



Bringing Schools and
Scientists Together

Biology 3.2 Internal Assessment Resource

The Folate Debate

Supports internal assessment for:

Achievement Standard 90714 v2

Research a contemporary biological issue

Credits: 3

Disclaimer: This assessment resource has been prepared LENScience teachers for use by schools to assess AS 90714 V2. All effort has been made to ensure the requirements of the standard have been met, however, this task has not been moderated.

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Teacher Guidelines:

The following guidelines are supplied to enable teachers to carry out valid and consistent assessment using this internal assessment resource. These teacher guidelines do not need to be submitted for moderation.

Context/setting:

This activity is based on a contemporary biological issue, its' implications and people's differing opinions about it. Students carry out research and then write a report. The students collect a range of material covering the biological knowledge, implications and different opinions relating to the issue – the mandatory fortification of bread with folate. Students could collect primary and secondary data, information and opinions. Material from the “Nutrigenomics - Food to match your genes” workshop may also be used.

(<http://lens.auckland.ac.nz/index.php/Nutrigenomics: Food to Match your Genes>)

Students work through the researched material and process the information to identify aspects that will be suitable for use in the report. Their notes and research material are organised and handed in as part of the authenticity process. The researched material could also be used to help determine if a student has **used** the research information to write the report for Achievement and **integrated** information from different sources for Merit and Excellence. Material that is integrated has come from different sources (often within a paragraph), has been rewritten in the student's own words and paragraphs flow in a logical manner rather than jumping from one topic to another. All material used should be referenced to show the sources of information with details given in a reference list. Students will need to evaluate their sources for bias and/or validity.

Conditions:

This assessment task must be carried out under conditions that meet both the school Assessment policy and NZQA Assessment Guidelines. These conditions should be specified in the appropriate place provided on the Student Instructions sheet. Sufficient time will need to be given to ensure students have opportunities to access a wide range of appropriate resources, process and interpret the information gained and prepare their final report.

Resource Requirements:

Students will require access to a range of sources of information on this issue.
Access to computers may be required.

Student Resources:

LENScience Nutrigenomics – Food to Match Your Genes

http://lens.auckland.ac.nz/index.php/LENScience_Special_Events - Students

Teacher Resources:

LENScience Teacher Professional Development Seminar Nutrigenomics: A Context for Teaching Year 12-13 Biology. <http://lens.auckland.ac.nz/index.php/NUTRIGENOMICS>

Other sites to support teachers and students to meet the criteria in the standard:

Find a range of relevant resources.

Epic Data base www.tki.org.nz

Integrate and reference resource material into their own words.

What is Plagiarism? <http://www.cite.auckland.ac.nz/index.php?p=plagiarism>

Learnt to recognise plagiarism tutorial <http://www.cte.usf.edu/plagiarism/plag.html>

Selecting What is Relevant / Trash or Treasure

<http://esolonline.tki.org.nz/content/download/5422/31950/file/relevance.doc>

Dot-Jot Note making template http://www.tki.org.nz/r/ict/ictpd/downloads/dotjot_templates.pdf

Evaluate resources

Evaluating websites: http://www.waikato.ac.nz/library/learning/s_evalsites.shtml

Critically Analyzing Information Sources

<http://www.library.cornell.edu/olinuris/ref/research/skill26.htm>

Referencing

It is good practice for students to record their sources of information so they are accessible by others, however, the need for referencing does not preclude achievement at any level.

Students should, however, still be encouraged to reference any diagrams, graphs, quotes (with quotation marks) and the processed/ integrated information in the body of their report in any format that is appropriate. For example, by referring to named sources/ individuals with dates in brackets or footnotes. This also helps to identify how well the information researched is integrated and evaluated. Integration at Merit and Excellence grades means that the student has used information from at least two different sources in either the same paragraph or a logical sequence of paragraphs.

Auckland University provides an online tool that produces references in the correct format e.g.

APA <http://www.cite.auckland.ac.nz/index.php?p=quickcite>

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Student Instructions Sheet

Introduction

Mandatory bread fortification with folate

Thursday, 16 July 2009, 10:57 am

Press Release: Paediatric Society of NZ

Mandatory bread fortification with folate

The Paediatric Society of New Zealand and the Royal Australasian College of Physicians, New Zealand Paediatric & Child Health Division strongly support the mandatory fortification of bread with folate. Folate is essential for human health and reproduction and the modern New Zealand diet does

New Zealand and Australia have a jointly agreed set of standards covering food safety. Under these standards both countries agreed to start fortifying bread with folate in 2009. Australia introduced folate fortified flour in September 2009, but the New Zealand government has deferred this until 2012.

In your research you will be looking at the biology of why fortifying bread with folate is considered necessary, the implications of fortifying bread with folate and the range of differing opinions on this issue.

Conditions

<<insert information about conditions such as - Task 1 time allowed for research. For example 1 week of class time and three weeks of homework time. Task 2 Individual write up using researched material. One week of class time starting on _____.>>

Task 1 – Preparation for research

Your research is going to be about the **mandatory fortification of bread with folate**. In your research you should be collecting information to help you form your own opinion on the answer to this question:

Does the benefit of folic acid fortification in preventing neural tube defects in a small number of babies, outweigh the possible risks of exposing everyone in the population to increased levels of folic acid?

Brainstorm:

What do you already know about this topic?

What do you want know i.e. what questions do you have about this topic?

Where do you think you could find the answers?

Do some initial reading / research to refine this topic down to a series of questions to focus your research.

Task 2 – Research

1. Use a wide range of sources (e.g. books, newspaper/journal articles, TV programmes, videos, websites, interviews etc.) to collect information on the:
 - **Biological concepts and processes** relating to the mandatory fortification of bread with folate.
 - Biological, social, ethical, economic or environmental **implications** of this issue.
 - Range of **differing opinions** relating to this issue.

Keep a record of the sources of all the researched information so that it can be used to produce a **reference list** with the report.

2. Organise your research notes and copies of research material into a <<insert information about how the research is to be organised e.g. logbook, scrapbook, portfolio, clearfile folder etc>>.
3. Go through the researched material and highlight or tag the key ideas (e.g. colour highlighting, stickies, annotations etc). This will help you to quickly access key ideas from your researched material when you are writing your report.

Task 3 - Report

1. You have <<insert information about length of time>> in which to complete drafts and a final version of your report. Your research material including annotations and notes will be available for you to use when writing the report. At the end of each period you will be required to hand in all researched material and all versions of the report.
2. Write a report, **in your own words** (see note below), in which you **integrate** information from a range of sources on EACH of the following to:
 - Discuss the **biological concepts and processes** upon which this issue (mandatory fortification of bread with folate) is based.

- Discuss any important **biological, social, ethical, economic or environmental implications** relating to this issue.
 - Discuss the **differing opinions** named people, groups or organisations hold and the **reasons** for each opinion.
 - Include **your own opinion** on the answer to this question: "*Are the benefits of folic acid supplementation to the few outweighed by possible harm to some of the many exposed?*" Use supporting evidence from your report to **justify** why you hold this opinion.
 - **Evaluate** the main sources of information you have used and comment on the validity of these sources and bias in the information relating to the issue, implications or opinions. Name the specific source your comments are referring to. You could also comment on a named source explaining why it was not used.
3. When writing your report, reference any diagrams, graphs, quotes (with quotation marks) and the information from sources in the body of your report in one of the formats suggested below. (See instructions below).
4. Any references used as information sources for the final report must be acknowledged in a **reference list**. (See instructions below).

Authenticity of Ideas, Facts and Quotations used in the body of the report:

To ensure all sources can be checked and authenticated, any facts/ideas/data/quotes/pictures/diagrams/maps, etc from your reference sources should be acknowledged at the point where they are used in your report. This can be done in the form:

- Author's surname, date of publication, page numbers, in brackets.
e.g. (Smith, 1998, p293)

This appears in the text of your report immediately after the sentence in which the material has been used.

e.g.

The Whale Liberation Society believes that whales are sacred animals and should never be killed
(New Zealand Herald, Jan 10th, 2006)

This may also be done in the form of footnotes. This involves the use of a number in the text next to your quoted material which refers to the author, date of publication and page numbers (or Internet site) listed at the bottom of the page.

e.g The Whale Liberation Society believes that whales are sacred animals and should never be killed¹

Reference List

Any references used as sources of information/facts/ideas/data/quotes/pictures/diagrams/maps, etc in your final report should be acknowledged in a reference list. It is recommended that you use the American Psychological Association (APA) referencing system. Auckland University provides an online tool that produces references in this format

<http://www.cite.auckland.ac.nz/index.php?p=quickcite>

¹New Zealand Herald, Jan 10th, 2006

The Folate Debate

Judgement for achievement	Judgement for achievement with merit	Judgement for achievement with excellence
<p>Information is researched and used to produce a report in their own words that shows descriptions relating to the:</p> <ul style="list-style-type: none"> • biological concepts and processes relevant to the issue, • implications • differing opinions <p><i>Describe</i> requires the student to define, use annotated diagrams, give characteristics of, or an account of- EN 6, bp 1.</p>	<p>Information is researched and integrated into their own words in a report that shows explanations relating to aspects of:</p> <p>EITHER the biological concepts and processes relevant to the issue OR the implications OR differing opinions</p> <p><i>Integrate</i> means to bring together and organise relevant information and opinions from a range of sources - EN 6, bp 2. <i>Explain</i> requires the student to provide a reason as to how or why something occurs – EN 6, bp 3.</p>	<p>Information is researched, and integrated into their own words in a report that shows discussion relating to aspects of:</p> <p>EITHER the biological concepts and processes relevant to the issue OR the implications OR differing opinions Own position stated and justified. Named sources are evaluated for validity and/or bias.</p> <p><i>Discuss</i> requires the student to show understanding by linking biological ideas. It may involve students in justifying, relating, evaluating, comparing and contrasting, and analysing - EN 6, bp 5.</p> <p><i>Evaluate</i> requires the student to:</p> <ul style="list-style-type: none"> - comment on sources and information, considering ideas such as <i>validity</i> (date, peer reviewed, scientific acceptance), <i>bias</i> (attitudes, values, beliefs), weighing up <i>how</i> science ideas are used by different groups, own opinions, attitudes and beliefs - provide a justified position that <i>supports</i> OR <i>opposes</i> aspects of the issue OR an implication of the issue. <i>Justified</i> means to demonstrate, with supporting evidence, why the position has been chosen - EN 6, bp 5.
<p>NOTE: ALL three bullet points must be described.</p>	<p>NOTE: All three of the bullet points under achievement do NOT have to be explained.</p>	<p>NOTE: All three of the bullet points under achievement do NOT have to be explained.</p>

Examples of Evidence:

Note that these excerpts are only small pieces indicative of descriptions, explanations and discussions. They have come from reports 4-5 pages long.

Excerpt showing description of issue:

DOC has been using 1080 for the past 30 years². The Department of Conservation uses 1080 to counter the devastating effects the 70 million possums are having on the native plants and animals. Possums threaten kamahi and rata forests. They prefer to eat the new growth on trees. They eat the endangered giant land snails (kauri snails) and the eggs of endangered birds such as the kiwi, kokako and kereru and compete with the kaka for food².

NOTE: This is not integrated since the information in the single paragraph has only come from one source.

Excerpt showing an integrated explanation of an issue:

1080 is less harmful to the environment than cyanide or other chemicals used to control possums because it is biodegradable and so does not persist in the soil. This is because the 1080 can be diluted with water and then detoxified by common soil micro-organisms (Smith, A. 2001, p63). The micro-organisms break the C=F bond in the 1080 which is why the 1080 does not persist and accumulate in the environment long term. Cyanide, on the other hand, can persist in a toxic form for many years (Brown, B. 2000, p22)

Excerpt showing discussion and integration:

There is some secondary kill when birds eat insects that have been killed by 1080. This lead to worries from some environmental activists that 1080 baits do more harm than good (Smith, A. 2004, p45). There have been alarming reports of “forest floor insect life dropping off and not recovering for more than a year after aerial drops of 1080” (Forest and Bird, Vol 1, 2003). The immediate effects on native birds are death either from eating the poisoned insects or from a depleted food supply because of the decrease in insect populations. Nonetheless research has shown that native bird and insect populations bounce back significantly once possums are reduced to low numbers. For instance monitoring of native robins after a 1080 operation in Pureora Forest in 1997 showed a 67% nesting success in the treated area compared with 30% in the area without possum control. A year later robin populations had increased 37% in the control area compared with 16.3% outside (Wise, I. 2000, p5)

Excerpt showing evaluation of named sources:

I found that the data from some of the sources of information has been used by both sides to reinforce their own points of view and that different groups dispute the validity of the published information and the interpretations that have been made. For example the information about how quickly 1080 disperses in water – one side (for the use of 1080) is saying that it disperses quickly while the other side claims that this information is not valid due to temperature differences between the test and reality. I think that the opinion of the scientists working for DoC has more validity since they publish their findings in peer reviewed journals. Much of the information I was able to collect contains bias in which the writer selectively used information to support their case. This was particularly so for the Society for the Eradication of 1080. Their website states that they are very opposed to its use and they obviously only selected information that supported their stance. I tried to locate the original source of information so that I could make my own judgement.

Excerpt showing **justified opinion**:

My opinion is that 1080 should be used to control the possum numbers as the damage done by possums to native forests is considerable^{12, 14, 18} and the evidence shows that native insect and bird populations do recover⁴⁰ and are more successful as a result of the removal of the possums⁴¹.

<<Insert annotated whole scripts (in context) showing evidence of description (Achieved), explanation and integration (Merit) and discussion, integration and evaluation of named sources with own opinion justified (Excellence)>>