



Gold Coast Christian College (Reedy Creek)

## Chemistry

IA3

**Student name**

Noah Alexiou

**Student number**

**Teacher**

**Issued**

14/07/2025

A

**Due date**

11/08/2025

End of week 4!!  
August 15!

## Marking summary

Criterion	Marks allocated	Provisional marks
Research and planning	6	
Analysis and interpretation	6	
Conclusion and evaluation	6	
Communication	2	
<b>Overall</b>	<b>20</b>	

# Conditions

<b>Technique</b>	Research investigation
<b>Unit</b>	Unit 4: Structure, synthesis and design
<b>Topic/s</b>	Topic 1: Properties and structure of organic materials Topic 2: Chemical synthesis and design
<b>Duration</b>	10 hours of class time
<b>Mode / length</b>	Written (e.g. scientific essay): 1500–2000 words
<b>Individual / group</b>	Individual
<b>Resources</b>	<ul style="list-style-type: none"><li>• School Library (online: internet and school intranet, databases, journals)</li><li>• Other software/technology</li></ul>

# Checkpoints

- Week 1: Select claim and develop research question.
- Week 2: Identify sources and conduct research
- Week 3: Analyse and evaluate evidence.
- Week 4: Submit draft.
- Week 5: Submit final response

## Authentication strategies

- You will be provided class time for task completion.
- Your teacher will collect and annotate a draft.
- You must acknowledge all sources.
- Your teacher will conduct interviews after submission to clarify or explore aspects of your response.
- You will use turnitin to submit your response.
- You will provide documentation of your progress at all the checkpoints listed

## Scaffolding

The response must be presented using an appropriate scientific genre (i.e. scientific essay) and contain:

- A claim
- A research question
- A rationale for the investigation
- Justified scientific arguments using evidence
- A conclusion to the research question based on the interpretation of the evidence
- Evaluation of the claim and suggestions of improvements and extensions to the investigation
- A reference list.

# Context

Investigate one of the following claims:

- Explore the chemical synthesis of a biofuel produced from algae and its comparisons with existing fuel sources
- Explore the structure and synthesis of biodegradable polymers and evaluate them against other types of organic compounds
- Examine the structure and synthesis of transgenic insecticides and compare them to biorational insecticides

You may identify an alternative claim in consultation with your teacher. This claim must be related to the subject matter of Unit 4

## Task

Gather secondary evidence related to a research question in order to evaluate the claim. Develop your research question based on a number of possible claims provided by your teacher.

Obtain evidence by researching scientifically credible sources, such as scientific journals, books by well-credentialed scientists, and websites of governments, universities, independent research bodies, or science and technology manufacturers. You must adhere to research conventions.

To complete this task, you must:

- select a claim to be evaluated
- identify the relevant scientific concepts associated with the claim
- pose a research question addressing an aspect of the claim
- conduct research to gather scientific evidence that may be used to address the research question and subsequently evaluate the claim
- analyse the data to identify sufficient and relevant evidence
- identify the trends, patterns or relationships in the evidence
- analyse the evidence to identify limitations
- interpret the evidence to construct justified scientific arguments
- interpret the evidence to form a justified conclusion to the research question
- discuss the quality of the evidence
- evaluate the claim by extrapolating the findings of the research question to the claim
- suggest improvements and extensions to the investigation
- communicate findings in an appropriate scientific genre, i.e. scientific essay.

## Instrument-specific marking guide (IA3): Research investigation (20%)

### Criterion: Research and planning

#### Assessment objectives

2. apply understanding of the properties and structure of organic materials or chemical synthesis and design to develop research questions
5. investigate phenomena associated with the properties and structure of organic materials or chemical synthesis and design through research

#### The student work has the following characteristics:

The student work has the following characteristics:	Marks
<ul style="list-style-type: none"> <li>• informed application of understanding of the properties and structure of organic materials or chemical synthesis and design demonstrated by a considered rationale identifying clear development of the research question from the claim</li> <li>• effective and efficient investigation of phenomena associated with the properties and structure of organic materials or chemical synthesis and design demonstrated by           <ul style="list-style-type: none"> <li>- a specific and relevant research question</li> <li>- selection of sufficient and relevant sources.</li> </ul> </li> </ul>	5–6
<ul style="list-style-type: none"> <li>• adequate application of understanding of the properties and structure of organic materials or chemical synthesis and design demonstrated by a reasonable rationale that links the research question and the claim</li> <li>• effective investigation of phenomena associated with the properties and structure of organic materials or chemical synthesis and design demonstrated by           <ul style="list-style-type: none"> <li>- a relevant research question</li> <li>- selection of relevant sources.</li> </ul> </li> </ul>	3–4
<ul style="list-style-type: none"> <li>• rudimentary application of understanding of the properties and structure of organic materials or chemical synthesis and design demonstrated by a vague or irrelevant rationale for the investigation</li> <li>• ineffective investigation of phenomena associated with the properties and structure of organic materials or chemical synthesis and design demonstrated by           <ul style="list-style-type: none"> <li>- an inappropriate research question</li> <li>- selection of insufficient and irrelevant sources.</li> </ul> </li> </ul>	1–2
• does not satisfy any of the descriptors above.	0

### Criterion: Analysis and interpretation

#### Assessment objectives

3. analyse research evidence about the properties and structure of organic materials or chemical synthesis and design
4. interpret research evidence about the properties and structure of organic materials or chemical synthesis and design

#### The student work has the following characteristics:

The student work has the following characteristics:	Marks
<ul style="list-style-type: none"> <li>• systematic and effective analysis of qualitative data and/or quantitative data within the sources about the properties and structure of organic materials or chemical synthesis and design demonstrated by           <ul style="list-style-type: none"> <li>- the identification of sufficient and relevant evidence</li> <li>- thorough identification of relevant trends, patterns or relationships</li> <li>- thorough and appropriate identification of limitations of evidence</li> </ul> </li> <li>• insightful interpretation of research evidence about the properties and structure of organic materials or chemical synthesis and design demonstrated by justified scientific argument/s.</li> </ul>	5–6
<ul style="list-style-type: none"> <li>• effective analysis of qualitative data and/or quantitative data within the sources about the properties and structure of organic materials or chemical synthesis and design demonstrated by           <ul style="list-style-type: none"> <li>- the identification of relevant evidence</li> <li>- identification of obvious trends, patterns or relationships</li> <li>- basic identification of limitations of evidence</li> </ul> </li> <li>• adequate interpretation of research evidence about the properties and structure of organic materials or chemical synthesis and design demonstrated by reasonable scientific argument/s.</li> </ul>	3–4
<ul style="list-style-type: none"> <li>• rudimentary analysis of qualitative data and/or quantitative data within the sources about the properties and structure of organic materials or chemical synthesis and design demonstrated by           <ul style="list-style-type: none"> <li>- the identification of insufficient and irrelevant evidence</li> <li>- identification of incorrect or irrelevant trends, patterns or relationships</li> <li>- incorrect or insufficient identification of limitations of evidence</li> </ul> </li> <li>• invalid interpretation of research evidence about the properties and structure of organic materials or chemical synthesis and design demonstrated by inappropriate or irrelevant argument/s.</li> </ul>	1–2
• does not satisfy any of the descriptors above.	0

## Criterion: Conclusion and evaluation

### Assessment objectives

4. interpret research evidence about the properties and structure of organic materials or chemical synthesis and design
6. evaluate research processes, claims and conclusions about the properties and structure of organic materials or chemical synthesis and design

The student work has the following characteristics:	Marks
<ul style="list-style-type: none"><li>• insightful interpretation of research evidence about the properties and structure of organic materials or chemical synthesis and design demonstrated by justified conclusion/s linked to the research question</li><li>• critical evaluation of the research processes, claims and conclusions about the properties and structure of organic materials or chemical synthesis and design demonstrated by<ul style="list-style-type: none"><li>– insightful discussion of the quality of evidence</li><li>– extrapolation of credible findings of the research to the claim</li><li>– suggested improvements and extensions to the investigation that are considered and relevant to the claim.</li></ul></li></ul>	5–6
<ul style="list-style-type: none"><li>• adequate interpretation of research evidence about the properties and structure of organic materials or chemical synthesis and design demonstrated by reasonable conclusion/s relevant to the research question</li><li>• basic evaluation of the research processes, claims and conclusions about the properties and structure of organic materials or chemical synthesis and design demonstrated by<ul style="list-style-type: none"><li>– reasonable description of the quality of evidence</li><li>– application of relevant findings of the research to the claim</li><li>– suggested improvements and extensions to the investigation that are relevant to the claim.</li></ul></li></ul>	3–4
<ul style="list-style-type: none"><li>• invalid interpretation of research evidence about the properties and structure of organic materials or chemical synthesis and design demonstrated by inappropriate or irrelevant conclusion/s</li><li>• superficial evaluation of the research processes, claims and conclusions about the properties and structure of organic materials or chemical synthesis and design demonstrated by<ul style="list-style-type: none"><li>– cursory or simplistic statements about the quality of evidence</li><li>– application of insufficient or inappropriate findings of the research to the claim</li><li>– ineffective or irrelevant suggestions.</li></ul></li></ul>	1–2
• does not satisfy any of the descriptors above.	0

## Criterion: Communication

### Assessment objectives

7. communicate understandings and research findings, arguments and conclusions about the properties and structure of organic materials or chemical synthesis and design.

The student work has the following characteristics:	Marks
<ul style="list-style-type: none"><li>• effective communication of understandings and research findings, arguments and conclusions about the properties and structure of organic materials or chemical synthesis and design demonstrated by<ul style="list-style-type: none"><li>– fluent and concise use of scientific language and representations</li><li>– appropriate use of genre conventions</li><li>– acknowledgment of sources of information through appropriate use of referencing conventions .</li></ul></li><li>• adequate communication of understandings and research findings, arguments and conclusions about the properties and structure of organic materials or chemical synthesis and design demonstrated by<ul style="list-style-type: none"><li>– competent use of scientific language and representations</li><li>– use of basic genre conventions</li><li>– use of basic referencing conventions .</li></ul></li></ul>	2
• does not satisfy any of the descriptors above.	1
• does not satisfy any of the descriptors above.	0