



## Year 12 Chemistry

### Portfolio: Organic Compound Assessment 2023

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|--|-----------------------|
| <b>TOPIC:</b> Module 7 Organic Chemistry   | <b>MARKS:</b> / 35    |
| <b>SUBMISSION REQUIREMENTS:</b><br>The investigation will be due in Week 10, Wednesday 13 <sup>th</sup> December 2023 on Canvas by 11:59 PM.   | <b>WEIGHTING:</b> 25% |
| <b>OUTCOMES TO BE ASSESSED:</b><br><br>CH12-4: <b>Selects</b> and <b>processes</b> appropriate qualitative and quantitative data and information using a range of appropriate media.<br>CH12-5: <b>Analyses</b> and <b>evaluates</b> primary and secondary data and information.<br>CH12-7: <b>Communicates</b> scientific understanding using suitable language and terminology for a specific audience or purpose.<br>CH12-14: <b>Analyses</b> the structure of, and predicts reactions involving, carbon compounds. |                       |
| <b>DIRECTIONAL VERBS:</b><br><i>Analyse</i> - Identify components and the relationship between them; draw out and relate implications<br><i>Communicate</i> - Share or exchange information, news, or ideas<br><i>Evaluate</i> - Make a judgement based on criteria; determine the value of.<br><i>Processes</i> - A series of actions or steps taken in order to achieve a particular end.<br><i>Selects</i> - Carefully choose as being the best or most suitable  |                       |

## TASK DESCRIPTION:

( Inquiry question: What are the properties and uses of polymers? )

### Part A: Polymer Profiles

Plastics are an important component of modern living, however with their use arises certain problems. Students will **select** and **process** primary and secondary information to create a polymer profile containing information about a specific polymer, including an **analysis** of its structure and prediction on how to make it. Students should choose **ONE (1)** addition polymer and **ONE (1)** condensation from the syllabus points below and communicate their information using correct chemical nomenclature.

- Model and compare the structure, properties and uses of addition polymers of ethylene and related monomers, for example:

– polyethylene (PE)

– polyvinyl chloride (PVC)

– polystyrene (PS)

– polytetrafluoroethylene (PTFE)

- Model and compare the structure, properties and uses of condensation polymers, for example:

– nylon

– polyesters

### Part B: Organic Compound Profile

In addition to creating the polymer profiles, students will also critically evaluate the scientific literature on the use or potential use of **ONE (1)** natural occurring, toxic compound from an Australian animal.

## Assessment Criteria

### Part A - Polymer Profile (20 marks)

**Select** one of the polymers below to **process**, collate, **analyse** and **evaluate** primary and secondary information through the presentation of a portfolio:

Choose one of these addition polymers: **Polyvinyl chloride, polystyrene, polytetrafluoroethylene, polyethylene**

Choose one of the condensation polymers: **Nylon or a polyester**

Detail the following for the chosen addition and condensation polymer:

- IUPAC & Industrial name of the polymer.
- Structural formula of polymer.
- IUPAC & Industrial name of its monomer.
- Structural formula of its monomer and the chemical reaction involved in the formation of the polymer.
- A detailed **analysis** of how the polymer's properties relate to its commercial usage.

### Part B – Organic Compound Profile (15 marks)

The natural world is full of organisms producing novel and unique organic compounds. There are a range of herbs, spices and other plants which contain various bioactive compounds (compounds which can produce a physiological effect beyond any classical nutritional properties). Students are to create a profile on 1 (one) bioactive compound made by a living Australian animal species, **analysing** sources which include scientific journal articles. In their portfolio, students are to communicate the following, accessing a variety of valid/reliable sources:

- The compound's IUPAC chemical name and other alternate names if present.
- Chemical structure, including structural formula, molecular formula and any isomers.
- Class of organic molecule (e.g. ester, alcohol, amine etc.).
- Organisms which produce this substance and where they live.
- Physical properties, chemical properties, effects on humans and toxicity data (including LD<sub>50</sub>).
- A critical evaluation of its uses or potential uses based on scientific journal articles.
- Include a C.R.A.P. **evaluation** of one main source of information

# DO YOUR RESOURCES PASS THE C.R.A.P. TEST?

|                    | 0 Points   | 1 Point   | 2 points  | 3 points  |
|--------------------|--|---|---|---|
| <b>CURRENCY</b>    | <input type="checkbox"/> No updates shown  | <input type="checkbox"/> Updates shown but long past  | <input type="checkbox"/> Updates shown<br><input type="checkbox"/> Slightly dated   | <input type="checkbox"/> Regular, current updates   |
| <b>RELIABILITY</b> | <input type="checkbox"/> Inaccurate information<br><input type="checkbox"/> Incomplete information | <input type="checkbox"/> Amateur<br><input type="checkbox"/> Borrows from other sources<br><input type="checkbox"/> No citations<br><input type="checkbox"/> No links to other resources  | <input type="checkbox"/> Passed some editorial control<br><input type="checkbox"/> Largely borrows from other sources<br><input type="checkbox"/> Some citations<br><input type="checkbox"/> Some links to reliable resources | <input type="checkbox"/> Scholarly<br><input type="checkbox"/> Original<br><input type="checkbox"/> Bibliography or citations provided<br><input type="checkbox"/> Links to and from other reliable resources |
| <b>AUTHORITY</b>   | <input type="checkbox"/> No author<br><input type="checkbox"/> No publisher                        | <input type="checkbox"/> Author or group author<br><input type="checkbox"/> No credentials<br><input type="checkbox"/> No publisher<br><input type="checkbox"/> No organizational support | <input type="checkbox"/> Author or group author<br><input type="checkbox"/> Publisher or organizational support   | <input type="checkbox"/> Expert author or expert group of authors<br>Credentials provided<br><input type="checkbox"/> Reputable publisher or organization   |
| <b>PURPOSE</b>     | <input type="checkbox"/> Unfairly biased*<br><input type="checkbox"/> Holds an agenda              | <input type="checkbox"/> Some bias*<br><input type="checkbox"/> More opinion than fact<br><input type="checkbox"/> Unbalanced to a fault  | <input type="checkbox"/> Small biases*<br><input type="checkbox"/> Shows some balance   | <input type="checkbox"/> Largely unbiased*<br><input type="checkbox"/> No clear agenda<br><input type="checkbox"/> May be balanced with multiple viewpoints   |

• Your judgements in each of the categories are merely guidelines; ultimately, you have to take the whole into consideration.

• \*Bias is in everything we read. Your job is to determine how much the bias influences the piece.



Inspired by UC Berkeley Library ([www.lib.berkeley.edu/TeachingLib/Guides/Internet/Evaluate.html](http://www.lib.berkeley.edu/TeachingLib/Guides/Internet/Evaluate.html)) and the work of Dianne McKenzie, 2013, ([librarygrits.blogspot.com](http://librarygrits.blogspot.com))

| <b>PART A CRITERIA: Polymer Profile: Addition Polymer<br/>(Outcomes CH12-4, CH12-7, CH12-14)</b>  | <b>Mark</b> | <b>Grade</b> |
|---|-------------|--------------|
| <p>A comprehensive portfolio will:</p> <p>Correctly selects a polymer, demonstrating ALL correct naming conventions associated with the polymer and its monomer's IUPAC &amp; industrial names. It correctly presents the compound's polymerisation reaction, displaying its structural formula correctly, as well as describe in detail any other associated conditions required. It describes in detail any other relevant chemistry related to the polymer's molecular structure. It also analyses in detail the relationship between the polymer's relevant physical and chemical properties AND its commercial usage, presenting all data in a highly organised AND structured manner.</p> | <b>9-10</b> | <b>A</b>     |
| <p>A thorough portfolio will:</p> <p>Correctly selects a polymer, demonstrating most correct naming conventions associated with the polymer and its monomer's IUPAC industrial names. It correctly presents the compound's polymerisation reaction, displaying its structural formula, as well as describe with minor error any other associated conditions required. It describes briefly other relevant chemistry related to the polymer's molecular structure. It also analyses briefly the relationship between the polymer's relevant physical and chemical properties AND it's commercial usage, presenting the data in a largely organised AND structured manner.</p>                    | <b>7-8</b>  | <b>B</b>     |
| <p>A sound portfolio will:</p> <p>Correctly selects a polymer, demonstrating most correct naming conventions associated with the polymer and its monomer's IUPAC or industrial names. It correctly presents the compound's polymerisation reaction, displaying its structural formula with minor errors or omitting any other associated conditions required. It omits other relevant chemistry related to the polymer's molecular structure and describes briefly the relationship between some aspects of the polymer's relevant physical or chemical properties it's commercial usage, with information presented data in a generally organised AND structured manner.</p>                   | <b>5-6</b>  | <b>C</b>     |
| <p>A basic portfolio will:</p> <p>Correctly selects a polymer, demonstrating poorly the naming conventions associated with the polymer or its monomer's IUPAC or industrial names. It will provide a limited description of the compound's polymerisation reaction, omitting key aspects of the reaction with no other associated conditions. It omits all relevant chemistry related to the polymer's molecular structure and identifies only some uses of the polymer, omitting key aspect of its properties. - Present data in a generally organised AND structured manner.</p>  | <b>3-4</b>  | <b>D</b>     |
| <p>A limited portfolio will:</p> <p>Present limited information on the chemical nature of an identified polymer.</p>  | <b>0-2</b>  | <b>E</b>     |

| <b>PART A CRITERIA: Polymer Profile: Condensation Polymer (Outcomes CH12-4, CH12-7, CH12-14)</b>  | <b>Mark</b> | <b>Grade</b> |
|---|-------------|--------------|
| <p>A comprehensive portfolio will:</p> <p>Correctly selects a polymer, demonstrating ALL correct naming conventions associated with the polymer and its monomer's IUPAC &amp; industrial names. It correctly presents the compound's polymerisation reaction, displaying its structural formula correctly, as well as describe in detail any other associated conditions required. It describes in detail any other relevant chemistry related to the polymer's molecular structure. It also analyses in detail the relationship between the polymer's relevant physical and chemical properties AND its commercial usage, presenting all data in a highly organised AND structured manner.</p> | <b>9-10</b> | <b>A</b>     |
| <p>A thorough portfolio will:</p> <p>Correctly selects a polymer, demonstrating most correct naming conventions associated with the polymer and its monomer's IUPAC industrial names. It correctly presents the compound's polymerisation reaction, displaying its structural formula, as well as describe with minor error any other associated conditions required. It describes briefly other relevant chemistry related to the polymer's molecular structure. It also analyses briefly the relationship between the polymer's relevant physical and chemical properties AND it's commercial usage, presenting the data in a largely organised AND structured manner.</p>                    | <b>7-8</b>  | <b>B</b>     |
| <p>A sound portfolio will:</p> <p>Correctly selects a polymer, demonstrating most correct naming conventions associated with the polymer and its monomer's IUPAC or industrial names. It correctly presents the compound's polymerisation reaction, displaying its structural formula with minor errors or omitting any other associated conditions required. It omits other relevant chemistry related to the polymer's molecular structure and describes briefly the relationship between some aspects of the polymer's relevant physical or chemical properties it's commercial usage, with information presented data in a generally organised AND structured manner.</p>                   | <b>5-6</b>  | <b>C</b>     |
| <p>A basic portfolio will:</p> <p>Correctly selects a polymer, demonstrating poorly the naming conventions associated with the polymer or its monomer's IUPAC or industrial names. It will provide a limited description of the compound's polymerisation reaction, omitting key aspects of the reaction with no other associated conditions. It omits all relevant chemistry related to the polymer's molecular structure and identifies only some uses of the polymer, omitting key aspect of its properties. - Present data in a generally organised AND structured manner.</p>  | <b>3-4</b>  | <b>D</b>     |
| <p>A limited portfolio will:</p> <p>Present limited information on the chemical nature of an identified polymer.</p>  | <b>0-2</b>  | <b>E</b>     |

| <b>PART B CRITERIA: Compound Analysis (Outcomes CH12-5)</b>   | <b>Mark</b>  | <b>Grade</b> |
|---|--------------|--------------|
| <p><b>A comprehensive profile will:</b></p> <p>Correctly identify the compound's IUPAC name and any relevant alternative names with an extensive description of the compounds molecular structure, including molecular formula, structural formula or other details of its chemical structure. It will have a comprehensive description of the class of organic molecule to which the molecule belongs and its functional group and a comprehensive list of the Latin names, common names and distribution of the organisms which produce this substance in Australia. It provides an extensive account of the physical and chemical properties of the compound including a detailed account of the toxicity of the substance, lethal dosage and its effect on the body. It also critically evaluates the validity of a scholarly article using a C.R.A.P. analysis, along with referring to other correctly cited journal articles both in the text and bibliography, using Harvard style referencing.</p> | <b>13-15</b> | <b>A</b>     |
| <p><b>A thorough profile will:</b></p> <p>Correctly identify the compound's IUPAC name and provide a brief but correct description of the molecular formula and structural formula. It will have a brief description of the class of organic molecule to which the molecule belongs and its functional group and describe a short list of the Latin names, common names or distribution of the organisms which produce this substance in Australia. It will provide a brief account on aspects of the physical and chemical properties of the compound including, toxicity of the substance, lethal dosage and its effect on the body. It will also evaluate the validity of a scholarly article, referenced with minor errors, along with referring to other correctly cited journal articles both in the text and bibliography, using alternative referencing or Harvard style with minor errors.</p>   | <b>9-12</b>  | <b>B</b>     |
| <p><b>A sound profile will:</b></p> <p>Correctly identify an unofficial name of the compound along with a correct description of the molecular formula or structural formula. It will provide a brief description of the class of organic molecule to which the molecule belongs, omitting details of the classes functional group. It will identify a brief list of the names of the species which produce this substance and identify the physical and chemical properties of the compound and may describes its effect on the body or its toxicity data. It explains possible or current uses for the compound referring to a single scholarly article's with a brief C.R.A.P. analysis, along with cited Journal articles in either the text or the bibliography, with referencing style errors</p>   | <b>6-8</b>   | <b>C</b>     |

|   |                   |                 |
|---|-------------------|-----------------|
| <p><b>A basic profile will:</b></p> <p>Correctly identify an unofficial name of the compound with minor errors and some errors in the compound's molecular formula or structural formula. It omits classification of the class of organic molecule to which the molecule belongs or provides an incorrect classification and identifies only one species which produce this substance, assuming there are multiple species that produces the compound. It identifies a physical or chemical property of the compound, or its effect on the body and identifies one possible or current use for the compound with no reference to any scholarly articles. It does not include a C.R.A.P. analysis and communicates using references to non-scientific articles</p> | <p><b>3-5</b></p> | <p><b>D</b></p> |
| <p><b>A limited profile will:</b></p> <ul style="list-style-type: none"> <li>• - Poorly attempt to describe an organic compound in limited detail with no reference to scholarly articles</li> </ul>  | <p><b>0-2</b></p> | <p><b>E</b></p> |