

NXplorers and STEM

Introduction

In 2014, Shell Projects and Technology leadership commissioned the development of a programme to help equip young people to embrace complexity through real world issues. The programme, which is sponsored by Shell and developed by Shaping Learning, offers a great way to enhance the STEM offer in your school.

Programme Objectives

The NXplorers programme sets out to:

- empower young people to address the complex challenges faced by the world today and to become agents of change
- provide the tools, methodologies and skills needed to tackle real world problems using collaborative, innovative and inter-disciplinary approaches
- develop STEM habits of mind through critical thinking and complex problem solving skills.

Content

The NXplorers programme uses a combination of systems thinking, scenario planning and a theory of change methodology to show young people how to deal with complexity. This way of thinking – known as NXthinking – is applied to the food, water, energy nexus, a context that provides real and relevant complex challenges across the globe.

Benefits

- High-quality professional development for teachers.
- Unique programme materials and tools that enrich and enhance STEM provision.
- A transformational skillset for students and future leaders that provides the capabilities for complex and inter-disciplinary thinking.
- A global collaborative movement for positive change applying STEM-related solutions to complex challenges.

Implementation

Trained facilitators deliver the ten modules of the NXplorers programme in a series of practical workshop sessions.

1. Before the workshop: Participants are asked to identify potential food, water, energy nexus issues in their local or national context.

2. Facilitator workshop (optional): This workshop is available to students or staff interested in becoming a NXplorers facilitator.

Successful completion of this workshop enables participants to take a facilitation role in the main NXplorers workshop.

3. Main NXplorers workshop: Students learn how to apply NXthinking and the NXplorers methodology to a complex issue and develop real world solutions. Students start to record their NXplorers journey and their thinking in the online collaboration space. Students develop an action plan and timeline for the project (anticipated to be between 6 and 12 months). Students present their NXplorers project and action plans.

4. NXplorers project in schools: On completion of the workshop, students lead the implementation of their projects using NXthinking and the NXplorers toolkit, with staff support. They record progress – and set backs – in the online collaboration space and ‘call out’ to other NXplorers for help, advice and support. Schools allocate time for the implementation, review and refinement of each NXplorers project. This can be an integral part of the STEM offer within the curriculum or part of an enrichment programme. Regional NXplorers teams provide ongoing support to help maintain momentum and ensure good progress is being made.

Online platform

The NXplorers website (www.nxplorers.com) provides:

- full details of the programme and how it can be run
- the tools and resources needed to facilitate the programme
- a place for students to record their NXplorers journey and collaborate with an online global community.

NXplorers in action Qatar



This is the journey of one group of first time NXplorers in Qatar.

Identifying local issues

The students started by identifying relevant local issues. They wanted to find out how they could optimise the use of food, water and energy to help create a more sustainable future. They were interested in how their school could create a responsible and sustainable model for the future of food, water and energy.

Using the NXplorers toolkit to dig deeper

As they explored the issues, the NXplorers became increasingly concerned about the vulnerability of their food security. They recognised that global political and economic factors could have a major impact on the supply chain and create a massive rise in the price of food – a situation that would be unsustainable for any length of time.

Using NXthinking to create ideas and real world solutions

The students applied **NXthinking** to create ideas. How could they turn an arid, desert landscape into productive agricultural land? Was there a cheap and effective way of collecting clean water? Which fruits and vegetables are best suited to a harsh desert climate?

Creating future scenarios

The students were ambitious - they used the **scenario planning quadrant** tool to create a **future scenario** where Qatar was a self-sufficient food-producing nation, with a year of food reserves stored up. The **feasibility funnel** tool enabled them to work out which of their ideas for change would be manageable and get them started towards achieving their ambitious target.

Taking positive action

The groups realised that their solutions drew on a range of STEM ideas and that they would be more powerful if they were combined. Selecting the right plants for their market garden – ones that were able to flourish with only a small amount of water – was crucial. Working with **design engineers** the students were able to create a **solar, floating desalination unit** that used **solar energy** to collect clean water that could be used in the market garden. And finally, they designed a **triangular polytunnel** that used the sun to evaporate seawater. Desalinated water condenses at the top of the polytunnel and runs down the sides to water the plants, leaving salt as a by-product that can be used elsewhere. These ideas are in place and are already beginning to make a difference.

Continuing the journey

Having used the NXplorers programme to find possible solutions to one nexus challenge, the local community has since approached the students with another – how to increase the use of public transport. The NXplorers toolkit is being used once again as the students explore this new issue and work towards even more positive change.



Improving food security

Students at Dukhan English School were concerned about the vulnerability of Qatar's food supply. They used NXthinking and the NXplorer tools to explore the issue and identify what they could do to bring about positive change.

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