VCE Chemistry

Examples of chemistry-based socio-scientific issues

Socio-scientific issues can be used as contexts for exploring chemistry ideas across Units 1 to 4. The following table gives some suggestions as to how students can make links between scientific concepts studied across Units 1 to 4 and relevant socio-scientific issues they may encounter in the media.

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| Unit  | Concept  | Issues  |
| 1  | Recycling and circular economies | Critical or ‘endangered’ elements are a great case study for the sustainable use of materials, including through recycling. Students could investigate which elements are [‘critical’ elements](https://css.umich.edu/factsheets/critical-materials-factsheet), ways they can be classified, how different nations might classify them differently, and [what the elements are used for.](https://www.acs.org/content/acs/en/greenchemistry/research-innovation/endangered-elements.html) |
| Organic chemistry in everyday life | Students can investigate everyday materials (e.g. fabrics, polymers used in building), identifying types of organic materials) and comparing similarities and differences between the properties of synthetic and natural alternatives; they can compare benefits, health effects and environmental impacts through a products life cycle. |
| Role of innovation in addressing society’s nutritional needs | Students can investigate the chemicals produced in highest quantities worldwide, such as ammonia and sulfuric acid, to consider the myriad of ways a particular chemical is involved in their lives. Ammonia is used to produce fertilisers to feed crops, but today the hydrogen utilised in the Haber-Bosch process comes itself from fossil fuels. As such, food is effectively a product of fossil fuel utilisation. Innovative projects, including from Australian researchers, are focusing on producing ‘green’ sources of hydrogen. |
| 2  | Acids in the environment | Students could investigate [acid rain or ocean acidification](https://www.noaa.gov/education/resource-collections/ocean-coasts/ocean-acidification) as examples of the [impact of acids in the environment](https://coastadapt.com.au/ocean-acidification-and-its-effects). |
| Redox chemistry | Students could investigate simple primary cells, including the benefits and environmental effects of disposal.Students could investigate the effects of corrosion and modes of prevention, as well as factors that affect the rate of corrosion. |
| Clean drinking water | Students could investigate clean drinking water and common pollutants that lead it to be a leading issue for some nations. |
| 3 | Energy generation from renewable and non-renewable fuels | Students could investigate greenhouse gas emissions generated by the combustion of different fuels and other environmental impacts, and compare the renewability of fuel sources.Students can undertake experiments related to the ongoing implementation of [hydrogen as a fuel](https://fchgo.eu/) and therefore examine the production of ‘green’ hydrogen and the [viability of it in Australia.](https://h2council.com.au/about-hydrogen/resources) |
| Role of innovation in addressing society’s energy needs | Students could examine novel and innovative fuel cells that address society’s energy needs with reference to green energy principles (e.g. from biofuel cells that operate in the human body, to large-scale fuel cells in vehicles). |
| 4 | Sustainable production of chemicals | Students could investigate the production of various chemicals, including medicines from a green chemistry perspective (including calculating atom economy). |
| Medicinal chemistry | Students could investigate a range of natural plant compounds that can be [extracted from plants and the surrounding ethical issues over biopiracy.](https://newsroom.unsw.edu.au/news/social-affairs/protecting-indigenous-bush-foods-and-medicines-against-biopiracy) |