Think Physics: Science Capital in the Classroom

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Outcomes

- participants will understand the concept of science capital and will have the opportunity to think about their own 'science capital'
- participants will consider the importance of careers awareness in primary schools
- participants will examine some resources to introduce 'careers in the classroom'.

Quick Quiz

What science-related qualifications or skills / knowledge do you have?

- e.g. 'A-level in Biology', 'read lots about planets'

What science related activities / experiences do you do outside of work/study?

- e.g. visit science centres

Who do you know that uses science in their work?

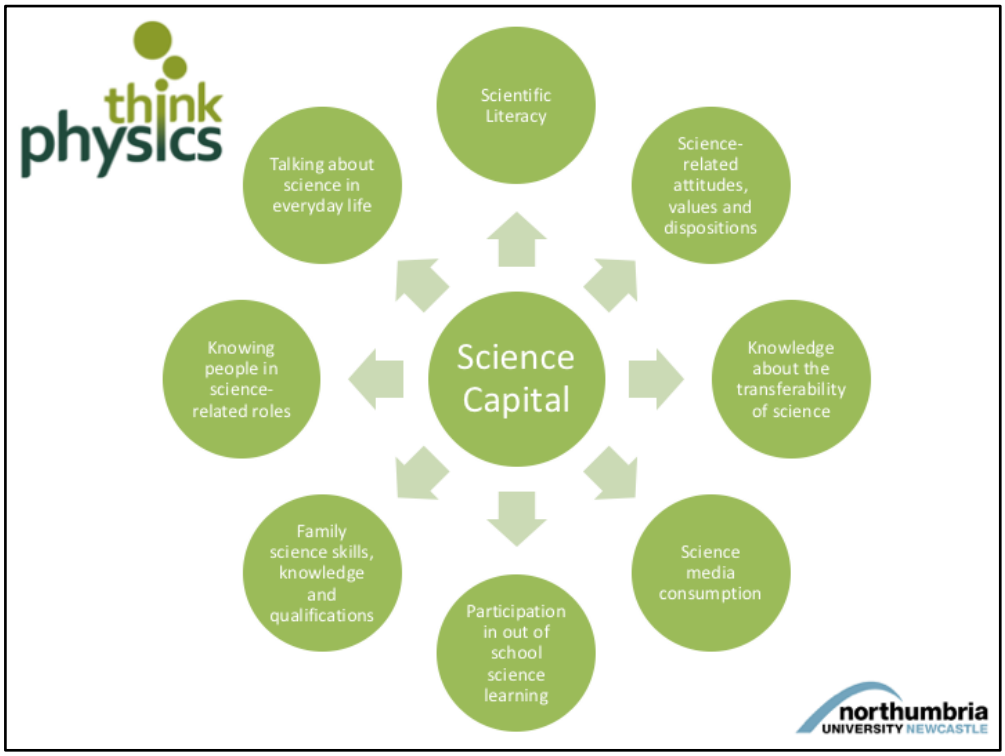
- e.g. 'my cousin is an engineer/car mechanic'

What three words would you use to describe your feelings about science?

What is science capital?

- ASPIRES – longitudinal study looking at STEM career aspirations, attitudes and choices of pupils aged 10 - 14
- Found a link between 'science capital' and students aspirations for future science careers
- Family background and interests made a difference in what pupils wanted to do

http://www.kcl.ac.uk/sspp/departments/education/research/aspires/ASPIRES-final-report-December-2013.pdf



Scientific literacy: a young person's knowledge and understanding about science and how science works. This also includes their confidence in feeling that they know about science.

Science-related attitudes, values and dispositions: this refers to the extent to which a young person sees science as relevant to everyday life (for instance, the view that science is 'everywhere').

Knowledge about the transferability of science: understanding the utility and broad application of science qualifications, knowledge and skills used in science (e.g. that these can lead to a wide range of jobs beyond, not just in, science fields).

Science media consumption: the extent to which a person, for example, watches science-related television, reads science-related books, magazines and engages with science-related internet content.

Participation in out of school science learning contexts: how often a young person participates in informal science learning contexts, such as science museums, science clubs, fairs, etc.

Family science skills, knowledge and qualifications: the extent to which a young person's family have science-related skills, qualifications, jobs and interests.

Knowing people in science-related roles: the people a young person knows (in a meaningful way) in their family, friends, peer, and community circles who work in science-related roles.

Talking about science in everyday life: how often a young person talks about science out of school with key people in their lives (e.g. friends, siblings, parents, neighbours,

community members) and the extent to which a young person is encouraged to continue with science by key people in their lives.

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https://www.youtube.com/watch?v=8y5vyjlxsBA

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Look back at earlier answers – would they say that they have high or low science capital?

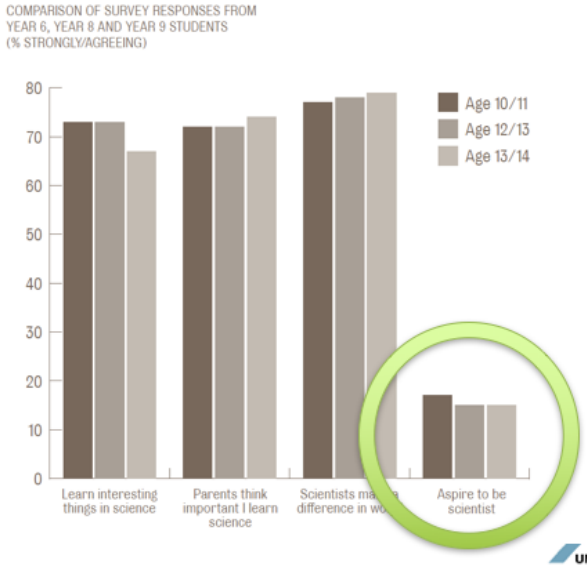
Note: This is not a judgemental statement, merely a description of how things are.

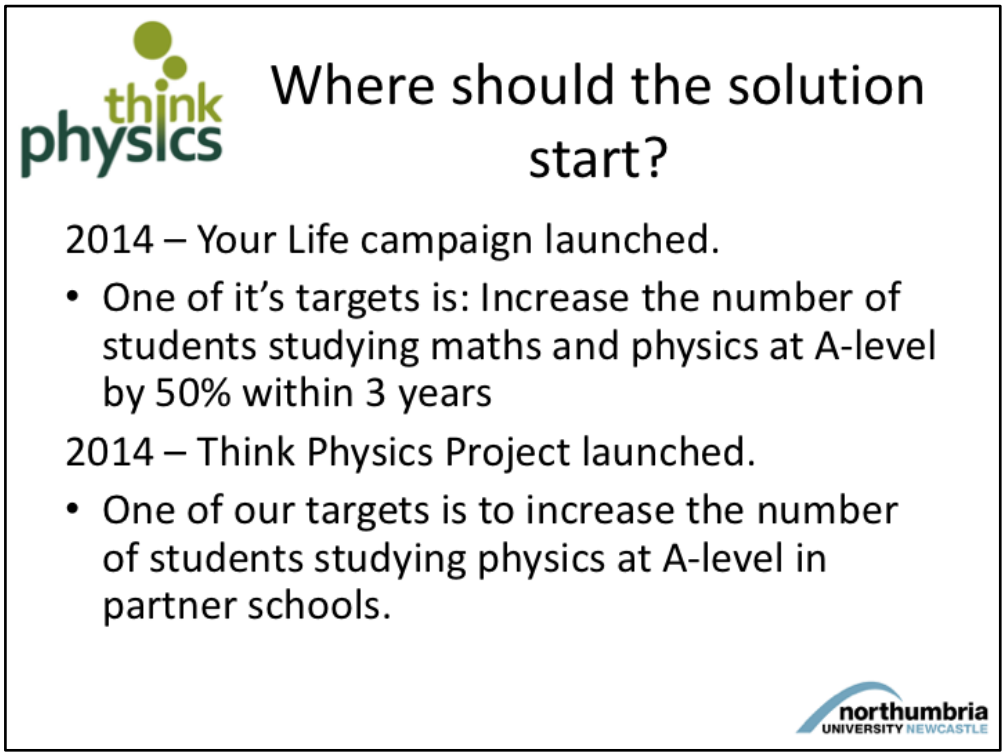
But why is Science capital important?

Every year, there are reports about the shortage of STEM skills, or of engineers, or of physics and maths teachers etc, and there have been efforts to encourage girls into physics and maths subjects for over 30 years. But not much has changed. STEM subjects based around engineering and technology appear to suffer a lack of interest. Quite a lot of interventions are based on the premise 'lets make science more fun', 'lets inspire kids' and then they will want to study science. But that doesn't seem to have worked.

Although having a high science capital doesn't mean that pupils WILL go on to study STEM, pupils that go on to study STEM often do have a high science capital.

Young People like science…

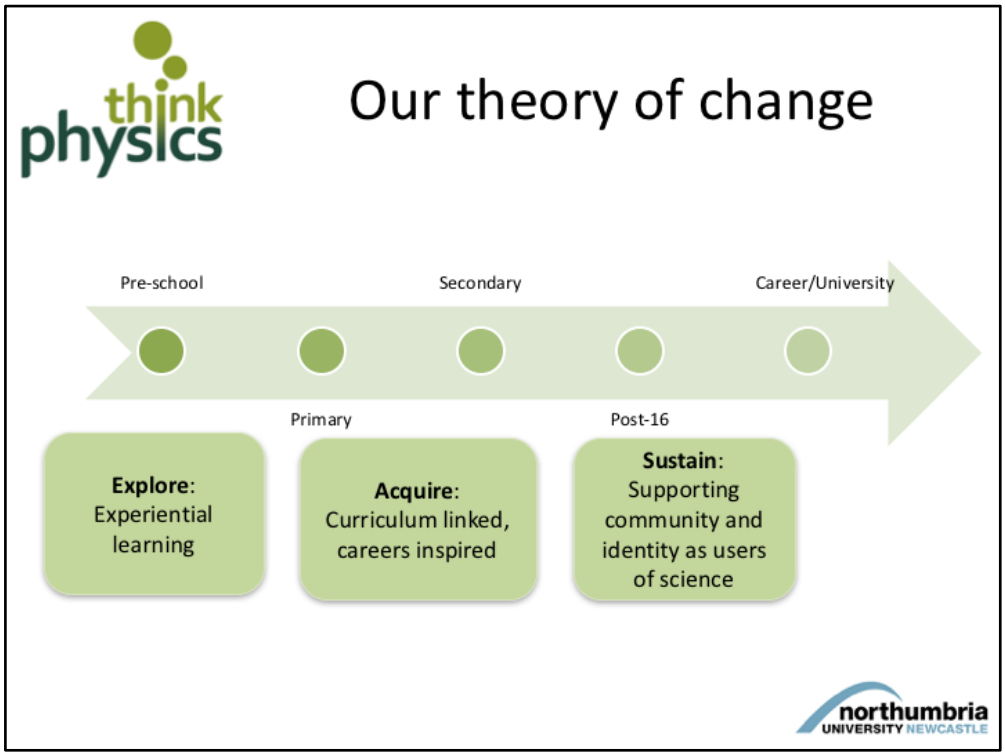




Companies want to solve the problem in the next few years (2020 is a figure often mentioned). However, the issue is

Lots of the interventions are aimed at older pupils – year 9 – 12. But it's mostly too late to change their minds. They might not know what they want to do, but they know what they don't want to do. And what they don't want to do is be a scientist - as shown by ASPIRES.

Working with kids at the top of this age range is mostly like shuffling deckchairs on the titanic. You're working with students who are already interested, rather than those who hadn't thought of it before.



We have used the 'Science capital' model to plan our work with schools. We use different aspects to think about how we can support and develop young peoples knowledge and awareness of the possibilities that studying science and maths can lead to.

We have 30 partner schools – 16 secondary and 14 primary.

With the secondary schools, we are working to support students who already show an interest in science – particularly girls, and students who don't think of themselves as 'brainy'. Physics connect for year 10 – 13 female physics students is one example of this.

But the key to long term change is our work with primary schools. Starting in pre-school, we aim to see each child regularly over their primary school. Through workshops, family science clubs, online materials and teacher support we are increasing their science capital. It's not that we want every child to work in STEM, but we do want them to know about what it can do for them.

For us, the primary work is the most important thing we do. Currently looking for more funding for 2017 onwards – and we are looking at going primary only if necessary. Other people want to work with the secondary and post-16 students because that feels like a quick win, but we believe that long term commitment is

vital.

Quote attributed to Marie Wilson of The White House project (2010), but also in the Film 'Miss Representation' by Marion Wright Edelman of The Children's defence fund.

When you talk to parents and children in primary schools, they often don't know what careers are available that use science.

Lots of recent reports suggest that careers advice in secondary schools is not very good. KCL have also found that students get different levels of advice depending gender, but also ethnicity and class.

But if students are making their minds up about what they don't want to be by year 6, then most of the secondary careers information is too late. Primary schools need to introduce careers information, before it's too late!

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There's more to science careers than being a scientist

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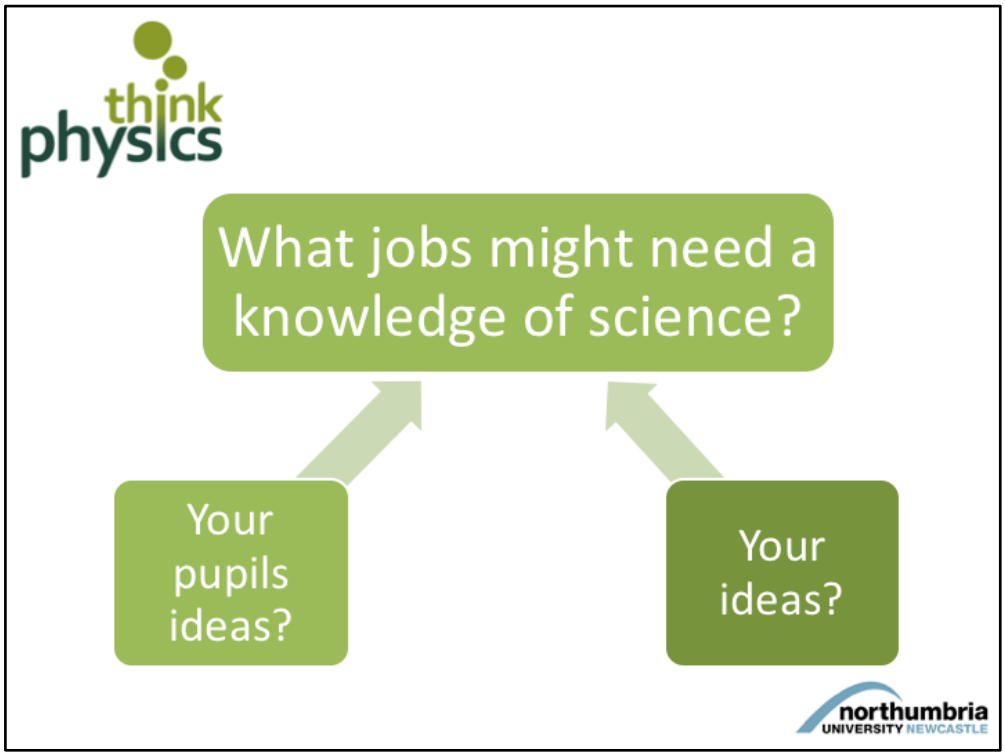


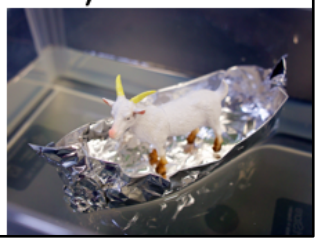
Ask people to come up with lists of jobs that might need a knowledge of science – both in terms of what their pupils might know, and what

Think Physics' Approach

- Sinking and Floating (year 1)
- Plants (year 1 or 2)
- Rocks (year 3)
- Levers and mechanisms (year 5 or 6)

Think Physics' Approach

- The Naval Architect (Goat on a Boat) (year 1)
- The Botanist (year 1 or 2)
- The Volcanologist AND The Geologist (year 3)
- The Mechanical Engineer (year 5 or 6)



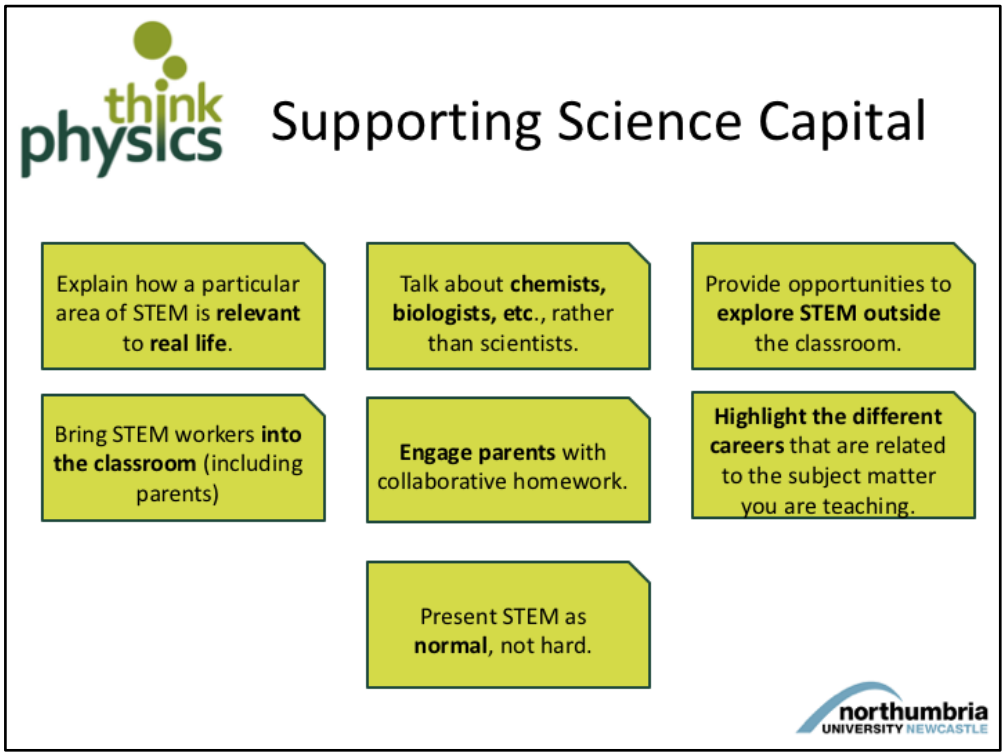
Where can I find out about different jobs?

Plotr https://www.plotr.co.uk/

iCould http://icould.com/

NHS Careers https://www.healthcareers.nhs.uk/

National Careers Service
https://nationalcareersservice.direct.gov.uk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Supporting Science Capital
Explain how a particular area of STEM is relevant to real life.
Talk about chemists, biologists, etc., rather than scientists.
Provide opportunities to explore STEM outside the classroom.
Bring STEM workers into the classroom (including parents)
Engage parents with collaborative homework.
Highlight the different careers that are related to the subject matter you are teaching.
Present STEM as normal, not hard.
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Next steps…

Following on from this session,

- What are the key points you will share with your colleagues?
- What will you do in your classroom / school:
  - Next week?
  - Next term?
  - Longer term?

Get in touch

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