

VCE Physics

Some Possible Practical Activities

The tables below list possible practical activities for each Area of Study. At the bottom of each list are the titles of short pracs prepared by Colin Hopkins that can be found on the Vicphysics website in the webpage for that Area of Study.

To find out what equipment is needed for each of these activities, listed below, go to this page on the Vicphysics <https://www.vicphysics.org/teachers/equipment/> where there is a link to a spreadsheet of the list of equipment a school needs to offer the full range of physics practical activities.

In the spreadsheet, there is a worksheet for each area of physics. For each item of equipment in a worksheet, among other descriptors there are numbers corresponding to prac numbers in the tables below for the different Areas of Study.

For example, in the Thermodynamics worksheet, there is the entry:

Item	Essential	Desirable	Shared?	Single item	Class set	Years 7 - 10	VCE	Unit 1 Heat
Thermometer 0 – 250 C by 2.0 C Mercury in glass	•				•	•	•	1, 2, 3, 4, 5, 6

Unit 3: How do physicists explain motion in two dimensions?

	Practical Activity	Description	Type
1	Circular motion	Investigate how the centripetal acceleration of a revolving rubber stopper, as measured by the number of washers on the end of the line, is affected by changes in radius and frequency. Investigate how the centripetal acceleration of a passenger in a Luna Park ride is related to the dimensions and speed of the ride.	Experiment Excursion
2	Projectile motion	Use ballistics car to demonstrate components. Investigate range, maximum height and time of flight for a range of angles and initial speed	Demonstration Experiment
3	Changes in Potential energy	Use a dropped mass attached to a spring to investigate the transformation of energy between gravitational potential energy, spring potential energy and kinetic energy. Investigate the energy transformation in a Luna park ride.	Experiment Excursion
4	Momentum and kinetic energy in collisions	Measure speeds of air track gliders before and after impact to investigate conservation of momentum and the elasticity of the collision. Newton's Cradle	Class exercise Demonstration
5	Reaction force	Use bathroom scales to investigate the reaction force when standing, leaning against a wall or in a lift. Investigate how the centripetal acceleration of a passenger in a Luna Park ride and determine the value of the reaction force.	Class exercise Excursion

Colin Hopkins' Short Pracs:

- String
- Springs prac

Unit 3: How do things move without contact?**Fields**

	Practical Activity	Description	Type
1	Satellite motion	Analysis of the Moons of the Solar System	Spreadsheet
2	Coulomb's Law	Dependence of electric force on charge and separation	Experiment
3	Electric Field	Plotting of electric field of various configurations Electric fields in a wire	Experiment Experiment
4	Properties of magnets	Investigate Force between magnets Investigate magnetic field of bar and horseshoe magnets	Demonstration or Class Exercise
5	Oersted's Experiment	Show magnetic effect of an electric current in magnetic field	Demonstration
6	Left Hand Rule	Show magnetic force on current loop Show movement of Al rod on rails with horseshoe magnet Show slow oscillation of loudspeaker cone	Demonstration Demonstration Demonstration
7	Magnetic field of Solenoid	Use current balance kit to determine magnetic field of a solenoid	Experiment
8	Turning Effect in a meter	Investigate meter mechanism with small compass	Class Exercise
9	Model DC Motor	Show motor principle with models	Demonstration
10	Dissection of DC Meter	Dissect a small DC motor then reassemble	Class Exercise

Colin Hopkins: Simple Pracs:

- Electric Motors Prac

Unit 3: How are fields used in electricity generation?**Electromagnetism**

	Practical Activity	Description	Type
1	Electromagnetic Induction	Show generation of induced EMF by magnet in solenoid	Demonstration
2	Model Generator	Use a model generator to demonstrate production of AC and DC.	Demonstration
3	Electromagnetic Induction	Investigate Lenz' Law	Formal Experiment
4	Electromagnetic Induction	Drop strong magnet through an Al cylinder	Demonstration
5	Transformer	Show effect of Turns ratio on voltage and current	Demonstration
6	Transmission Lines	Show the effect of transformers on Power loss and voltage drop	Demonstration

Colin Hopkins: Simple Pracs:

- Induction: Aluminium pipe and a ceramic magnet
- Power Lines, Transformers and Fuses

Assessment Task: Application of physics concepts to explain a model, theory, device, design or innovation:

Some examples of devices

AC synchronous motor	Three phase motor	Loudspeakers	Linear motor
DC shunt wound motor	Alternator	Microphone	Telephony
Magnetohydrodynamics	DC Generator	Relays	Homopolar motor
Industrial lifting magnets	Transformer	Particle accelerators	Magnetic damping
DC series wound motor	Transmission line	Mass spectrometer	Analog meter
Three phase generator	Maglev trains	MRI	

Unit 4 AOS1 How has understanding about the physical world changed?

	Practical Activity	Description	Type
1	Standing waves in strings	Attach a weighted string to a ticker timer	Demonstration / experiment
2	Standing waves in springs	Use a slinky to show harmonics in stretched spring	Demonstration
3	Diffraction of waves	Use a sound source at different frequencies and with speakers of different diameters to observe the amount of spreading. Use of a ripple tank to show diffraction	Demonstration
4	Diffraction of light	Investigate diffraction of light through red and blue filters with slides of single slit of varying widths	Class Exercise of Experiment
5	Interference	Use a sound source connected to two speakers to produce an interference pattern in front of the speakers. Note nodal positions and measure distances to determine wavelength. Change spacing of speakers and change of nodal positions	Experiment
6	Interference of light	Investigate interference of light through red and blue filters with slides of double slits of varying size FARLabs (Online)	Class Exercise or Experiment Experiment
7	Photoelectric Effect	Discharge of electroscope with zinc plate on top with UV light	Demonstration
8	Photoelectric Effect	Investigate the effect of intensity and frequency of light incident on a metal surface on the energy of ejected electrons	Class Exercise
9	Hydrogen Spectrum	Investigate the energy levels of Hydrogen	Class Exercise
10	Energy gap in LEDs	Investigate the triggering voltage for LEDs producing light of different wavelengths	Experiment

Unit 4: AOS 2. How is Scientific enquiry used to investigate fields, motion and light.

Practical Investigation: Possible topics

Motion of a parachute	Energy transfer in a pole vault	Forces and energies in stretched rubber
Motion of a balloon	Motion on a trampoline	The bounce time of a ball
Forces and energies of a bouncing ball	Physics of a sprint start	
Sweet spot of a tennis racket		

Efficiency of a cycle dynamo	Efficiency of a DC motor
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