Learning about chemistry does not only take place in schools. Informal and lifelong learning takes place through the pursuit of hobbies, consumption of mainstream media and social media, from literature, films and TV, as well as attendance of exhibitions and events.

**This document examines the issue of chemophobia, and initiatives to address it.**

Chemophobia is not a new phenomenon, it has been considered a problem by the chemical industry and publicly discussed since the 1960s.[[1]](#footnote-2) It is a complex issue, stemming from the power that chemicals and by extension, chemists have to destroy life, as evidenced by chemical warfare (poison gas in particular), which overshadows the many benefits that chemistry and chemists have brought everyday life. The difficulty of knowing or predicting long term effects of the use of chemicals has shaken public confidence, especially in areas of environmental contamination and potential for negative effects on human health, such as lead in petrol, or persistence of chemicals such as the now banned pesticide DDT, or BPA found in some plastics. As methods of detecting chemicals and their actions advance, there will be further questions posed regarding the long term effects of prevalently used chemicals.

Sense About Science recently refreshed and relaunched a toolkit for journalists writing about chemical stories. The organisation see hyperbolic and unbalanced news stories as a major threat to the reputation of chemistry. The repetition of inaccuracies and the apparently unchallenged placements of adverts for 'chemical-free' products are particular concerns.[[2]](#footnote-3) Journalists face tight deadlines, covering subjects outside their specialities, with very limited time to research and generate an engaging story, so are accused of relying too heavily and uncritically on press releases. Editors have the final say, and push for material in a style they believe their audience wants.

Their audiences could push back and demand better specialist coverage. The desire for realism and authenticity from film and television viewers has led to producers to seek expert advice in order to portray credible situations, while working within a format that prioritises entertainment.[[3]](#footnote-4) Most recently this can be seen in the success of *Breaking Bad*, AMC network's long running serial (2008-2013) about methamphetamine production.[[4]](#footnote-5)

Schools are under pressure of curriculum, lesson length and resources, as well as concerns related to adequate supervision of large classes. Where schools have specialist, enthusiastic chemistry teachers who actively participate in personal development, they have greater success at encouraging A-Level chemistry uptake.[[5]](#footnote-6)

Hobbies that use chemicals dwindled when necessary chemicals became and remain quite hard to acquire.[[6]](#footnote-7) Perceptions of danger discourage parents from facilitating children's interests, though for adults, some raw chemicals have once again become available through internet sales. Maker Faires, often organised by and held at museums and science centres which require careful consideration of health and safety, now enthusiastically present hobbies that require chemicals.[[7]](#footnote-8)

Chemistry sets are cited as inspirational by older chemists and inventors, but the difficulty of replacing chemicals, or of expanding a home set became increasingly frustrating. Chemistry sets acquired a reputation of being neutered by the removal or substitution of chemicals that had repeatedly been involved in accidental poisoning, fires and explosions at homes.[[8]](#footnote-9) The production of chemistry sets to examine one particular question, for example to test for acid rain, while tapping into a curiosity about environmental pollution, does not carry the same potential for experimentation as more comprehensive sets.

Photographers seeking a challenge that digital photography cannot satisfy in the same way turn to chemical methods. The opportunity for control and experimentation appeals to photographic artists seeking particular effects. Historic techniques, including wet plate photography, have gathered followers.[[9]](#footnote-10)Internet forums allow photographers to share resources. People can buy raw chemicals or ready prepared mixtures, and online suppliers remain vigilant to who they sell to.[[10]](#footnote-11)

Accuracy, to a certain degree is what audiences of films and television shows apparently want;

Exhibitions and events follow a tradition of public engagement and science communication. The 1951 Festival of Britain incorporated cutting edge chemistry.[[11]](#footnote-12) It is hard to know what the impact was on visitors.

Today, measuring impact is paramount, with museums and science centres mindful that while lasting outcomes are difficult to gauge, they are called on to justify funding.[[12]](#footnote-13) The need to seek funding from industry is heightened by cuts to government sponsorship, coupled with commitments to free entry.

Museums and science centres promote themselves as neutral spaces, although this is vigorously contested. Neutrality may be impossible, but balance and openness should be sought. Criticism follows chemical industry sponsorship, especially the oil industry.[[13]](#footnote-14) When an exhibition generates discussion, from whichever angle they come at it, this should be considered a desirable result.

At the Science Museum, London chemistry has been uncontroversially and overwhelmingly presented as about laboratories and the equipment involved in manufacturing, experimenting and quality control.[[14]](#footnote-15)

On the whole, chemicals lack visibility in museums unless their discovery, manufacture and function are elevated to dramatic, life changing narratives (pharmaceuticals and dyes for instance). A sense of chemicals as potentially dangerous also shapes how museums collect chemicals. To a generalist curator, without access to affordable, reliable specialist expertise or analytic equipment, which is increasingly how museums operate, chemical collections represent an expensive hazard best avoided.

Museums cultivate relationships with academics and industrialists. In the case of chemical testing, time and expense often prohibit this from being a viable solution but for exhibition and event ideas, text creation or editing, specialists can lend authority to museums. This is mutually beneficial as museums can provide academics with a venue, an audience and guidance on suitable forms of science communication, while academics can provide expert assistance when the museum requires it and their authority draws visitors to events, such as Manchester Science Festival.[[15]](#footnote-16)

1. BBC Horizon, 1964, Pesticides and Posterity [↑](#footnote-ref-2)
2. Sense About Science. "Making Sense of Chemical Stories" 2014. <http://bit.ly/1lE2ihj> [↑](#footnote-ref-3)
3. Kirby, David. *Lab coats in Hollywood: Science, Scientists and Culture* MIT Press, 2011. [↑](#footnote-ref-4)
4. Ben Wetherbee and Stephanie Weaver, “'You Know the Business and I Know the Chemistry’: The Scientific Ethos of Breaking Bad”, *Excursions*, vol. 4, no. 1 (2013) [↑](#footnote-ref-5)
5. Bennett J., Lubben F., Hampden-Thompson G. Schools That Make a Difference to Post-Compulsory Uptake of Physical Science Subjects: Some comparative case studies in England. International Journal of Science Education, Volume 35, Number 4 (March 2013), pp. 663-689 [↑](#footnote-ref-6)
6. Consultation on proposed changes to the Poisons Act 1972, Poisons Rules 1982, Poisons List 1982 and associeated amendments. November 2013. [↑](#footnote-ref-7)
7. Maker Faire, worldwide listings tagged "chemistry" <http://bit.ly/SLshLo> [↑](#footnote-ref-8)
8. Von Korff, R. W. "Where Have the Chemistry Sets Gone?". *The Midland Chemist* 43, no. 5 (2006): 4-7. [↑](#footnote-ref-9)
9. Wetplate, Blur magazine <http://www.blur-magazine.com/sections/wetplate> [↑](#footnote-ref-10)
10. Wet Plate Supplies <http://bit.ly/1pv3jut> [↑](#footnote-ref-11)
11. Forgan, Sophie. "Festivals of Science and the Two Cultures: Science , Design and Display in the Festival of Britain, 1951." *The British Journal for the History of Science* 31, no. 2 (1998): 217-40. [↑](#footnote-ref-12)
12. International Science Centre Impact Study Final Report <http://bit.ly/1fmchax> [↑](#footnote-ref-13)
13. Tateatate, Introduction to oil sponsorship <http://bit.ly/1tiZkl7> [↑](#footnote-ref-14)
14. Morris, Peter "The image of chemistry presented by the Science Museum in the Twentieth Century" *International Journal for Philosophy of Chemistry*, Vol. 12 (2006), No. 2, 215-239. [↑](#footnote-ref-15)
15. Manchester Beacon Network. "About us" http://bit.ly/1opZJ7v [↑](#footnote-ref-16)