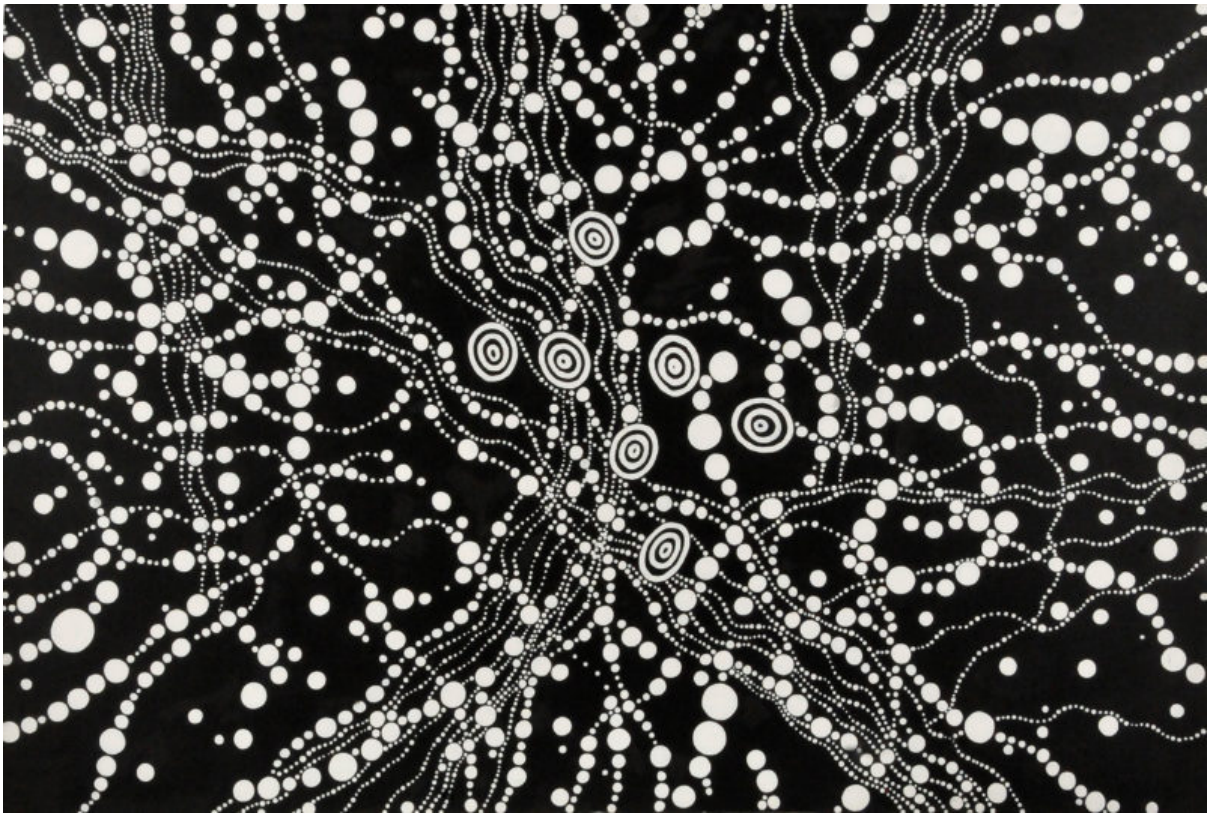
Physics Kickstart Workshops



Walangari Karntawarra "Seven Sisters"

Kickstart Physics is for year 11 and 12 content. Building a strong foundation for students at this stage can encourage them to continue with their Physics studies. These hands-on, syllabus related workshops give your students access to a wide range of instruments and resources from our modern teaching laboratories, Kickstart allows students to have a real university experience in physics.

Kickstart would like to acknowledge and pay respect to the traditional owners of the land – the Gadigal people of the Eora Nation. It is upon their ancestral lands that the University of Sydney is built. As we share our knowledge, teaching, learning, and research practices within this University may we also pay respect to the knowledge embedded forever within the Aboriginal Custodianship of Country.

Modules 1-4

Workshop description
In this workshop, students will cover one investigation from each of the module in the year 11 course, with an additional section devoted to student diving deeper into one of those investigations, or related investigation. This depth study section will give the opportunity for the students to make use of the experiments related to an area of their own interest and have a chance to ask our casual academics their advice on further study, as well as the chance to gather further data that may assist their depth study

The investigations covered are as follows:

Kinematics: Position vs time, velocity vs time and Acceleration vs time graphs

Dynamics: Dynamics cart

Waves: Ray diagrams and making a telescope

Electricity and magnetism: Magnetic field through coils and calculating μ_0

Depth study

Module 5: Advanced Mechanics

Workshop description
In this workshop, students will learn about Some fundamental concepts in mechanics. With some familiar concepts such as the Monkey and the hunter investigation and the gravity trampoline demonstrations, the student will also have access to new investigations such as torque. This experiment will give student the chance to apply the scientific method to calculate and derive values related to torque. This hands-on workshop gives student a first-hand experience with the concepts of mechanics.

The investigations covered are as follows:

Projectile Motion

Planetary Motion

Circular Motion

Torque

Module 6: Electromagnetism

Workshop description
In this workshop, students will learn about electromagnetism from a unique way, then combining those concepts to have a deeper understanding of what we mean by Electromagnetism. These concepts are then combined to go through a number of applications of electromagnetism.

The investigations covered are as follows:

Electric fields, ε_0

Magnetic fields, μ_0

Electromagnetic induction

Transformers

Applications of EM

Module 7: The Nature of Light

Workshop description
In this workshop, students will learn about the nature of light from various different perspectives including Wave and quantum models. We'll see this tory of light and how it has changed over time through modern physics. Some exciting experiments will give students a first-hand experience with the concept of light and experimentation.

The investigations covered are as follows:

EM spectrum:

Wave model: Double slit

Wave model: Polarisation and Malus' Law

Quantum model: photoelectric effect

Special relativity

Module 8: From the Universe to the Atom

Workshop description
In this workshop, students will learn about a number of concepts in modern physics through some hands-on experiments and investigations. Our experiments are designed to be interactive and to give students various techniques and skills in experimentation.

The investigations covered are as follows:

Charge of an electron: Oil drop experiment

Spectrum of light: Hydrogen and other spectra

Radioactive half-life decay

Mass defect

New particles in the LHC

Optional if you'd like to swap one of the above component experiments from the above modules with another experiment, please select "Combination of Modules" when registering and an email will go to you to ask you to identify the experiment you'd like to have us show your students.

Depth study support

We can offer suggestions on how you can incorporate the above workshops into a Depth Study on request. If this is something you and your students are interested in please let us know by emailing science.kickstart@sydney.edu.au