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AUSTRALIAN SCHOOL SCIENCE
INFORMATION SUPPORT FOR
TEACHERS AND TECHNICIANS

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Water testing for PFOS and PFOA

Posted by Anonymous on Tue, 2016-08-16 12:32

Water testing: Is it possible to do classroom testing for PFOS and PFOA in water samples? If so, how would you go about it?

What other water quality/contamination tests could be done in a classroom?

Thanks.

Voting:



No votes yet

Australian Curriculum:

Planning and conducting

Year Level:

Senior Secondary

Laboratory Technicians:

Laboratory Technicians

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Water testing

Submitted by sat on 24 August 2016

Answer reviewed 18 Jan 2023

PFOS and PFOAs

PFOS (Perfluorooctane Sulfonate) and PFOA (Perfluorooctanoate) are part of a chemical group that have been used in the manufacture of some common household products such as non-stick cookware and fabric treatments, and have been used previously in some types of fire-fighting foam.

These chemicals do not break down in the environment and are considered environmental contaminants as they are toxic to mammals and bioaccumulative. Commercial testing laboratories use highly sensitive Liquid Chromatography Mass Spectrometry instruments because PFOS and PFOA are present in very small quantities and measured in parts per billion or parts per trillion.

Science ASSIST has found a reference to PFOS and PFOA testing that requires a liquid chromatograph. This instrumentation is not usually found in schools and, whilst this would make an interesting investigation, is definitely beyond the scope of most schools.

Alternative water testing:

Science ASSIST suggests water quality tests that align with the curriculum, student skill sets, and are readily available and cost effective for schools. The following tests are reproducible and meaningful to students:

- Physical parameters:
 - Temperature
 - Turbidity using a turbidity tube or data logging equipment
 - pH using test strips or pH metres
 - Salinity using a metre or data logging equipment
 - EC (electrical conductivity) using a metre or data logging equipment. Combined pH and EC metres may be purchased.
 - Dissolved oxygen using a metre or data logging equipment
- Chemical parameters:
 - Ammonia, nitrate, nitrite, phosphate and sulphate. Separate test strips or aquarium testing kits are available to quickly perform these tests
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Biological indicators:

- Macroinvertebrates

Test metres can be purchased as ‘hand held’ models, which are effective while field testing. These are generally available from reputable science suppliers at a reasonable cost. Data logging equipment can be used for many applications in school science and it is worth investigating sensors that may suit your testing needs in the biology, chemistry and physics disciplines. See our list of [School science suppliers](#).

Note: Although a number of resources discuss faecal coliform tests, Science ASSIST does not recommend the testing for faecal bacteria due to the risks of cultivating human pathogens. It is however an important indicator for water health and we suggest accessing websites with information regarding Australian drinking water guidelines and Australian guidelines for managing risks in recreational water.

There are several educational resources available:

- 'Statewide Education Resources' Waterwatch Victoria website, http://www.vic.waterwatch.org.au/cb_pages/education.php (Accessed Jan 2023)
- Department of Environment, Climate Change and Water NSW. 2010. Contains resources for both Primary and High Schools, <https://www.nswwaterwatch.org.au/resources> (Accessed Jan 2023)

References:

‘PFOS and PFOA’, NSW Government Health website, <https://www.health.nsw.gov.au:443/environment/factsheets/Pages/pfos.aspx> (Accessed Jan 2023)

‘Perfluorooctane Sulfonate (PFOS) and related chemical products’, OECD website, <https://www.oecd.org/env/ehs/risk-management/perfluorooctanesulfonatepfosandrelatedchemicalproducts.htm> (Accessed Jan 2023)

‘PFOA Testing’, Applied Technical Services website, <https://atslab.com/chemical-analysis/pfoa-testing/> (Accessed Jan 2023)

Tracy, Mark; Liu, Xiaodong and Pohl, Christopher. 2008. Analysis of Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoate (PFOA) in Water Samples Using Reversed-Phase Liquid Chromatography (RPLC) with Suppressed Conductivity Detection, Dionex Corporation website, <http://tools.thermofisher.com/content/sfs/posters/68680-LPN-2133-01-PFOS-note.pdf> (Accessed Jan 2023)

NHMRC. 2016. Australian drinking water guidelines, NHMRC website, <https://www.nhmrc.gov.au/about-us/publications/australian-drinking-water-guidelines> (Accessed Jan 2023)

NHMRC. 2008. Australian guidelines for managing risks in recreational water, NHMRC website, <https://www.nhmrc.gov.au/about-us/publications/guidelines-managing-risks-recreational-water>

(Accessed Jan 2023)

Department of Health, Western Australia and the University of Western Australia. 2007. Microbial Quality of Recreational Water Department of Health, Western Australia website.

<https://www.health.wa.gov.au/~media/Files/Corporate/general%20documents/water/envwater/other-publications/PDF/Microbial%20Quality-of-Recreational-Water-Guidance-Notes.ashx> (Accessed Jan 2023)

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