelines, drafts, responds to feedback on Sci Journal. <b>Presents</b> journal and EEI and notes on time. References are <b>appropriately acknowledged</b> . Criteria sheet attached.	<b>Selects, modifies and implements</b> an appropriate procedure specific to the research question. <b>Identifies</b> several experimental variables that can be used to test the hypothesis. <b>Identifies and addresses</b> most safety /ethical issues. <b>Demonstrates</b> planning, drafts, research, <b>presents</b> Sci journal and notes on time. References are <b>appropriately acknowledged</b> . Criteria sheet attached	<b>Selects and implements</b> an appropriate procedure specific to the research question but may lack clarity. <b>Identifies</b> several experimental variables that can be used to test the hypothesis, but has <b>omitted</b> some important variables.. <b>Identifies</b> and addresses some safety /ethical issues. <b>appropriately acknowledged</b> <b>Presents</b> experiment and Sci Journal on time. References are, criteria sheet attached.
3. Develop skills and processes to collect, organise, interpret and present primary data ( results, bibliography)	<b>Collects and organises</b> data to <b>identify</b> trends and <b>interrelationships</b> . The <b>manipulation</b> (eg averages) and <b>presentation</b> of data (graphs and tables) are <b>complete and clearly</b> provided with headings, labelled axis and units. <b>Thorough descriptions</b> , including table headings accompany the results.	<b>Collects and organises</b> data to <b>identify</b> trends. The <b>manipulation</b> (eg averages) and <b>presentation</b> and of data (graphs and tables) are <b>mostly</b> provided with headings, labelled axis and units. Descriptions, including table headings accompany the results.	<b>Collects and organises data</b> . The data (graphs and tables) are <b>generally provided</b> with headings, labelled axis and units.
4. Analyse data gathered from investigations. (Discussion)	<b>Interprets</b> and <b>critically</b> analyses the results and <b>links</b> this to theoretical concepts, to <b>draw conclusions</b> relating to the research question and background research (introduction). <b>Clear</b> evidence of relevant data interpretation is provided using figures gathered from the investigation to <b>identify patterns or trends</b> . Has honestly assessed the reliability of their results, giving an <b>explanation</b> of the assessment. Possible errors or weaknesses in the design are <b>identified</b> and discussed. Suggestions for further research are provided.	<b>Interprets</b> the results and <b>draws conclusions</b> relating to the research question and background research (introduction). <b>Clear</b> evidence of relevant data interpretation is provided to <b>illustrate patterns or trends</b> . Has assessed the reliability of their results, giving some <b>explanation</b> for this assessment. Possible errors or weaknesses in the design are <b>identified</b> and suggests some improvements.	<b>Discuss</b> the results and <b>draws conclusions</b> that may relate to the research question and background research (introduction). Evidence of relevant data interpretation is provided to <b>illustrate patterns or trends</b> . Has reflected on the reliability of their assessment but <b>has not</b> given enough <b>explanation</b> for their assessment. Possible <b>errors are identified</b> , and suggest a few improvements.
5. Make judgements and draw conclusions pertaining to the validity of an investigation. (Conclusion)	The discussion <b>relates</b> to the hypothesis and <b>Evaluates</b> the design of the experiment and <b>reflects</b> on the adequacy of data collection and proposed refinements	<b>Evaluates</b> the designs of the experiment and the adequacy of the data collected	<b>Discussing</b> results and draws conclusions