

Physics at home 16-18

For students working remotely because of school closures, these ideas are divided by physics topic. We hope this saves time right now, along with the [Physics at home 11-14](#), [Physics at home 14-16](#) and [CLEAPSS advice for practicals at home](#).

Forces and Motion

- **Careers clip** - [Forces and Motion in Games Programming](#)
- Vectors **IOP Quick** - [Static crate](#)
- Forces **PhET** - [Newton's laws - 1st](#), **Alom Shaha** - [Circular Motion](#), **Veritasium** - [3rd law](#)
STEM learning - [Monkey and Hunter](#), **Marvin & Milo** [Slinky drop](#)
- Gravity - **Veritasium** - [Misconceptions - falling objects](#). **Moon video** [feather & hammer](#)
- Graphs - **PhET** [Moving man](#) – Charts tab [and PDF instructions](#)
- Hooke's law - **PhET** [Hooke's law](#), [Investigate springs](#) and [Investigate pendulums](#)
- Moments - **PhET** [Balancing Act](#)
- Momentum - **Marvin and Milo** [Bouncing balls](#), [Hovercrafty](#), **PhET** [Collision Lab](#)

Sound and Waves

- **Careers** - [Ultrasound in Physiotherapy](#)
- **Free computer software** - [sound card oscilloscope](#), compare with **Quick** [Slink-o-Scope](#) to explain why a transverse graph is drawn to show displacement for a longitudinal sound wave.
- **PhET** [Wave on a String](#)

Light and EM Waves

- E-M waves - **PhET** [Radio Waves & Electromagnetic Fields](#)
- Black body radiation - **PhET** [Blackbody radiation](#)
- Diffraction at double slit **oPhysics simulation** - [superposition](#)

Electric circuits

- **Isaac Physics:** [Kirchoff's Laws](#)
- **Internal resistance** - [YouTube video](#)

Fields

- Gravity - **PhET** [Gravity Force Lab](#)
- Electric - **PhET** [Coulomb's Law](#), **Boston Uni** [Electroscope](#), [Force and potential sim](#)
- Particle motion in fields - **Boston Uni** [Magnetic](#), [Mass Spec](#)

Electromagnetic induction

- Motors - **IOP Physics** [electric motor demonstration film](#), **School Physics** [DC electric motor](#)
- E-M induction - **Dr Schuster** [induction and emf](#) **PhET** [Faraday's law](#), animation [AC generator](#), video [EM induction](#), **Veritasium** [Levitating barbeque](#), **Veritasium** [First Electric Generator](#)
- Transformers - Demo [How transformers work](#), interactive [The transformer](#)
- Video - [F = BIl experiment](#)
- Video - [Induced emf - required practical](#)

Thermal physics

- Black body radiation - **PhET** [Blackbody radiation](#)
- See core practicals in **Skills** below

Atomic, Nuclear and Particle Physics

- Atom/Nucleus **PhET** - [Rutherford Scattering](#), Marie Curie [short story - part 1](#) & [part 2](#)
IOP Spark videos [Teaching radioactivity](#) - select as needed, **NASA** - [Energy levels](#) Q's.
- Background radiation - **IOP worksheet** [Measuring your annual dose](#), **SciShow** [for quark enthusiasts](#), **xkcd** [Radiation dose infographic](#)
- Radioactive decay [Practical simulation](#) - use coins/ M&Ms/ lego bricks, plot a graph for the number decaying against 'throw number' (effectively time), **Boston Uni** [Decay simulation](#)
- **SciShow** [intro to particles](#), Fundamental Forces [video playlist](#)
- **CERN** [Particle physics playlist](#)

Quantum Physics

Quantum Technology resources for students (synoptic) - **STEM Learning** [Laser Cooling](#), [GPS and Atomic Clocks](#) (teachers' notes and answers below)

Uncertainty principle - [Perimeter Institute](#)

The Photoelectric Effect - **Walter-Fendt** [simulation](#)

Astrophysics

- **IOP videos** [Models of the Solar System - Earth, Sun and Moon](#), [The Life Cycle of Stars](#), [Life Cycle of a Star](#), [Star formation](#), [How Big is the Universe?](#), [The Expanding Universe and the Big Bang](#)
- [Scale of the universe](#), [Powers of ten](#) videos, Interactive [Solar system tour](#), [Magnifying the universe](#) simulation
- Doppler effect **NSO** [Redshift](#), **Marvin and Milo** [Doppler spin](#)
- **NSO** [Expansion of the Universe](#) - balloon model **NSO** [Big Bang Demo](#), PDF instructions for [washers/elastic expanding universe](#) with data analysis

General

- A Level physics online - [Free Livestreams for Yr 12](#)
- [Issac Physics](#) - set assignments or allow students to explore independently [weekly lessons](#)
- [Physics 4 U](#) - Good for worksheets and resources to work offline or on paper.
- **IOP Ireland** resources - [Science on Stage](#)

Skills

- **NUSTEM** [Required practicals](#) short videos. For teachers but accessible for students.
- [Graph game](#) - **PHET Sims**

For teachers

- Teacher notes on Quantum Technology resources - **STEM Learning** [Laser Cooling](#), [GPS and Atomic Clocks](#), [Diffraction](#)

Collated by the IOP's **Professional Practice Group**

See [IOPSpark](#) and [TalkPhysics](#) for more