

CHEMISTRY Level 4

Common Assessment Task

Work Requirements:

N/A

Assessment Type:

Extended response

Criteria being assessed:

- Criterion 3 - elements 1, 3, 4, 5, and 6
- Criterion 4 - all elements
- Criterion 5 - elements 1, 2 and 4. OR Criterion 6 elements 1, 2 and 5. OR Criterion 7

Suggested conditions:

- This task should take no more than 2.5 hours of class time.
- The response should be no more than 800 to 1200 words.
- Electronic submission.
- This task requires an individual response by each learner.

Task Description:

To write a scientific report detailing a single example of the use of chemistry to address the growing need for renewable energy. This report is to be based on the background information given below.

Background

This year “the IPCC working group 3 report found:

- Coal must be effectively phased out if the world is to stay within 1.5C, and currently planned new fossil fuel infrastructure would cause the world to exceed 1.5C.
- Methane emissions must be reduced by a third.
- Growing forests and preserving soils will be necessary, but tree-planting cannot do enough to compensate for continued emissions for fossil fuels.
- Investment in the shift to a low-carbon world is about six times lower than it needs to be.
- All sectors of the global economy, from energy and transport to buildings and food, must change dramatically and rapidly, and new technologies including hydrogen fuel and carbon capture and storage will be needed.”

Source: <https://www.theguardian.com/environment/2022/apr/04/ipcc-report-now-or-never-if-world-stave-off-climate-disaster>, The Guardian Australia (accessed 5 April 2022)

Chemical processes and understanding can be applied to underpin the storage, production and use of energy. These processes include the production and reaction of fuels or applying electrochemistry, for example:

- The use and impacts of electrochemistry to as energy storage and use (Criterion 5)
- The use and impacts of electrochemistry in fuel production or use (Criterion 5)
- A comparison of fuels (such as natural gas, ethanol, hydrogen and ammonia) discussing their impacts and ability to store and release energy (Criterion 6)
- A comparison of fuels (such as natural gas, ethanol, hydrogen and ammonia) discussing their impacts and ability to transport energy. (Criterion 7)

What you need to do:

To write a scientific report detailing a single application of chemistry in the current or near future energy industry in society and/or an issue relating to this. You should ensure that your report discusses or includes all of the following:

- the detailed chemical background of the chosen topic
- the significant components of the chosen topic (e.g. industrial processes involved, raw materials used, potential hazards caused by process)
- the connections between significant relevant influences relating to the chosen topic (e.g. ethical, political, cultural, social and economic influences)
- a conclusion which includes an assessment on the relative impact of influences regarding the chosen topic (e.g. economic/societal importance vs. societal/environmental impact)
- a detailed bibliography.

Teacher use only - What needs to be submitted for assessment?

Learners write a scientific report and submit it electronically.