
Inclusive Outreach Activity Targeting Negative Alternate Conceptions of Chemistry

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Conceptions of chemistry questionnaire

This is a short survey to capture attitudes to chemistry and opinions about a range of chemistry-related issues. The survey consists of 16 questions about your opinions and attitudes to some chemistry-related topics, followed by some questions about you, including your level of chemistry education. It should take around 10 minutes total to complete and needs to be completed in one go (i.e. you cannot save it and come back later).

All personal data will be anonymised; you may withdraw your consent to participating at any time up until the data collected has been anonymised (before Sunday 31st March 2019). If you withdraw your consent, all identifiable data will be removed from the analysis. Your participation in this questionnaire is entirely voluntary; you can leave questions unanswered or stop filling it out at any point. If you change your mind at any point before the data is fully anonymised, you can withdraw without needing to give a reason.

Data will be stored in password-protected files and will only be accessible to the researchers involved in the project. Identifiable data will be deleted by (at the latest) Friday 26th June 2019. Anonymised data may be used for presentations, research reports, project summaries and similar. Your data will not be identifiable, but if you do not want your data used in this way please do not complete this questionnaire. Anonymised, non-identifiable data may be kept for up to five years, but will then be destroyed.

The information you provide will be treated confidentially and shared on a need-to-know basis, with the minimum amount of data collected. For information about General Data Protection Regulation information please follow this link: https://www.york.ac.uk/education/research/gdpr_information/. Personal data will be processed for research under Article 6 (1) (e) of GDPR: Processing is necessary for the performance of a task carried out in the public interest.

Special category data is processed under Article 9 (2) (j): Processing is necessary for archiving purposes in the public interest, or scientific and historical research purposes or statistical purposes.

If you have any questions you wish to ask, please contact myself (Alex Palmer, sap533@york.ac.uk) or my project supervisor Julia Sarju (julia.sarju@york.ac.uk). You can also contact the Chair of Ethics Committee via email at education-research-administrator@york.ac.uk. If you are still dissatisfied, please contact the University's Data Protection Officer at dataprotection@york.ac.uk.

*Required

1. Do you consent to taking part in this survey? You may withdraw at any time. *

Mark only one oval.

☐ I consent to taking part in this survey After the last question in this section, skip to question 5.

☐ I do not consent to taking part in this survey After the last question in this section, stop filling in this form.

2. Would you be prepared to participate in a follow-up workshop on topics covered in this questionnaire?

Mark only one oval.

☐ Yes (I am a student at the University of York) After the last question in this section, skip to question 4.

☐ Yes (I am not a student at the University of York) After the last question in this section, skip to question 4.

☐ No After the last question in this section, skip to question 5.

3. Finally, please indicate your year and course of study (e.g. 2nd year Psychology)

Contact details

As you have indicated a willingness to participate in a workshop, please provide a contact email address.

4. Email address *

Skip to question 5.

Attitudes to chemistry

In this section I will ask you to describe your attitude to certain topics/areas and ask you to rate your confidence. This is optional and you do not have to answer any of these questions if you do not wish to.

5. Which of the following best describes how you feel about chemistry?

Mark only one oval.

- ☐ Excited
- ☐ Happy
- ☐ Neutral
- ☐ Bored
- ☐ Confused
- ☐ Sad
- ☐ Angry
- ☐ Other: _____

6. On a scale of 1 to 10, how important do you think chemistry is in everyday life?

Mark only one oval.

| | | | | | | | | | | | |
|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| Not at all important | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Very important or vital |

7. Please rate your confidence in your understanding of chemistry

Mark only one oval.

| | | | | | | | | | | | |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| I don't feel confident talking about chemistry at all | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | I feel very confident talking about chemistry |

8. How accurately do you think mainstream media (including news broadcasts on TV/radio, newspapers, and news websites) generally reports chemistry?

Mark only one oval.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
|-------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------|
| Very inaccurately | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Very accurately |

9. Please describe the main factors you think could influence chemistry reporting in the media

10. Please rate your confidence in your ability to critically assess evidence

Mark only one oval.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------|
| Not at all confident | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Very confident |

Opinions about chemicals

In this section I will ask some questions about your personal opinions on chemicals - this is optional and you do not have to answer any of these questions if you do not wish to. Each question will ask you to rate between 1 and 10 how much you agree or disagree with the statement: 1 = totally disagree, 10 = totally agree, 5 = don't know/unsure.

11. All chemicals are man-made

Mark only one oval.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| Totally disagree | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Totally agree |

12. All chemicals are dangerous and harmful

Mark only one oval.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| Totally disagree | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Totally agree |

13. Natural chemicals are safer than synthetic (human-made) chemicals

Mark only one oval.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| Totally disagree | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Totally agree |

14. Everything is made of chemicals

Mark only one oval.

| | | | | | | | | | | | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| Totally disagree | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Totally agree |

15. Chemicals are unavoidable in everyday life

Mark only one oval.

| | | | | | | | | | | | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| Totally disagree | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Totally agree |

Opinions about science issues

In this section I will ask some questions about your personal opinions about a broader range of science-related issues - this is optional and you do not have to answer any of these questions if you do not wish to. Each question will ask you to rate between 1 and 10 how much you agree or disagree with the statement. 1 = totally disagree, 10 = totally agree, 5 = don't know/unsure.

16. Climate change is not an imminent threat to humanity

Mark only one oval.

| | | | | | | | | | | | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| Totally disagree | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Totally agree |

17. The idea of a 'detox' is scientifically meaningful

Mark only one oval.

| | | | | | | | | | | | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| Totally disagree | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Totally agree |

18. Vaccination is no longer necessary

Mark only one oval.

| | | | | | | | | | | | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| Totally disagree | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Totally agree |

19. GMOs are not inherently dangerous

Mark only one oval.

| | | | | | | | | | | | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| Totally disagree | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Totally agree |

20. Homeopathic medicine is more effective than a placebo

Mark only one oval.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| Totally disagree | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Totally agree |

Personal information

In this section I will ask you for some information about yourself - this section is optional and you do not have to provide this information if you do not wish to.

21. What is the highest level of chemistry study you have undertaken?

Mark only one oval.

- ☐ GCSE Science or equivalent
- ☐ GCSE Chemistry (or equivalent Chemistry-specific qualification)
- ☐ A-Level Chemistry or equivalent (e.g. Chemistry Higher)
- ☐ Undergraduate degree in Chemistry
- ☐ Other: _____

22. Please select the option that most accurately describes your gender

Mark only one oval.

- ☐ Male
- ☐ Female
- ☐ Non-binary (neither male nor female)
- ☐ Prefer not to say
- ☐ Other: _____

23. Is this the same as the gender you were assigned at birth?

Mark only one oval.

- ☐ Yes
- ☐ No
- ☐ Prefer not to say
- ☐ Other: _____

24. Please select the option(s) that most accurately describe your sexual and romantic orientation

Tick all that apply.

- ☐ Gay
- ☐ Lesbian
- ☐ Bi+ (bisexual/biromantic, pansexual/panromantic, or other multiple-gender sexual/romantic attraction)
- ☐ Asexual (including asexual spectrum identities, e.g. demisexual, grey-asexual)
- ☐ Aromantic (including aromantic spectrum identities, e.g. demiromantic, greyromantic)
- ☐ Queer
- ☐ Questioning/unsure
- ☐ Heterosexual/heteroromantic
- ☐ Other: _____

25. Please select the option(s) that most accurately describes your ethnic group

Tick all that apply.

- ☐ Black
- ☐ Asian
- ☐ Other minority ethnic group
- ☐ White
- ☐ Prefer not to say
- ☐ Other: _____

26. Do you consider yourself to have a disability? This could include mental health conditions such as depression, physical impairments, 'invisible' illnesses, autism-spectrum conditions and cognitive impairments.

Mark only one oval.

- ☐ Yes
- ☐ No
- ☐ Unsure
- ☐ Prefer not to say
- ☐ Other: _____

Attitudes to chemistry

Thank you for participating in the workshops! This is a short follow-up questionnaire so that I can study their impact. As before, all personal data will be anonymised and you have the right to withdraw from this questionnaire at any time.

1. Email address *

2. Which of the following best describes how you feel about chemistry?

Mark only one oval.

- ☐ Excited
- ☐ Happy
- ☐ Neutral
- ☐ Bored
- ☐ Confused
- ☐ Sad
- ☐ Angry
- ☐ Other:

3. On a scale of 1 to 10, how important do you think chemistry is in everyday life?

Mark only one oval.

[illegible]

4. Please rate your confidence in your understanding of chemistry

Mark only one oval.

[illegible]

5. How accurately do you think mainstream media (including news broadcasts on TV/radio, newspapers, and news websites) generally reports chemistry?

Mark only one oval.

[illegible]

Mark only one oval.

[illegible]

Mark only one oval.

[illegible]

Opinions

In this section I will be asking some questions about your opinions on some chemistry-related topics - this is optional and you do not have to answer any of these questions if you do not wish to. Each question will ask you to rate between 1 and 10 how much you agree or disagree with the statement: 1 = totally disagree, 10 = totally agree, 5 = don't know/unsure.

Mark only one oval.

[illegible]

Mark only one oval.

[illegible]

Mark only one oval.

[illegible]

Mark only one oval.

[illegible]

12. Statistical reporting tied to real numbers was easier for me to understand

Mark only one oval.

| | | | | | | | | | | | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| Totally disagree | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Totally agree |

Experiences of chemistry

In this section I will be asking some questions about your experiences of chemistry in the past - if you have not studied Chemistry as a separate science (e.g. you did the Double Science award at GCSE), please indicate this below and answer other questions in this section substituting 'science' for chemistry.

13. What is the highest level of chemistry study you have undertaken?

Mark only one oval.

- ☐ GCSE Science or equivalent
- ☐ GCSE Chemistry (or equivalent Chemistry-specific qualification)
- ☐ A-Level Chemistry or equivalent (e.g. Chemistry Higher)
- ☐ Undergraduate degree in Chemistry

14. In the past, I felt confident talking about chemistry (e.g. contributing in lessons)

Mark only one oval.

| | | | | | | | | | | | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| Totally disagree | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Totally agree |

15. In the past, I have been made to feel that chemistry "isn't for me"

Mark only one oval.

| | | | | | | | | | | | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| Totally disagree | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Totally agree |

16. My experience at school put me off chemistry

Mark only one oval.

| | | | | | | | | | | | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| Totally disagree | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Totally agree |

17. Please describe any factors/experiences that you feel influenced your engagement with chemistry

Opinions on the workshops

In this section, please provide any feedback you like on any aspect of the workshop (or this survey).

18. Please use this space to provide feedback on the workshops or on this survey
