

Physics at home 16-19

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](#)

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