Embedding Time Travelling Trees into the Secondary School Curriculum

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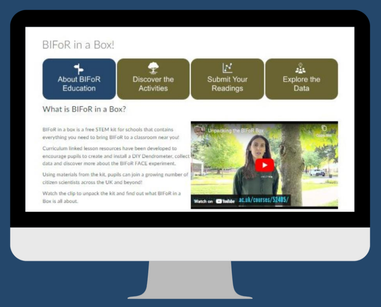
Introduction

As complex social-ecological systems, forests allow us to study key concepts at a wide range of spatial and temporal scales. From the chemistry of carbon and water molecules, the biology of disease and pathogen spread and the geography of feedback loops and global challenges; forests, plants and ecosystems are deeply rooted within the school curriculum.

Despite this, such perspectives are frequently overlooked in our classrooms. In a previous role as a secondary science teacher, I found high quality resources to teach these concepts were often hard to come by. Our aim at BIFoR is to bridge this gap and help engage the next generation of plant scientists and foresters.



Scan the QR code to head to the site!

BIFoR Education is a **free online learning platform** for schools that contains everything needed to bring the Birmingham Institute for Forest Research (BIFoR) to life!

An expanding set of engaging, **curriculum linked** activities have been co-created with researchers to support pupils in **KS3, 4 and 5**.

Virtual BIFoR FACE

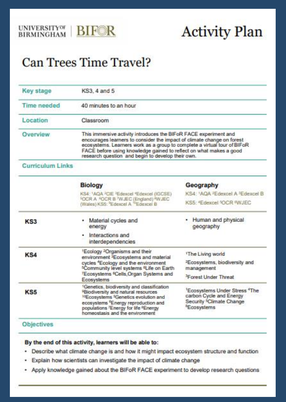
Using a fully immersive, 3D tour developed by HEFI, schools can visit one of the largest climate change experiments without leaving their classrooms!

A small Public Engagement grant has helped us develop an escape room style task to be used at science festivals.

Can Trees Time Travel?

This immersive VR activity introduces the BIFoR FACE experiment and encourages learners to consider the impact of climate change on forest ecosystems.

Key stage: 3 4 5


Activity Plan

Can Trees Time Travel?

Key stage	KS3, 4 and 5
Time needed	40 minutes to an hour
Location	Classroom
Overview	This immersive activity introduces the BIFoR FACE experiment and encourages learners to consider the impact of climate change on forest ecosystems. Learners work as a group to complete a virtual tour of BIFoR FACE before using knowledge gained to reflect on what makes a good research question and begin to develop their own.

Curriculum Links

	Biology	Geography
	KS4: *AQA *CIE *Edexcel *Edexcel (IGCSE) *OCR A *OCR B *WJEC (England) *WJEC (Wales) KS5: *Edexcel A *Edexcel B	KS4: *AQA *Edexcel A *Edexcel B KS5: *Edexcel *OCR *WJEC
KS3	• Material cycles and energy • Interactions and interdependencies	• Human and physical geography
KS4	*Ecology *Organisms and their environment *Ecosystems and material cycles *Ecology and the environment *Community level systems *Life on Earth *Ecosystems *Cells,Organ Systems and Genetics	*The Living world *Ecosystems, biodiversity and management *Forest Under Threat
KS5	*Ecology, biodiversity and classification *Biodiversity and natural resources *Ecosystems *Genetics evolution and ecosystems *Energy reproduction and ecosystems *Life in the UK *Energy homeostasis and the environment	*Ecosystems Under Stress *The carbon Cycle and Energy Security *Climate Change *Ecosystems

Objectives

By the end of this activity, learners will be able to:
- Describe what climate change is and how it might impact ecosystem structure and function
- Explain how scientists can investigate the impact of climate change
- Apply knowledge gained about the BIFoR FACE experiment to develop research questions

Scan the QR code to head to the virtual BIFoR tour.

Top left: A fully resourced curriculum linked lesson for KS3, 4 and 5 using the virtual tour. Top right: example lesson plan. Bottom left: escape room task for science festivals.

BIFoR in a Box (BFIAB)

A **free STEM kit** for schools! BFIAB contains curriculum linked lesson resources and all the materials needed for pupils to create and install a **DIY Dendrometer**, collect data and discover more about the BIFoR FACE experiment. Over 95 kits have been sent out and we have an active network of over 100 schools across the UK. For the first growing season, we asked schools to 'sign up' rather than targeting specific schools to ensure the kit was used. The participation of local areas (POLAR) classification groups areas across the UK based on the proportion of young people who participate in higher education. Of those that signed up, 10% of schools are POLAR 4 Quintile 1, the lowest rate of participation.


Field Work Data

DIY Dendrometer! (Part B)

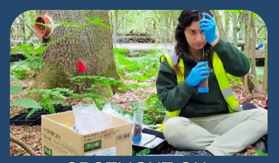
Left: BFIAB resources. Right: map of schools that signed up for a kit.

An interactive dashboard has been developed for schools to submit their data and incentives are being developed to encourage schools to submit their readings. This includes a knowledge exchange event to mark COP28 in October.

And Beyond!

Spotlight resources introduce pupils to the people, places and things behind BIFoR research. Additional activities motivate pupils to engage with complex concepts such as limiting factors, plant pathogens and transpiration. Each of our activities are fully resourced with learning plans, and **adaptable slides and handouts** ready to use by teachers in their classrooms.

With support from BIFoR volunteers, the institute also runs in person visits to BIFoR FACE, the University Campus (including Winterbourne & Wolfson Advanced Glasshouses) and local schools.

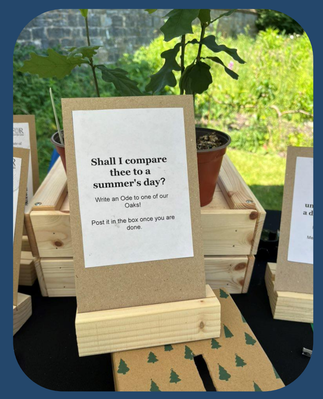


SPOTLIGHT ON

BIFoR
PhD Student

Benchmark 4: Linking curriculum learning to careers

Key stage: 3 4 5



Left: example of a spotlight resource. Right: example of outreach stand activities.

Acknowledgements

Thank you to the wider BIFoR team and our incredible volunteers who have supported all of our education and outreach activities.