



University of
Sheffield

School Outreach

**Inspiring the new generations into
scientific research, physiology,
discovery, innovative thinking
to create a visionary, life-changing
future.**



FROM BENCH TO CLASS: Our Outreach Aims

Our perception of reality is regulated by the sensory systems. At the University of Sheffield, the Hearing and Vision Research groups work together to discover the biology underpinning the **development, function, ageing** and **genetic-based alterations** of our hearing and vision sensory systems. We want to learn how sound and light are processed by our ear and eye and then perceived by the brain to drive human behaviour. We also use basic-discovery research to develop therapeutic intervention methods to prevent age and noise-related hearing loss, which affects millions of people in the world.

We plan to take our research to schools to promote science and encourage innovative and creative thinking among students.



Our goals are:

- to illustrate basic principles in human biology,
- to show how scientists work to address important questions in human biology and develop treatments for disorders,
- to promote innovative thinking,
- to encourage students to be creative, and
- to encourage and develop the student's presentation skills.





ENGAGEMENT: Our Outreach Activities

1. The (Virtual) Reality of Our Sensory Systems

Who is this activity for? Key stage 4 – 5 (age 14-18)

Activity description:

This activity offers students the opportunity to embark on a journey through the sensory systems through virtual reality models (wearing 3D goggles). This allows students to better understand the anatomy of the sensory organs, how they work and the consequences associated with sensory deprivation.

Time: up to 10 min/student (10 students/each run). Whilst waiting to engage in this activity students will participate in activities 2, 3 or 4.

Location: School – classroom.

What will students do?

During this activity students will be able to interact with the software by, for example, identifying the different components of the auditory and visual systems and discover their specific role. This will facilitate the understanding of how light and sound waves are converted into electrical signals that are perceived by our brain. This state-of-the-art technology will also provide students with a feeling of being involved in a research project (e.g. giving the excitement of looking down a microscope).

Learning outcomes:

- to understand basic concepts of human biology,
- to discover the physiological processes occurring within our bodies,
- to raise awareness regarding sensory system malfunction, and
- to discuss mechanisms of disease prevention.





ENGAGEMENT: Our Outreach Activities

2. Just How Important Are Your Senses?

Who is this activity for? Key stage 4 – 5 (age 14-18)

Activity description:

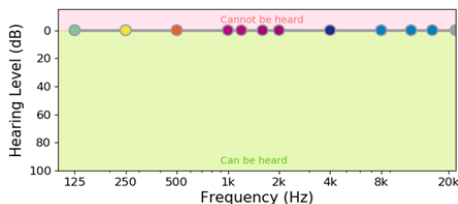
To appreciate the importance of the sensory systems, students will get the opportunity to experience how hearing and vision can be affected by different conditions.

Time: 5-10 min/student (6 students/each run).

Location: School – classroom.

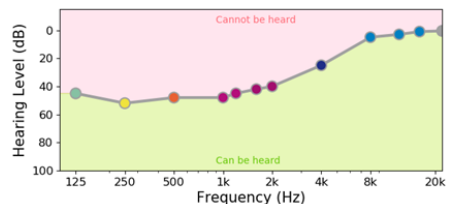
What will students do?

Students will use high-performance noise-cancelling headphones that will simulate sudden hearing loss and the sensation of social isolation (see examples below). Students will also have the opportunity to watch natural landscapes that are altered according to a particular visual dysfunction. This will be followed up with a group discussion exploring the impacts of sensory deprivation on everyday life.



"Bohemian Rhapsody" by Queen

Normal Hearing



Learning Outcomes:

- To appreciate the implications and impact of sensory deprivation – the feelings of isolation, the loss of independency that accompanies the illness and the sensations experienced by someone with damage of the sensory system.



ENGAGEMENT: Our Outreach Activities

3. Hands On Microscopy! Techniques in Physiology Research

Who is this activity for? Key stage 5 (age 16-18)

Activity description:

During this activity students will be taught the principles of fluorescence microscopy and calcium imaging at cellular level using fixed and fluorescently labelled sensory organs.

What will students do?

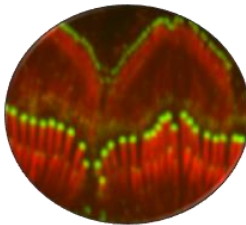
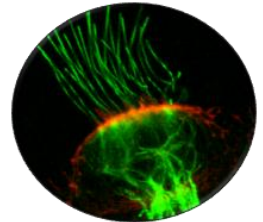
We will provide 10 teaching fluorescent microscopes (bench-top). Students will use these microscopes to understand the principles of microscopy and calcium imaging.

Time: 15 min/student (10 students/each run).

Location: School – classroom. Alternatively, we can run this activity during the school visit at the University.

Learning Outcomes:

- To gain insight into the research process.
- To view sensory biology hands on.
- To acquire a basic understanding of the materials and methods used in biological research.





ENGAGEMENT: Our Outreach Activities

4. Speak Up for Science: Group Presentations

Who is this activity for? Key stage 5 (age 16-18)

Activity description:

Students and teachers are invited to the University to participate into a group debate. This activity will be carried out as a consolidation exercise after the school visit. This activity will be followed by a tour in the laboratories.

What will students do?

During this activity students will be introduced to the concept of developing a group debate. Each group will give a brief presentation where each part will take a different standpoint (e.g. researcher, clinician, patient, educator) on a pre-selected topic such as “Why teenagers should avoid loud music?”. This will be followed by a debate.

Time: up to 3 hrs, depending on the available time from schools. For this activity, all the students (and teachers) involved in project will be invited to the University to explore our research and teaching facilities.

Location: University of Sheffield.

Learning Outcomes:

- to improve presentation skills and critical thinking,
- to learn how to articulate scientific concepts,
- to understand why research is important, and
- to increase awareness of career paths involving research, medicine, science and advocacy.





Past Events





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For further information contact:

Professor Walter Marcotti

Neuroscience Institute

University of Sheffield, Western Bank,
Sheffield S10 2TN

Email: w.marcotti@sheffield.ac.uk

www.sheffield.ac.uk/neuroscience-institute

www.sheffield.ac.uk/hearing



Bluesky

@hearingshef.bsky.social

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