



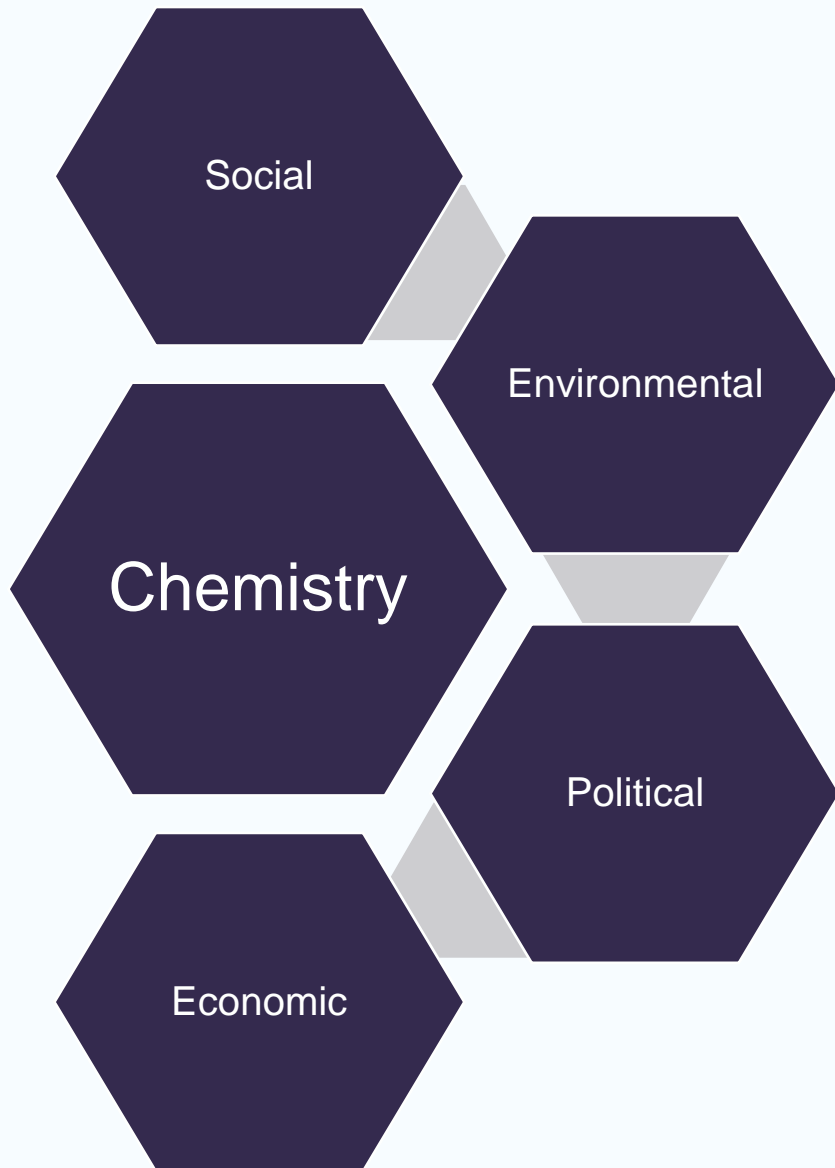
Chemistry for All: Global, Diverse, and Fit for Purpose

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Chemistry
is
Global



Sustainable Chemistry Est. 2013



2012/13: development

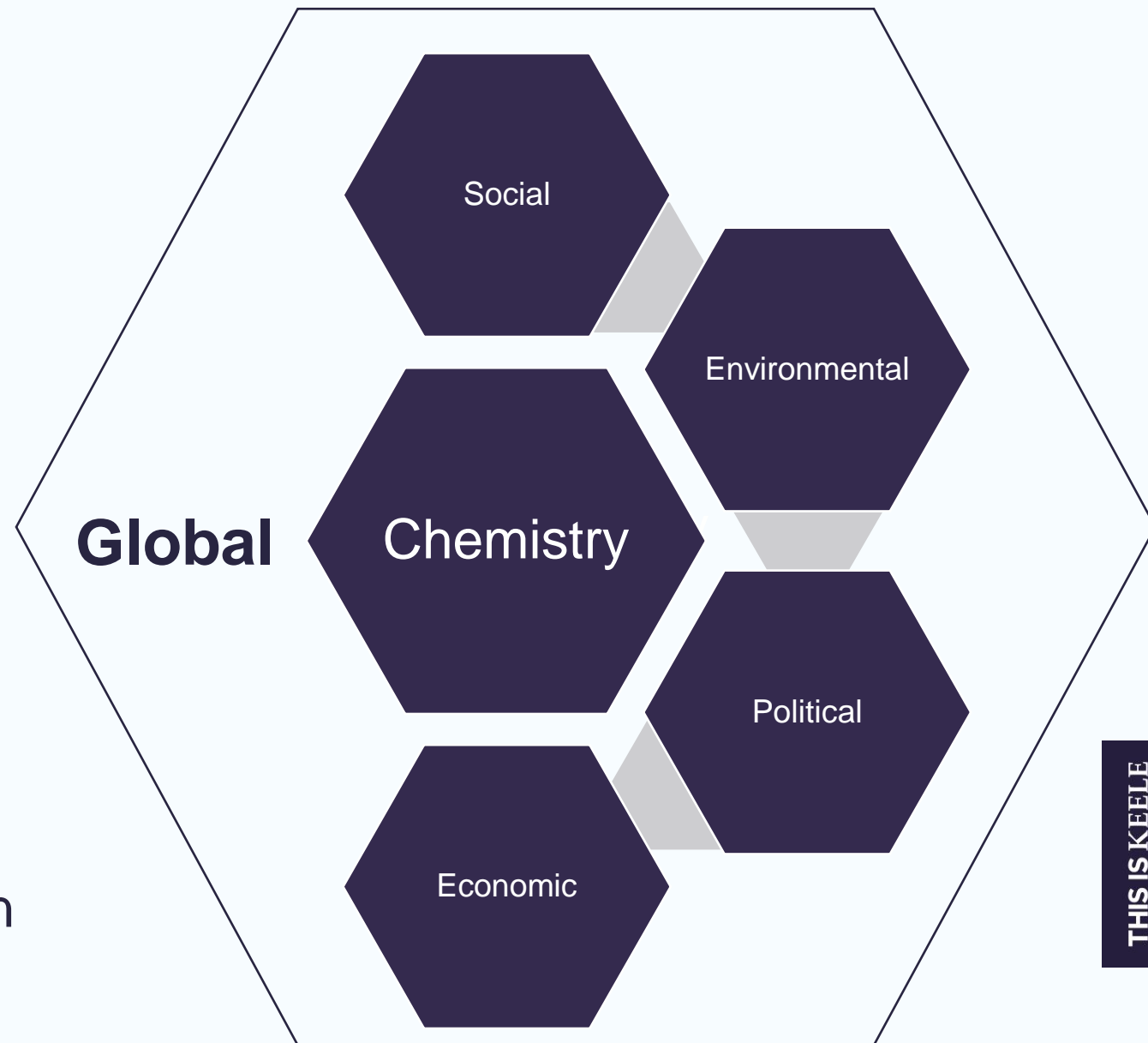
2015/16, 2016/17: delivered in person and via distance learning to Chinese students

Sustainable Chemistry v.2019



2017/18: expansion to address wider range of SDGs

2018/19: addressing content, context and assessment through decolonization lens



International Group Work (15/16, 16/17)

How do you teach sustainability via distance learning to a culture you barely know?

Answer: you get the students to teach you!

Assignment 1: group video project describing sustainability/environmental issues on campus or in your city (Chinese students only)

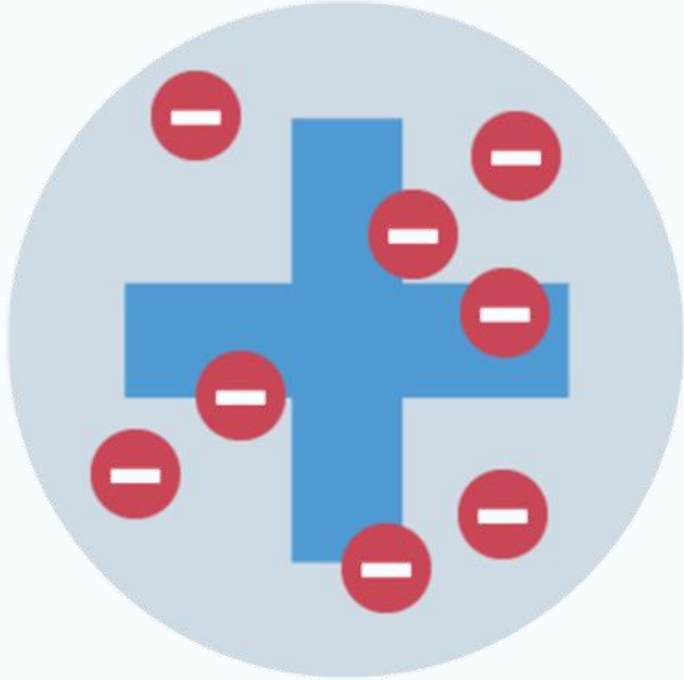
Assignment 2: mixed groups of Chinese and Keele students. What does sustainability mean to you?

Haxton, K.J. & Darton, R.J. (2019). International Group Work for Sustainable Chemistry. *New directions in the teaching of physical sciences (Online)*. (14).

Cranwell, P.B., Edwards, M.G., Haxton, K.J., Hyde, J., Page, E.M., Plana, D., Sedhi, G. & Wright, J.S. (2019). Chinese Students' Expectations Versus Reality When Studying on a UK-China Transnational Chemistry Degree Program. *New directions in the teaching of physical sciences (Online)*. (14).

Cultural Accessibility

The plum pudding model



After discovering the electron in 1897, J J Thomson proposed that the atom looked like a plum pudding.

Source: BBC Bitesize Revision

Do my analogies, contextualisation, examples, stories and humour work for the majority of students?

Who am I excluding?

plum pudding model



The scientific idea that an atom is a sphere of positive charge, with negatively charged electrons in it.

Decolonization

“the end of rule by a foreign power and the recuperation and/or formation of an ‘independent’ entity” Gopal (2021)

“An intellectually expansive curriculum that taken as a whole, puts different ideas, texts and traditions in conversation is pedagogically sound” Gopal (2021)



Decolonization cont'

Who is teaching?

Teaching staff, guest lecturers...

How are we teaching?

Active? Time on Task?

Traditional Assessment modes

Addressing awarding gaps
(achievement gaps)

What are we teaching?

Knowledge

Tradition

Accreditation

What are we normalizing?

What power structures are we perpetrating?

What decolonizing is not:

Erasing cis white European men (or any other source of knowledge) from reading lists and teaching materials

“a largely white or largely male curriculum is not politically incorrect, as is often believed, but intellectually unsound. Monocultures do not produce good thinking and are themselves a lethal form of unmarked narrow identity politics” Gopal (2021)

Achieved ‘just’ through an inclusive curriculum. A curriculum can be inclusive and remain colonized

Quick, easy, widely accepted as necessary

Chemistry is Diverse

The purpose of an undergraduate chemistry laboratory class is to:



Teach and learn good laboratory practice



Teach and learn scientific skills



Acquire data for analysis for assessment



Elucidate/explain key scientific concepts



Give/acquire practical experience of lectured content



Generate chemical waste

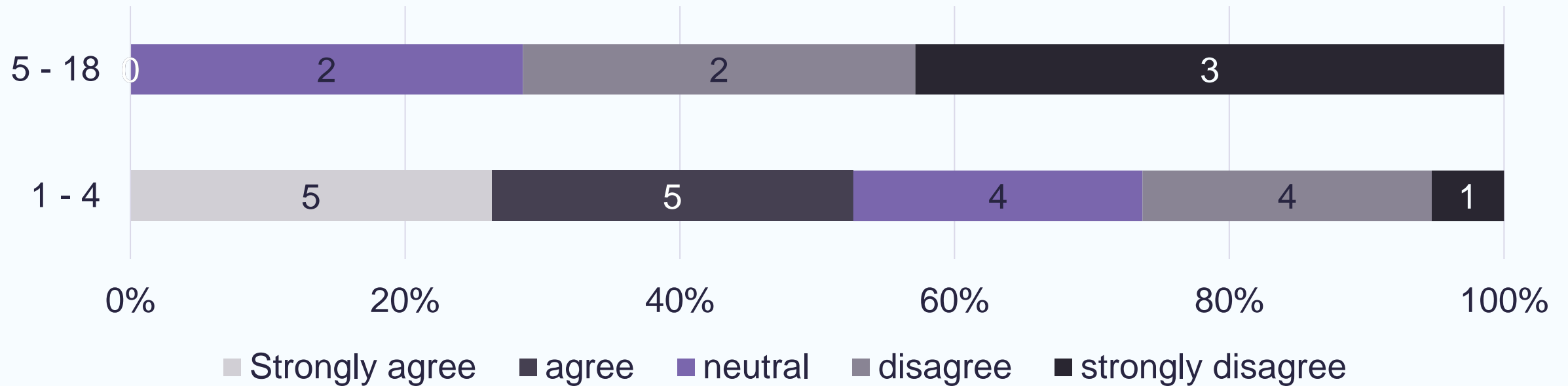


Provide a venue for social interaction



Build a sense of community

Representations of scientists (pictures, descriptions of work of specific scientists) within my discipline reflect my background



“I can relate to British scientists and stuff like that because I'm British. It should make sense that if you're of Asian or African descent, that such scientists should also be present.”

15 minute challenge

Spend 15 minutes researching an idea, concept or scientist.

Plan to spend 1 minute of class time talking about what you find.



Chemistry is Fit for Purpose



“The development and application of chemical knowledge and practices with the main intent of analyzing, synthesizing, and transforming matter for practical purposes.” Sevian and Talanquer (2014)

Suggestions for Teaching Practice

- Subtitles/captions on recorded teaching materials to aid comprehension.
- Incorporate global examples, case studies and perspectives into classes.
- Allow opportunities for students to ask questions and try to create a supportive and comfortable environment.
- Increase staff diversity, invite diverse speakers for seminars or guest lectures.
- Reflect on what is taught and WHY you are teaching it.

Choice of Assessment

Brief

- Either/Or assessment
 - ‘someone was wrong on the internet’
 - ‘fake news’
- Within exams
 - Choice of question
 - Choice within question

Topic

- Example or Context
 - Encourage selecting examples/products/context of relevance/interest
- Subject
 - Magazine style article on topic of choice
- Solution
 - Business plan/feasibility study addressing defined problem
- Experiment
 - Choice for lab report

Format

- Audio/Visual
 - Poster
 - Presentation
- Presentation
 - In person
 - Online
 - Pre-recorded
- Style of written work
 - Discursive
 - Explainer
 - Creative non-fiction

How Research Works

Who decides what research questions to ask?

Who decides what research is funded?

What ethical issues are there?

Normalising a research culture that includes participants from the countries of study and values their input into research design and interpretation



Decolonizing is...

Essential: global challenges require global perspectives and diverse voices

Hard: tackling power structures and hegemony, both explicit, implicit and covert, reconsidering why we teach what we teach, and the emphasis of our curriculum is challenging

Worthwhile: reconsidering content, context and assessment makes our disciplines more relevant and reflective of a global society

Normality is overrated

What is normalized in your work area?

Who are the people regarded as 'normal'?

Who are excluded from those spaces?

“Reflecting on what we commonly think of as a “chemist” as well as the skills and knowledge that they hold” Vincent-Ruz (2020)



Thank you!

