

Teaching Scenario 3: The Charitable Trust

Level

Ages: 11 - 14

UK Key Stage: 3

UK Years: 7 - 9

US Grade: 6th - 8th Grade

Introduction

It is commonly assumed that girls are not as interested in science, technology, engineering or maths, and this is why so few pursue STEM careers. Research shows, however, that girls do enjoy STEM subjects, but they shy away for two key reasons: they do not see how useful a science qualification is, and they do not feel 'clever' enough to do science.

In general, girls prefer careers where they can make a difference. This might explain why women make up a large majority of medicine and veterinary science graduates, as both subjects have obvious positive societal impacts and their usefulness is well understood.

The Churchill Fellowship also found that girls respond better to collaboration and "mission-based tasks" than competition. When girls lose a competition, they tend to take that as an indication that they are not good enough, whereas boys tend to take such losses as temporary state and thus develop more resilience to failure.

It is therefore important to show girls that careers in other STEM subjects will also provide them with the opportunity to solve problems and make a difference. This means not just cutting through the stereotypical concepts of what a STEM career is, but demonstrating the important societal contributions that people in such careers can make. It is also essential to emphasise collaboration and teamwork, and to avoid competition as a core motivator.

Learning outcomes

The aim of this scenario is to help students understand:

- The broad spectrum of jobs that studying STEM subjects make possible
- The societal good that working in STEM can allow people to do
- That medicine and veterinary science aren't the only 'helping' subjects you can study — engineering, for example, can also be focused on solving real world problems
- STEM subjects often require people to work collaboratively in teams with a focus on achieving their shared goals, not on 'winning'
- That everyday people work in STEM, and that it's not a career reserved for 'super-geniuses' or 'brainiacs'.



It's worth noting that the idea that STEM is reserved only for the extremely intelligent is pervasive and needs combatting at every opportunity. Words like 'genius', 'brainiac', 'mastermind', 'Einstein' or 'boffin' should be avoided, as they will alienate girls who are very unlikely to self-identify as intelligent, even if they are.

Scenario

Tech entrepreneur turned philanthropist Dame Florence Akinyi is setting up a charitable trust to fund research and innovation focused on projects that benefit society. She has committed to giving away £1 million each year to individuals and groups that she feels are doing important work.

She has decided to take a broad view of what sort of projects she wants to fund and is keen to hear from all sorts of different people, working on a variety of challenges. Some of those challenges might be global in nature, others might be local.

Dame Florence's current priority is the development of her website and, in particular, the section showcasing projects she thinks demonstrate the kind of work she wants to fund or challenges she wants to see addressed. She is hiring a copywriting agency to research STEM projects and write content for her website.

Situation

A copywriting agency has been asked to research three topics: the global challenges facing humanity, important local-scale problems, and the work being done to solve some of these problems. She wants to see a brief outline of at least three challenges, and to see example of how STEM is helping or might be able to help.

Key questions

- What global challenges will humanity need to solve over the next century?
- What local challenges do we face in our own communities?
- How many of those challenges might be solved with contributions from science, technology, engineering or maths?
- What projects exist that are already addressing parts of these challenges?
- What do we mean when we talk about a project "making a difference"?
- Why do people find it satisfying and enjoyable when they work on projects that make a difference?

Note: Some challenges will lead to easier discussions than others, and may be local, global, or both. For example, a discussion of disease can lead to an examination of vaccination, not just the production of vaccines but also how they can be kept cool in hot countries. The clean water problem might lead to discussion of the Life Straw, and Emily Cummins' water carrier or use of Practical Action's free online resources, eg Water! Water!. The issue of pollution might lead to conversations about local problems around environmental impacts of industry, how we dispose of our waste, or Practical Action's globally focused Plastics Challenge.



Client

The client is philanthropist Dame Florence Akinyi, who is launching a new charitable trust to fund research and innovation that has a positive impact on people's lives, both locally and globally.

Stakeholders

Other people with an interest in the outcome of this project are:

- Angela Brown, journalist who is writing a profile of Dame Florence and her new foundation.
- Dr Liu Jiahui, who a local researcher with an eye on sustainable technologies who's hoping to apply for funding.
- A charity that works in developing countries and is hoping to collaborate with Dame Florence's trust.

Commission

To produce descriptions of three important local or global challenges that might be solved through science, technology, engineering or maths, and three descriptions of innovative STEM projects that produce a clear benefit for society. (The projects do not have to be related to the challenges.)

Tasks and activities

Research local challenges

- What sort of problems does your local community face?
- Working on your own to start with, write down a list of challenges
- Share those challenges with the rest of the class
- Together, discuss and prioritise the list of challenges to produce a Top Five

Research global challenges

- What sort of challenges does humanity face over the next hundred years?
- Working on your own to start with, write down a list of challenges
- Share those challenges with the rest of the class
- Together, discuss and prioritise the list of challenges to produce a Top Five

It would be possible to use sticky notes to collate and prioritise the problems lists. Students write a single challenge on each sticky note and stick them to the walls of the classroom. Students then rearrange the sticky notes into groups of similar ideas.

To make the exercise shorter, you could ask the students to pick their top five or ten ideas, the ones that they feel most strongly about.



How could STEM help

- Discuss how STEM might help address some of these challenges
- Which challenges seem like they need a scientific solution? A technical solution? An engineering solution?
- How might scientists, technologists and engineers approach these problems?

Making a difference

- What does it mean to “make a difference”?
- If a project is “for the public good” or “for the benefit of society”, what does that mean?
- Why might people find projects that make a difference satisfying?
- What is a “social enterprise”?
- Is it possible to make money and make a difference?

Projects that make a difference

- What STEM projects can you find that make a difference?
- What problems do they tackle?
- How did they come about?
- Do different projects have anything in common? (Eg cheap, sustainable, easy to deploy.)

Writing your descriptions

- On your own or in small groups, write descriptions of three challenges, global or local.
- On your own or in small groups, write descriptions of three projects that make a difference.

Present your descriptions

Present your descriptions to Dame Florence Akinyi, explaining why you made the choices you did.

Responses from other stakeholders

What kind of responses or challenges do you think your work would receive from:

- The journalist?
- The scientist?
- The charity?

This might be an opportunity for role playing, where students split into groups of four. The student playing the journalist then interviews the campaigner and the toy store manager about their opinions of the new design, and then asks the designer to provide a response.



Resources

For Girls in STEM, Belonging, Not Brain Structure, Makes the Difference, Stephanie Kelly, Huffington Post http://www.huffingtonpost.com/stephanie-kelly/for-girls-in-stem-belongi_1_b_4394592.html

Generation STEM: What girls say about science, technology, engineering and math, Girl Scouts https://www.girlscouts.org/content/dam/girlscouts-gsusa/forms-and-documents/about-girl-scouts/research/generation_stem_full_report.pdf

UK Science and Discovery Centres: Effectively engaging under-represented groups, UK Association for Science and Discovery Centres [http://sciencecentres.org.uk/reports/underserved/UK%20Science%20and%20Discovery%20Centres%3b%20Effectively%20engaging%20under-represented%20groups%20\(May%207%202014\).pdf](http://sciencecentres.org.uk/reports/underserved/UK%20Science%20and%20Discovery%20Centres%3b%20Effectively%20engaging%20under-represented%20groups%20(May%207%202014).pdf)

The Winston Churchill Memorial Trust of Australia report, Marita Cheng, 2011, https://www.churchilltrust.com.au/media/fellows/2011_Cheng_Marita.pdf

Human Immunity and Defence, BBC Bitesize, <http://www.bbc.co.uk/education/clips/zhp2h2hv>

Arktek, the passive vaccine storage device, <http://borgenproject.org/arktek-keeping-vaccines-cool/>

Emily Cummins' sustainable fridge, <http://www.wes.org.uk/emilycummins>

The LifeStraw, <http://www.vestergaard.com/our-products/lifestraw> and <http://www.gizmag.com/go/4418/>

Emily Cummins, water carrier (click on 'Inventions'), <http://www.emilycummins.co.uk/about>

Water! Water!, Practical Action, <http://practicalaction.org/mtl-water-water>

Water for the World, Practical Action, <http://practicalaction.org/water-for-the-world>

Design Challenge: Water Harvester, Practical Action, <http://practicalaction.org/design-challenge-water-harvesting>

Plastics Challenge, Practical Action, <http://practicalaction.org/plastics-challenge>

Social Enterprise, Wikipedia, https://en.wikipedia.org/wiki/Social_enterprise



Feedback

If you have any feedback on these scenarios, or the rest of the education pack, or if you would like to provide suggestions for improvements, please contact Suw Charman-Anderson at suw@findingada.com.

About this pack

This free education pack comprises of:

- Notes for Teachers
- Introduction to Teaching Scenarios
- Teaching Scenario 1: The Ultrobot
- Teaching Scenario 2: The Recruitment Fair
- Teaching Scenario 3: The Charitable Trust
- Useful Resources
- The Amazingly Enormous Careers Poster
- Ten Types of Scientist poster
- Ada Lovelace poster

All resources have been produced by Ada Lovelace Day, and are available to download for free from their website, findingada.com. These files will be continually updated so please do check the website for the latest versions.

For schools who wish to buy prints of the posters in sizes up to A0, these are available online from the [Ada Lovelace Day RedBubble store](http://AdaLovelaceDay.RedBubble.com), with prices starting at £10.99.

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