



Royal
Botanic Garden
Edinburgh

Expedition Botanics – explore the world of plants like never before!

Dates: Monday 05th – Friday 09th August 2024

Times: 9.30 – 16.00 (Friday 9.30 – 13.00)

Suitable for: pupils heading into S5/S6 or moving on from school

Cost: £225 for the week

For more information, please check [our website](#).

Bookings are via [our online shop](#).

PLEASE NOTE: This is a suggested programme, with some of the specific events potentially happening on a different day.

Based in the heart of RBGE's main research buildings, and out and about in our world-renowned plant collections, this 5-day summer school gives you a chance to delve into the wonders of plants – Earth's most important organisms. Experience how real science works and how it can help humanity face up to the challenges of the future such as climate change and food security.

You will work as a team to uncover some of the mysteries of the botanical world and find out how plants sit at the heart of almost all life on earth. You'll pick up careers advice, learn about experimental design and develop your lab and communication skills.

Day 1 | Putting down roots

Today we'll welcome you to the Botanic Garden where you can meet the Team and each other. You'll get a feel for the huge range of work that goes on in this amazing place and the many career opportunities working with plants.

After getting to know each other better we'll visit the exhibitions at Inverleith House to inspire ourselves and look at how art can interpret and interact with science in ways that you wouldn't have thought of!

In the afternoon we'll get out in some of the wild areas of the garden to learn a fundamental skill - plant identification. Can you tell an ash from an oak, or a mint from a monkeyflower? And why do we need to?

Lastly, we'll prepare ourselves for our 'expedition' the following day.

Skills, knowledge and questions:

- What makes plants *the* most important organisms in the world?
- What does a Botanic Garden do?
- How can we interpret science in imaginative ways?
- Plant identification 1

Day 2 | Investigating Biodiversity 1: Expedition and Lab day 1

We'll start the day with a trip to the Garden to find out all about fieldwork. Our focus will be on identification skills, and the ecology of the habitats we visit. Plants support humankind, and we'll pick up on some of the riches they bring to our lives through hearing about plant lore. We'll try out different ways of recording our findings and even make our own beautiful herbarium specimens. We'll also take DNA samples for our lab session in the afternoon.

In the afternoon, we'll do one of the most important techniques in biology today - DNA extraction. Using the samples we've collected in the field, we'll start out lab investigation of one of the most incredible partnerships in the living world, between peas and beans, and *Rhizobium* bacteria.

Skills, knowledge and questions:

- Plant identification 2
- Field work recording
- GPS and data-collection
- Lab confidence and DNA extraction

Day 3 | People and plants

Today is all about our relationship to plants.

Plants have influenced us in many ways, in everything from medicine, to religion, art and to food. We'll see some of the treasures of the library and archives, looking at how plants have inspired people to produce works of art throughout history. We'll also take a look at the diversity of people who have worked in/with the Garden through the years.

Then we'll get out into the garden to learn more about the fascinating anthropology of plants, understanding how people have perceived plants in many ways, and take a biochemical sensory tour – so get your sniffing nose on!

In the afternoon, we'll look at the applied side of plant lore, ways in which people are using plants in all kinds of innovative products and have a chance to make our own botanical product to take home with us.

Skills and knowledge:

- Understanding plants and people – plant use and plant lore from magic to medicine
- Plant biochemistry
- Making things – the botanical business

Day 4 | Lab day 2

Today is part 2 of our DNA lab work. We'll use PCR to investigate the plant and bacterial partnership to see if we can detect the nitrogen-capturing *Rhizobium* bacteria in various plant parts. This partnership offers huge potential for the future of food security, as well as a very real opportunity to drastically reduce CO₂ and nitrogen pollution worldwide.

While the PCR runs, we'll do two things:

We'll visit the herbarium to see some of the 3 million dried plant specimens from across the globe, and discuss the historical, modern, and future issues around these priceless collections.

We will also get out into the garden and look at another important symbiosis – plants and pollinators. You can design a field experiment to help us understand this fascinating relationship.

In the afternoon, we'll learn our next lab technique – microscopy, while we explore the microscopic world of pollen. It isn't just there to give us hayfever, but is essential to the survival of almost every flowering plant. The architecture of these beautiful pollen grains is perfectly adapted to each plant's pollinator, so we'll investigate some of the mysteries of evolution and adaptation, as well as learning how pollen can help us delve into the deep past.

- Field techniques – pollinator observation and experimental design
- Lab techniques – PCR
- Lab techniques – microscopy and pollen identification

Day 5

Our last day is a little shorter (finishing at 13.00).

There'll be a chance for you to share your interests through the week, for us to potentially explore some other topics that you mention throughout the week/find experts in those topics, or have more time spent on specific activities you enjoyed, and finish up with a botanical picnic together.