Why should we bother with science?

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University of Chester

Other ways of looking at this

I know the questions seem a little negative and confrontational

- “Why should we bother with science?”
- “What’s the point of science education?”

Headline-grabbing questions!

What about…

- “What are the opportunities presented by science education?”

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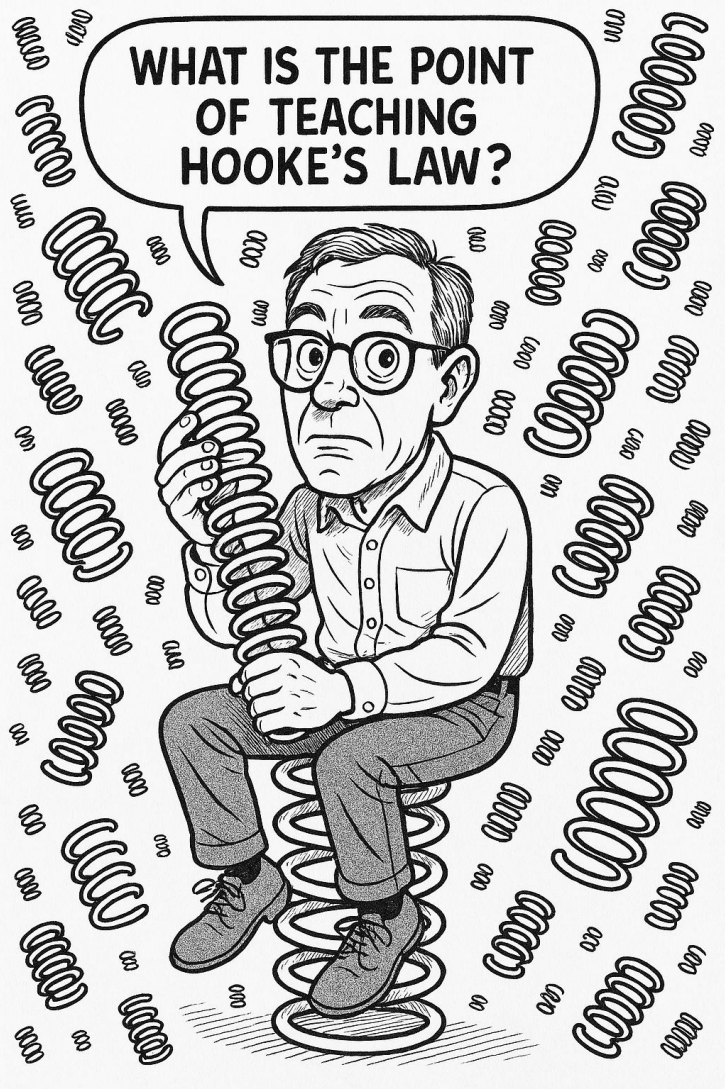
Why does this matter to me?

- Two stories:
  - The Hooke's Law experience
  - The COVID vaccine experience



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I’m not going to give you an answer…

I here to cause…

- Provocation
- Reflection

- My own views are quite fluid, they’ve been developing for 33 years and will probably continue to do so!

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Does this actually matter?

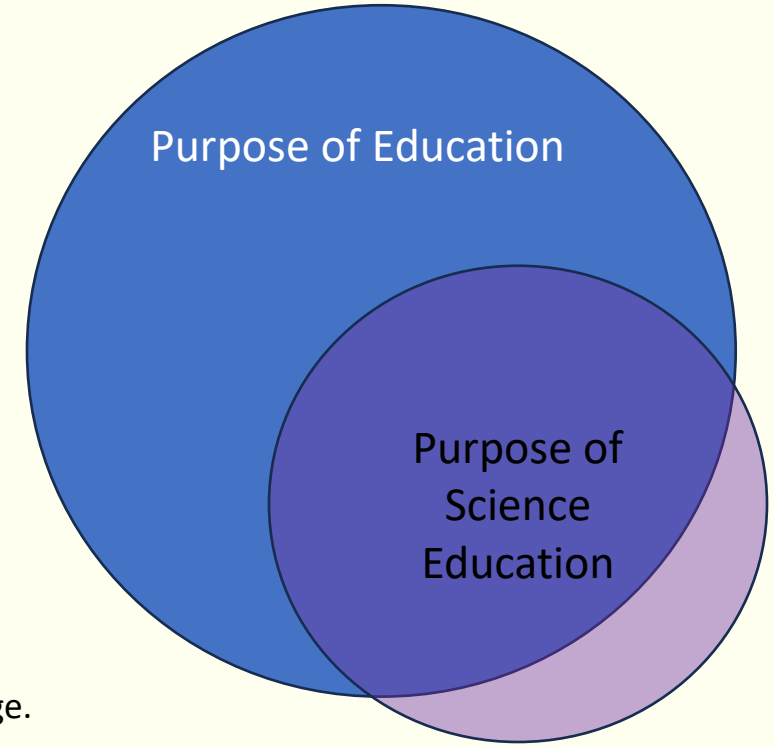
- In this presentation I will not give you my preferred view (which is complex, and growing ever increasingly complex!)
- My aims:
  - Set a position on why this matters
  - Share some perspectives through which you may consider the purpose of science

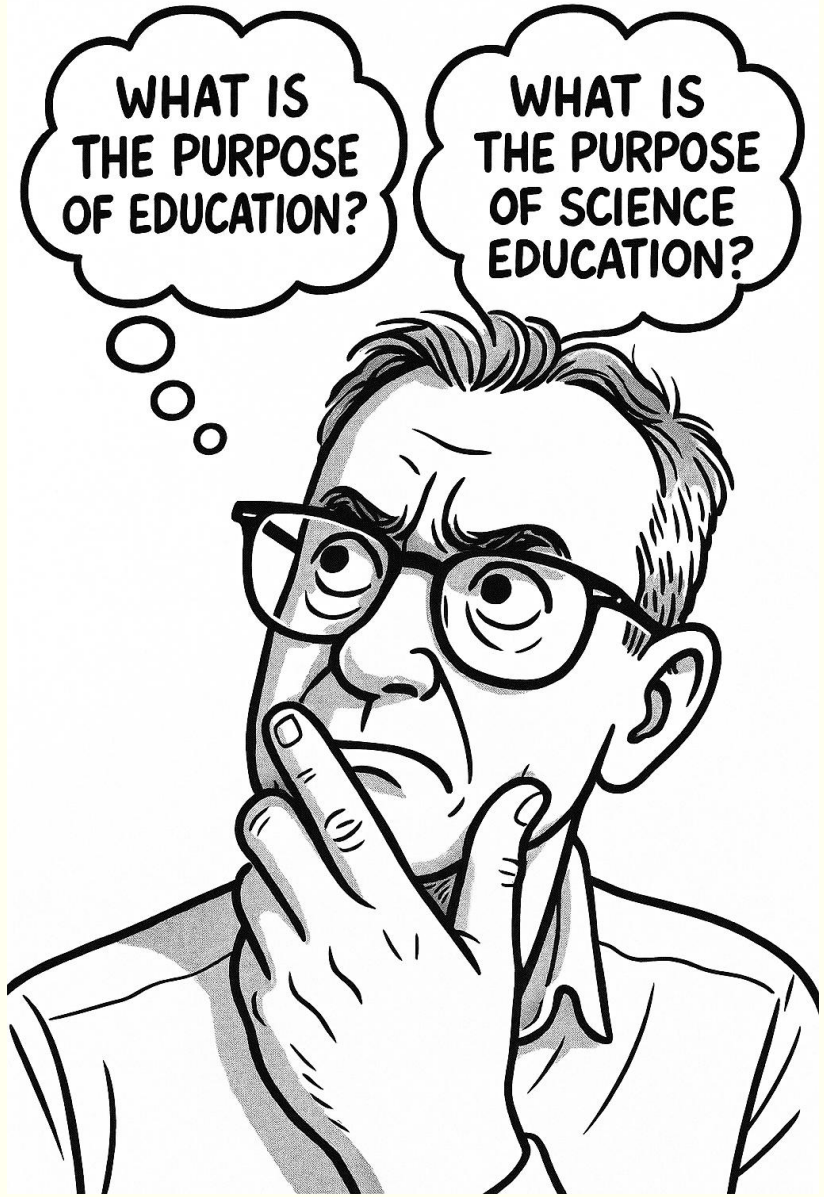
Slight detour...

Is the PoSE a subset of the PoE, do they intersect, are they independent of each other?

What is the purpose of education?
Maybe consider Biesta:

- Qualification
- Socialisation
- Subjectification





Biesta, G. (2016). *Good education in an age of measurement : ethics, politics, democracy*. Routledge. https://doi.org/10.4324/9781315634319

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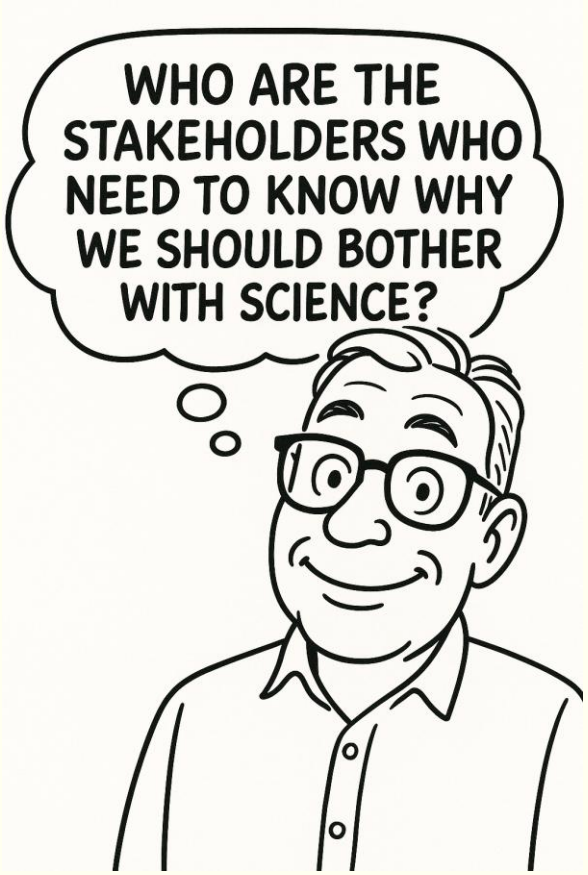

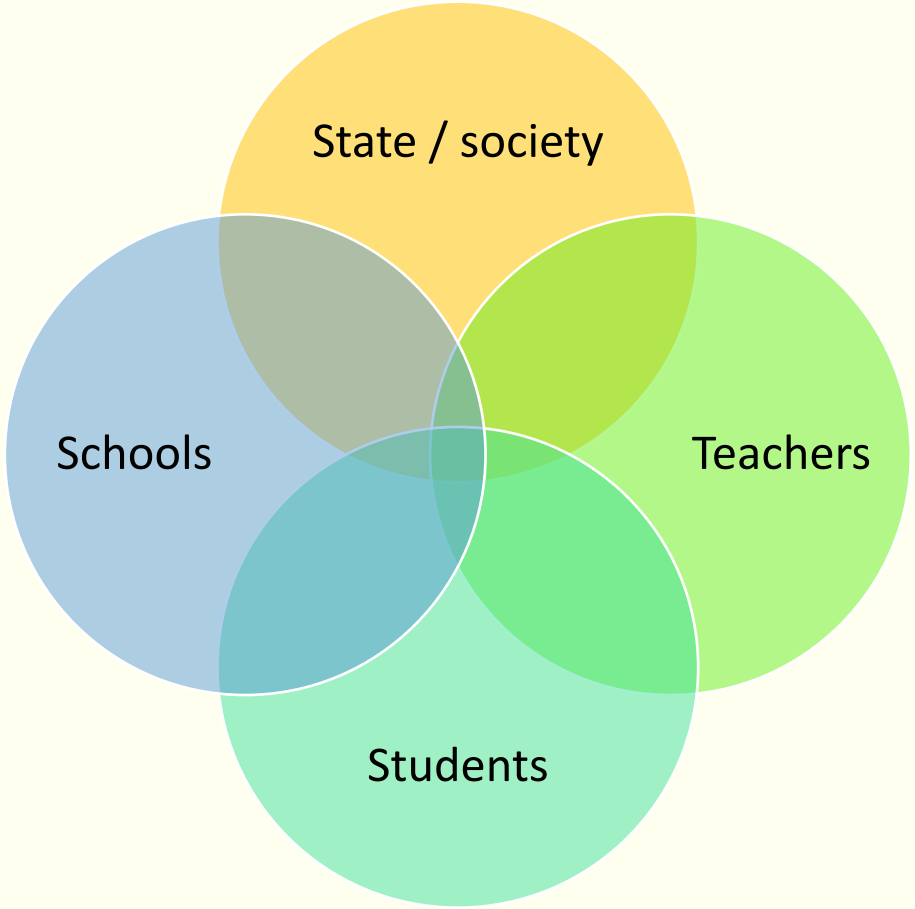

- Why should we teach science?
- Why does it matter?
- Who benefits from science education? How? What are the benefits?

- Does it depend on perspective, on who you ask?

- Are these views compatible?
- Can they be, should they be?

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Why should the question matter?

State / society	They pay taxes and fund (most) school science. The state determines the compulsory curriculum
Schools / other teachers	Science occupies a lot of the timetable, it is compulsory, it is expensive, it is hard to recruit and retain teachers
Students (and hopefully science teachers)	They are on the receiving end! Their engagement matters, for themselves and for society. Should we take their engagement for granted?

I still need to think about parents and carers!

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“GCSEs prepare students for A-levels”

- Summer 2023 GCSE entries:
  - Combined Science ~441 000 students (882 000 entries)
  - Biology ~174 000, Physics and Chemistry ~167 000 each
  - Roughly ~608 000 students
- Summer 2025 A-level entries
  - Biology ~66 000
  - Chemistry ~60 000
  - Physics ~42 000
  - Max 168 000 students, minimum 66 000
- **At least 440 000 students did not pursue A-level B, C, or P. (>72%)**

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Inclusivity

- Inclusivity is also about ensuring that everyone in a science classroom feels they belong IN STUDYING THE SUBJECT irrespective of how far they take the subject
- It must be for everyone, it must have something valuable to offer everyone, and students need to understand this

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Articulate the purpose

- This is not just sharing lesson objectives, this is promoting student investment / engagement
- Ignoring the mandatory curriculum dimension, should we teach anything at all if we can't come up with a good reason for us teaching it and the students learning it? Should we demand attention and compliance just because our students have to be in our classroom?
- "We're learning this because…"

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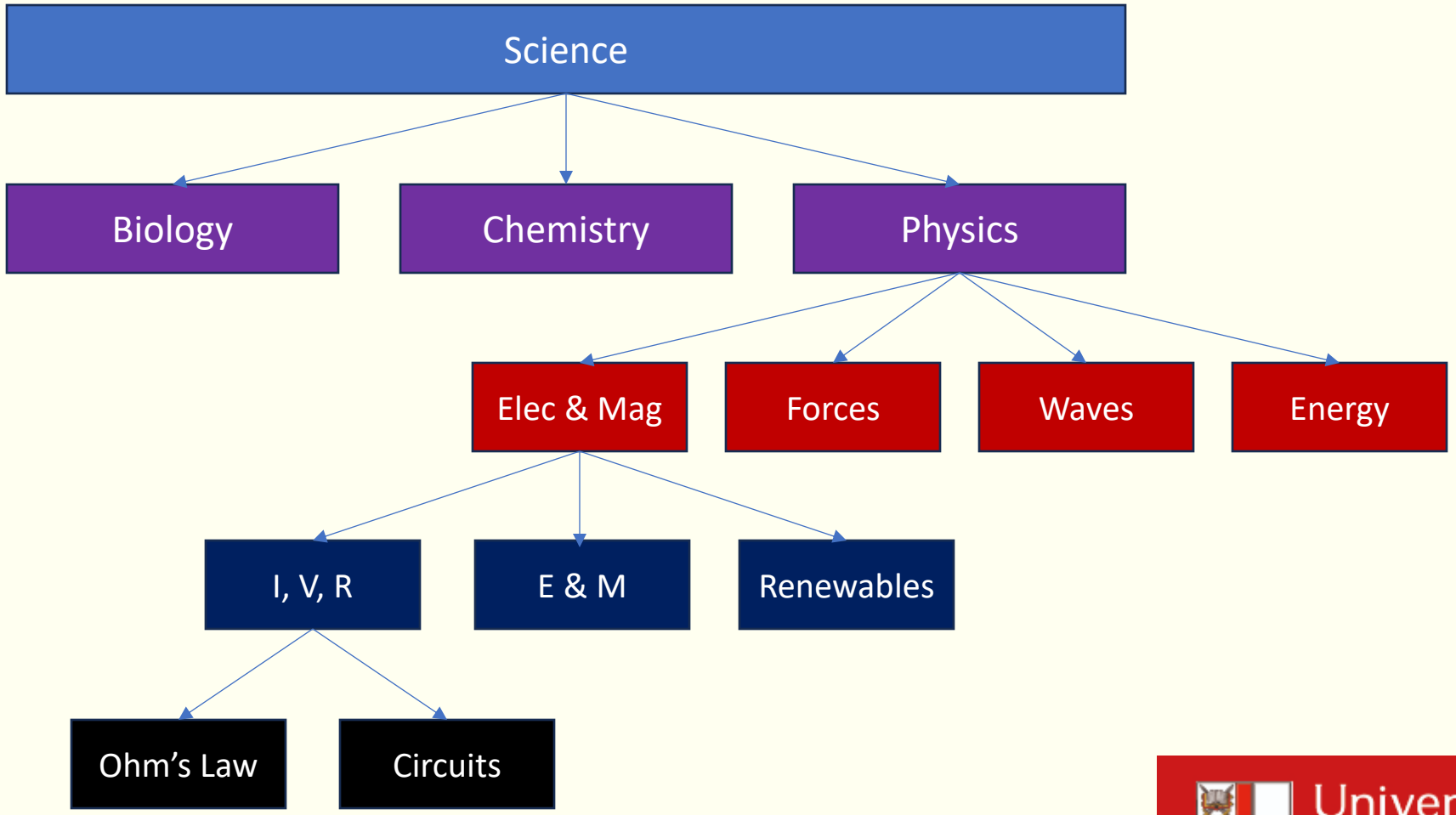
Articulate the purpose – it has many levels (an example)



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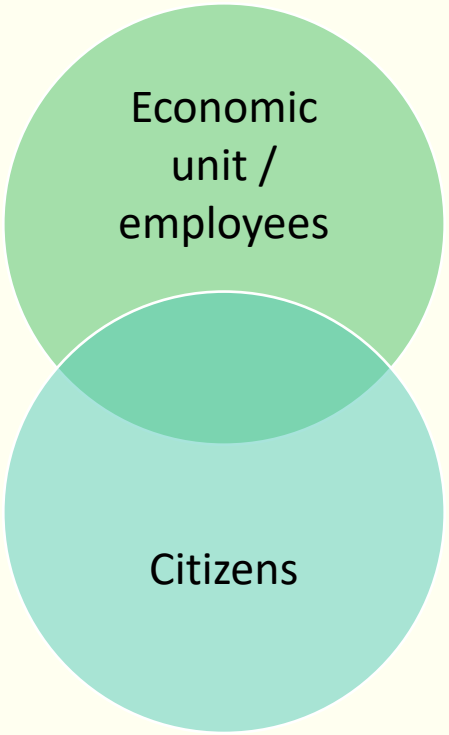
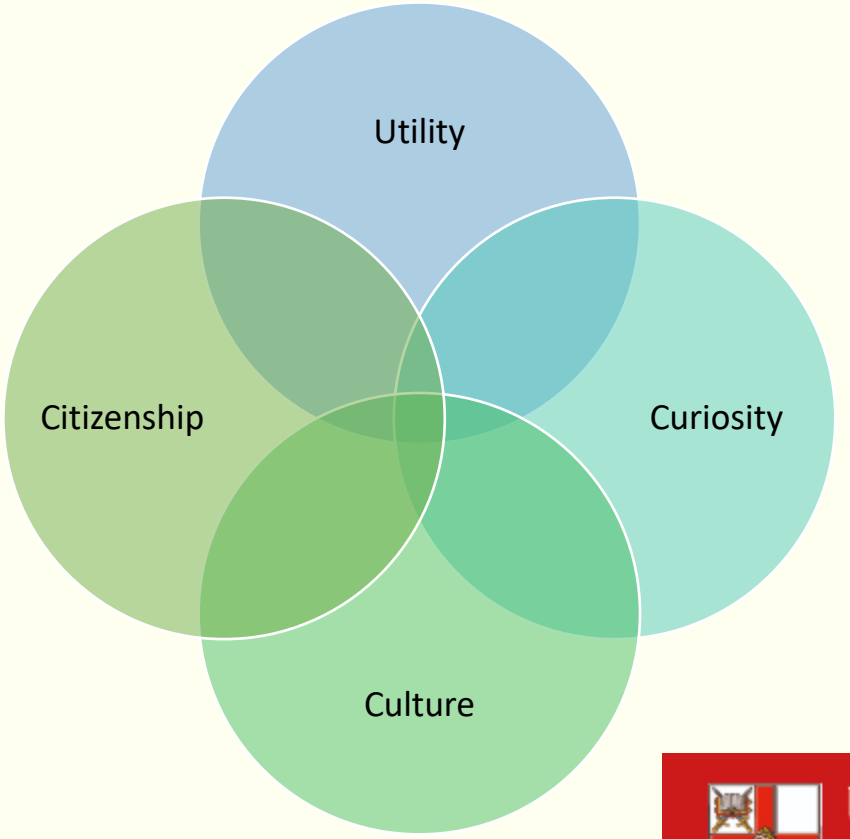
Perspectives
(none of which need to be mutually exclusive)

State centred



Student centred



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State centred

Economic unit / employees

- Some students - Possession of gateway qualifications to enable access to higher, more specialised (more relevant) qualifications with direct workplace benefits

- All students – range of skills that may be valuable in the workplace (and in life). For example: diverse measuring skills, handling data, objective assessment, pattern spotting, appreciating cause and effect, safety
- At levels up to 16, how much substantive content is actually valuable in the workplace? Is the workplace utility in terms of substantive knowledge a valid perspective during compulsory science education? Can it ever be the case?

Citizens

- The “state” needs scientifically literate citizens, who trust science. Why?
- To ensure understanding of, and compliance with, a range of science-based policies and laws. For example: Vaccines, pollution, health, climate, agriculture
- Appreciating the extent and importance of science within public policy issues, for example around climate change: renewables and nuclear, climate and weather, sea-levels, health issues, resources and economics, migration, agriculture etc.

Student centred

Utility

What do we mean by “useful”?

- To whom?
- In what way?
- Is the substantive (content) knowledge genuinely useful?
- Can the content be used to promote aspects of disciplinary knowledge (skills) which are useful?
- Avoid the “knowledge nuggets” nonsense!
- This will inevitably intersect with other categories (such as employment and educational opportunities but from a student-centred perspective)

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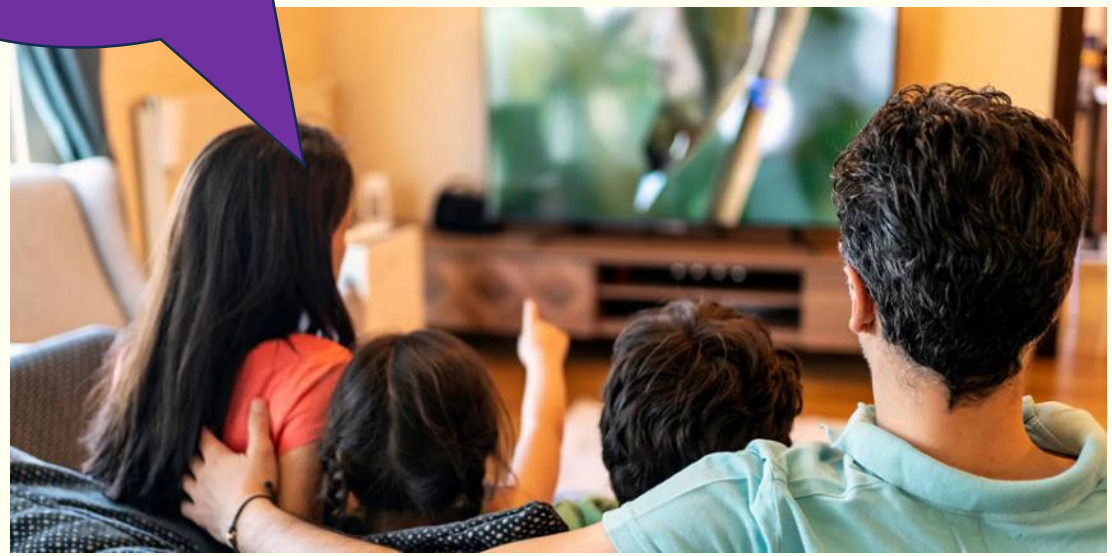
I'm so glad I was taught all about the electromagnetic spectrum!

If only I knew more about semi-conductor physics I would enjoy TV so much more!



SARCASM ALERT

https://www.flir.com/discover/public-safety/teledyne-flir-cameras-help-save-lives-in-stockholm-fire/

https://www.ofcom.org.uk/tv-radio-and-on-demand

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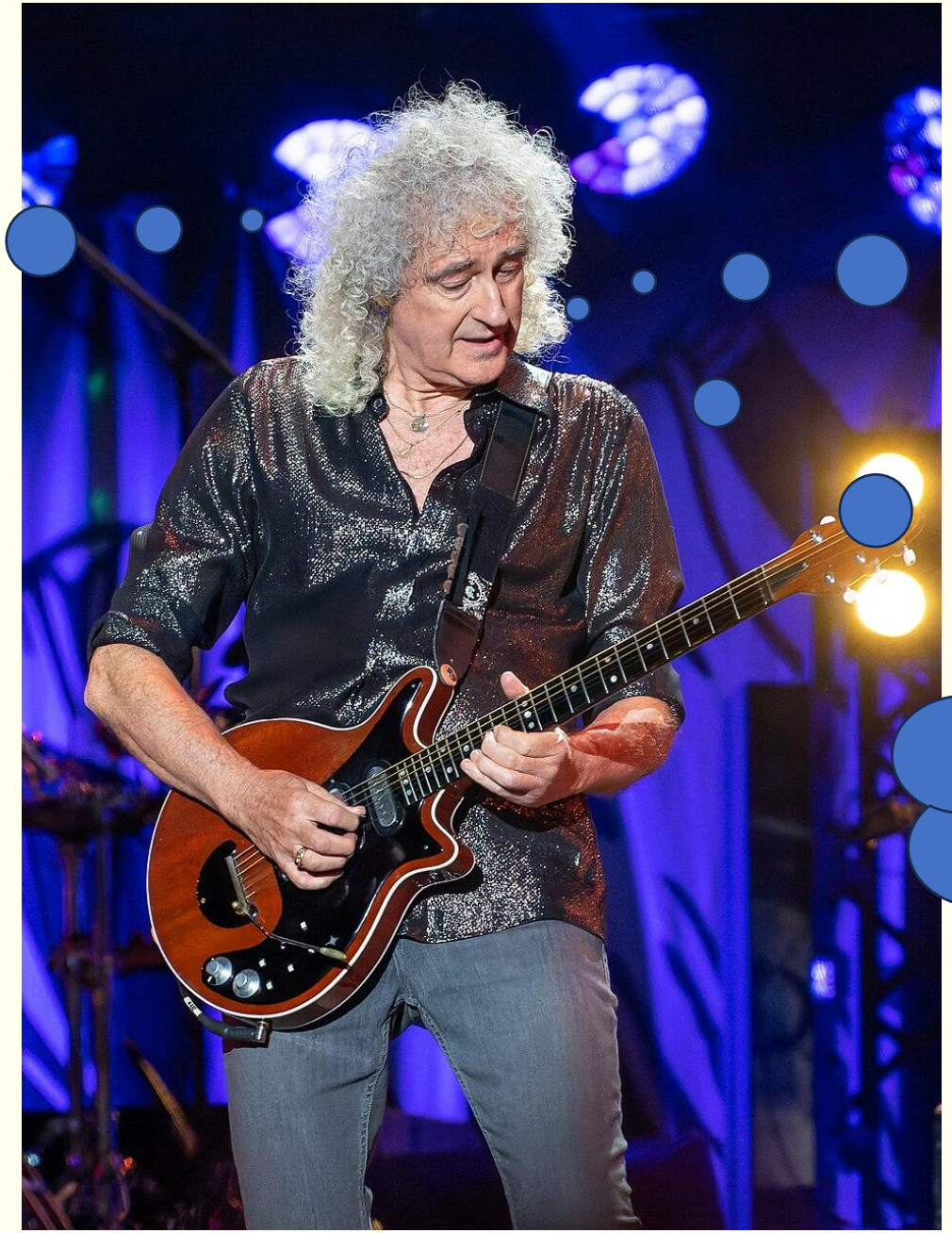
I'm a virtuoso guitarist



I know my physics, I wound my own electromagnetic pickups, I have a PhD

However, I suspect my virtuosity is not dependent upon my science!

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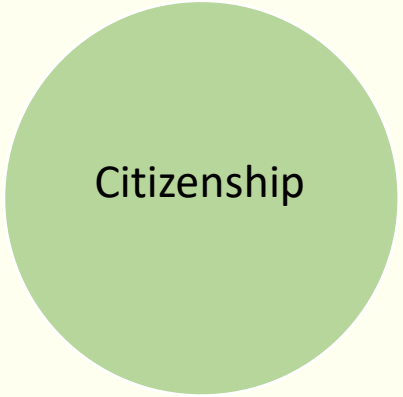
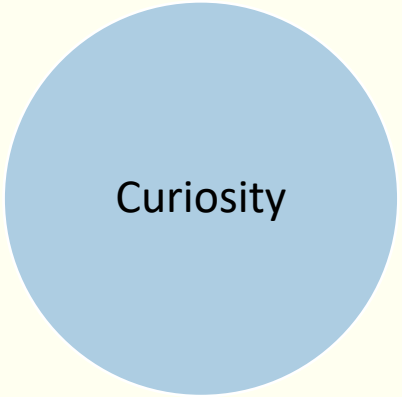
Student centred (some thoughts)



- Importance of science as citizens in 21st century democratic society
- Empowered citizenry making informed judgments
- Understanding data and how science is done
- Trusting science
- Dealing with misinformation
- Skills to do the above



- Humans are curious, we are explorers
- We ask “why?” just because we are human
- Awe and wonder

- Science relating to our broader lived experience (not a bolt-on – science IS culture)
- History (national, regional, global)
- Identity

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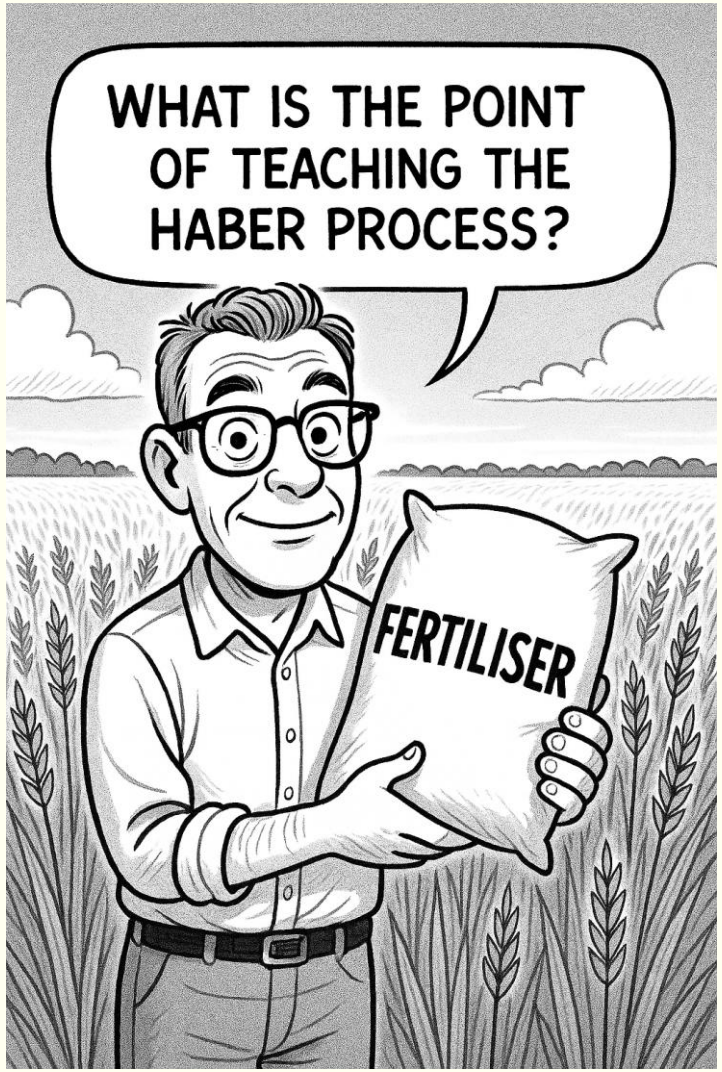
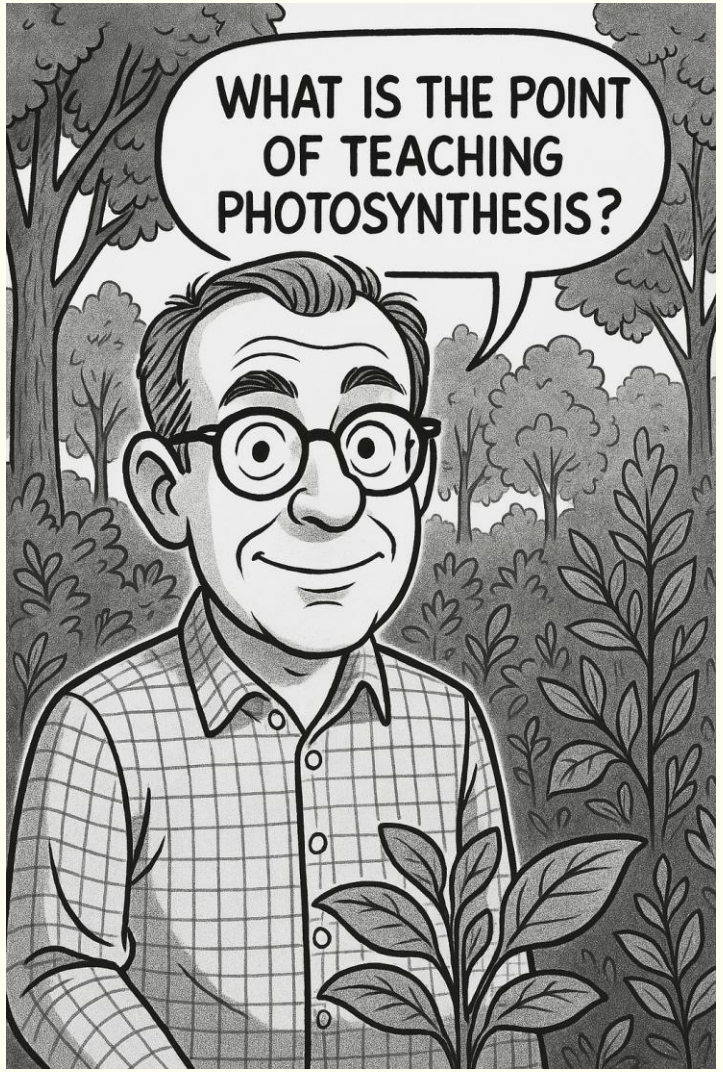
Audience participation time!





Also remember, for "what is the point" you could read "what are the opportunities"…

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My research

- Two studies
  - What's the point of science? Perceptions of **experienced members of the science education community** about why science should be taught
  - What's the point of science? Perceptions of **pre-service science teachers** about why science should be taught

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Would you be willing to participate?

Anyone involved in science education can take part in this study, it is open to all. You'll be asked to complete an anonymous survey exploring multiple views on the purpose of science education. The survey should take no more than 10 minutes to complete. Your responses will help policy makers and teacher educators, and findings will be shared by the ASE.

Flyers on the ASE stand with link to participant information

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ASSOCIATION FOR SCIENCE EDUCATION

What's the point of science?

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Access the survey with this QR code

The Participant Information Sheet can be read here

This work is conducted by researchers at the University of Chester, in partnership with the ASE.

You can contact the lead investigator, Dr Mark Whalley, at mark.whalley@chester.ac.uk.

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What next?

- See you next year…
- Results of research
- Chatting about my book on this subject (then I will share my opinions!)

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Thank you

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Also find me on LinkedIn

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