

# Physics Partners

EXPERT PRACTICAL HELP FOR SCHOOLS



# INTRODUCTION FROM SIR RICHARD FRIEND

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Physics remains vitally important to our industries, our infrastructure and our economic wellbeing. For all these reasons, and to allow children to explore their scientific curiosity, all pupils deserve the opportunity to experience expert, innovative Physics teaching. Physics Partners helps to achieve this important aim by sending its team of expert trainers into schools to support physics teachers and physics technicians.

The work of Physics Partners fills a real gap in educational provision: I have watched with great interest the expansion of its activities and the increasing recognition of its value. As its Patron I wish it continuing and increasing success.

**Sir Richard Friend FRS**  
**Cavendish Professor of Physics,**  
**University of Cambridge.**

*The sessions I have attended have often been better than paid CPD courses: staff have come away with ideas they can implement in the classroom and an increased confidence for teaching Physics*

**Seb Stuart, Head of Science,**  
**St Francis of Assisi**  
**Catholic**

*Physics Partners have facilitated the effective science partnership between seven West Midlands schools to prioritise the improved teaching of Physics by non-specialist science teachers. The resulting CPD for teachers of Key Stage 3 Physics has been incredibly valuable. It has promoted the confidence and skills of staff so that they are able to enthuse in their students a love of Physics that will lead to more students taking this subject for further study. Physics Partners have been incredibly supportive and inspiring in their work with our schools*

**Claire Clayton, Head of Science, Bishop**  
**Milner Catholic College, Dudley**



## OUR CHARITY

Physics Partners is an innovative educational charity, giving free, expert, hands-on support to physics teachers and technicians in state schools in England. By helping teachers and technicians, our work enables more pupils with scientific aptitude to achieve their potential.

It is now widely accepted that one of the biggest factors influencing student learning outcomes is teacher quality. Hanushek (2011) claims that "The magnitude of the differences is truly large, with some teachers producing 1.5 years of gain in achievement in an academic year while others with equivalent students produce only 1/2 year of gain. ... No other attribute of schools comes close to having this much influence on student achievement."

We are especially keen to help in areas of social disadvantage, where pupils are less likely to have the specialist teaching they need.

## Why we are needed

There is a huge shortage of qualified physics teachers. Many physics teachers do not have a relevant post A-level qualification, and some schools have no qualified physics teachers at all.

The effect is that physics teaching is, far too often, left to newly qualified or non-specialist teachers who may not have the skills or confidence to teach successfully.

The consequence, unless they are given help and support, can be a demotivated class, a loss of interest in science, and a loss of future physics A-level candidates.

## Physics and the UK economy

Physics-based industries are vital for the UK economy. The range of these industries includes mechanical and structural engineering; astronomy; IT-based industries; civil engineering; manufacturing; medical equipment

*As a result of Physics Partners' involvement, physics teaching at Harris Academy Chafford Hundred is much stronger, with more students choosing to take it at A-level*

**Nick Power, former Specialist Leader of Education-Science: Harris Academy Chafford Hundred**

*Other physics insets I have attended were just watch and do, but Physics Partners have the time to explain everything that I did not fully understand*

**Annie Jand, Senior Science Technician, Buxton School, Leytonstone**

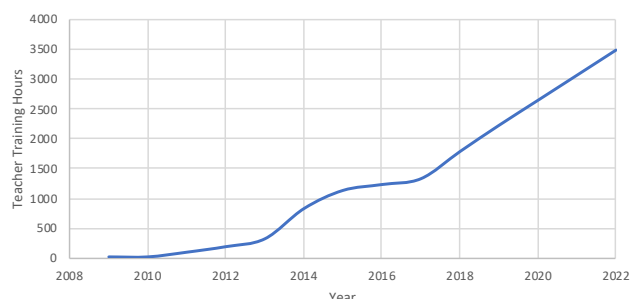


# THE HELP WE PROVIDE

We deploy expert physics teachers to go into schools and support technicians and teachers in their space, using the school's own equipment. We also give telephone and online support, and we have an extensive library of online resources. We help prepare lesson plans and schemes of work, and we can also loan equipment. Because most of our training is in the schools themselves, the method is time and cost-effective. We also help schools set up local partnerships, and we train groups of teachers from different schools.

## A proven method

We have been operating for over thirteen years and now support more than 200 schools. With feedback from schools being overwhelmingly positive, we plan to continue our expansion in the coming years.



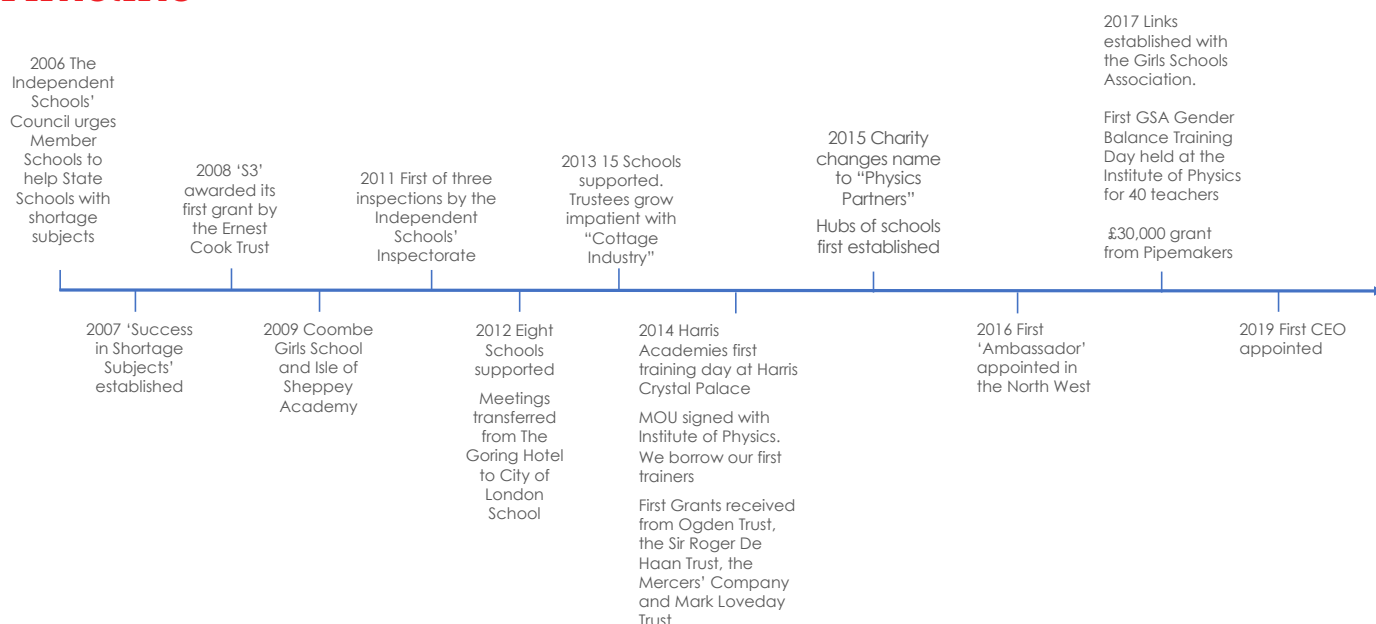
# HOW WE STARTED

A number of people in the education sector recognised that state schools needed support to improve physics teaching. Physics Partners was established as an educational charity in 2007 under the name "Success in Shortage Subjects". The training model was developed using pilot exercises, and is now established. Governance is the responsibility of the trustees, all of whom have a background in education, and two of whom are serving physics teachers.

## Library of Resources

Our resource library has more than 200 experiments, grouped by topic and explained in detail - with separate notes for teachers, technicians and pupils. This library is available online: [www.physicspartners.com](http://www.physicspartners.com).

## Timeline



# HOW WE WORK

We operate on a hub-based system, with groups of schools supported by a hub leader. Currently we have twenty hubs spread across the UK, with ambitions to double the number in the next three years. The hubs are in:

**Somerset:** schools centred on Taunton with funding from The Ogden Trust

**Kent and Sussex:** schools supported by Roedean School, Sevenoaks School, Tonbridge School and Worth School

**Isle of Wight:** schools supported by The Institute of Physics

**London:** schools supported by Dulwich College, Westminster School and Wimbledon High School; with some 20 Harris academies. London activities are funded by the Pipe Makers Livery Company

**Hertfordshire and Bedfordshire:** schools, part of a joint project with The Girls' Schools Association

**West Midlands:** schools in Birmingham supported by The Pipe Makers Livery Company, with help from King Edward VI School

**North West:** schools from Liverpool, Knowsley, Wigan and St Helens, Halifax, Manchester, and Preston supported by The Ernest Cook Trust and the Institute of Physics

**Yorkshire and Humberside:** schools in Beverley, Scarborough and York supported by The Holbeck Trust.

Much of our work is at Key Stage 3, because this is the stage where enthusiasm for science is often gained or lost. We also offer support at Key Stage 4 and for Advanced Level Physics.

*We would love to carry these sessions forward to next year as the confidence of all involved has grown and the impact has been the results of the mocks and (fingers crossed) the real exams.*

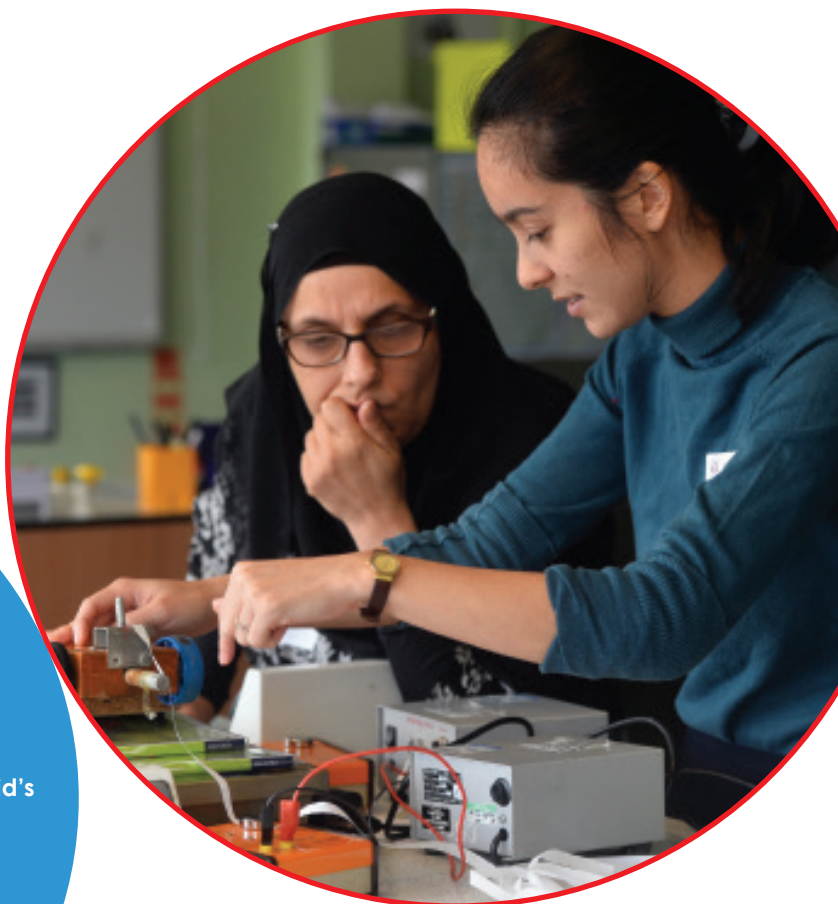
**Derek Donaldson, Subject Leader for Science, St Wilfrid's Catholic School, Crawley.**

## THE INSTITUTE OF PHYSICS

Physics Partners works with the Institute of Physics in a number of areas. Its Head of Education is one of our Advisors and our Chief Executive is a member of its Advisory Group. We have collaborated with the Girls' Schools Association on a project to attract more girls into A-level Physics and undergraduate courses in Physics, Maths and Engineering.

## OUR TRAINERS

We use a mix of serving and recently-retired teachers as well as trainers employed by the Institute of Physics. 80% of these trainers are professionally registered and 60% are trained teachers. All of our trainers have a passion to educate, and are skilled in explaining complex concepts.



# WHO HAS GIVEN US SUPPORT

We are very grateful to the Ernest Cook Trust, who gave us initial funding to enable us to start our work, and who have been generous with their help throughout. We are also very grateful for financial support from:

- + The de Laszlo Foundation
- + The Doosan Corporation
- + The Frank Jackson Foundation
- + The Holbeck Charitable Trust
- + The Ironmongers' Company
- + The Kent Community Foundation
- + The Loveday Charitable Trust
- + The Mercers' Company
- + The Ogden Trust
- + Paul Tao, in memory of his father, C.F. Tao
- + The Rochester Bridge Trust
- + The Roger de Haan Charitable Trust
- + The Tallow Chandlers Company
- + The Worshipful Company of Tobacco Pipe Makers & Tobacco Blenders

We are also grateful to the schools and to the individual teachers who have supported us with time and resources.



## Our Chief Executive

Bryan Berry, founding Principal of Heathrow UTC. Former Director of Tomorrow's Engineers and the Science Learning Centre South West. Chartered Physicist at the Institute of Physics

## Our Trustees

Christina Astin, Head of Partnerships, King's School Canterbury and former Head of Science and Physics. Fellow of the Institute of Physics

Thomas Cookson (Chairman); former Head of King Edward VI School, Southampton; Sevenoaks School and Winchester College

Nick England, former Head of Ryde School, Isle of Wight, and author of numerous physics textbooks

Sir Michael Jenkins OBE, former Chair of the Education Committee, Sevenoaks School and former Chief Executive of LIFFE and Chairman of The London Clearing House

Tony Lyng, former Head of Brockhill Park College, Folkestone

Krysia Sosin, Assistant Head at Hylands School, Chelmsford and formerly Head of Science at Buxton School, Waltham Forest

## Our Advisors

Sir Richard Friend FRS, Cavendish Professor of Physics, Cambridge University

Dr Alan Barr, Professor of Particle Physics, Oxford University

Mary Breen, Headmistress of St Mary's School Ascot, and previously Head of Physics at Eton College

Jonathan Shephard, a founding trustee of Physics Partners and former Chief Executive of the Independent Schools Council

Dr Elizabeth Swinbank, Honorary Fellow in Science Education at the University of York, and chair of the editorial board of Physics Review magazine

Charles Tracy, Head of Education at the Institute of Physics

# WHAT SCHOOLS SAY ABOUT OUR WORK



*The trainers are friendly, approachable, and have an enthusiasm for all things physics. They create an atmosphere that allows you to ask those questions that we are too embarrassed to ask – just like the pupils we teach*

**Michelle Farrett, Director of Science,  
Herne Bay High School**

*An exceptionally helpful session on the new A-level required practicals, and a workshop that helped bring novel interactive approaches to conceptually challenging ideas*

**Mike Hickman, Head of  
Science, Falmouth  
School**

*Extremely valuable training sessions, particularly for Physics non-specialists: a good mix of theory and inspiring practical demonstrations, which were easy to replicate in lessons*

**Nicky Steen, Head of Science,  
Richard Lander School, Truro**

*Inexperienced staff have been given the confidence to teach physics in an engaging and challenging way*

**Andrew Griffin, Federation  
Consultant for Science,  
Harris Federation**



*Our meetings have looked at the challenges surrounding encouraging more girls into studying Physics at A Level and beyond. We are so grateful to Physics Partners for initiating this project.*

**Emma Smart, Head of Science,  
Bedford Girls School**

*Physics Partners have given us engaging practical ideas for teaching Key Stage 4 physics, and boosted the confidence of our non-specialist staff*

**Janice Chambers, Teacher of  
Science, Hayesbrook School,  
Tonbridge**

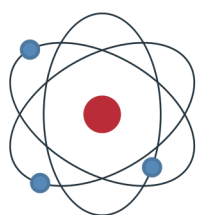
# WAYS IN WHICH YOU COULD SUPPORT PHYSICS PARTNERS

We are always looking to establish new Physics Partners hubs, where groups of schools can share resources and benefit from specialist training and mentoring. If you think you can help, please get in touch through [admin@physicspartners.com](mailto:admin@physicspartners.com). You are also welcome to contact our Chairman, Thomas Cookson ([trcookson@btinternet.com](mailto:trcookson@btinternet.com)) or our Administrator, Charlotte Hails ([cyh@sevenoaksschool.org](mailto:cyh@sevenoaksschool.org)). There are three ways in which you can help:

- ✦ Ideas for a new hub. If you know of an area where there is enthusiasm for starting a new hub, please contact us
- ✦ Become a Physics Partners trainer. If you would like to give time and expertise to help schools in need, please contact us. We can talk you through the process for accreditation as one of our trainers.
- ✦ Help us with funding. We are grateful for funding from trusts and individuals, and for help provided directly to East Kent primary schools through the Independent/State Schools Partnership. To expand our work we will need additional funding from other sources. If you can help, either with a donation or with funding for a specific expansion of activities, please contact us.

Physics Partners is a registered charity (1125644), and a company limited by guarantee (06292894) (England & Wales). Registered Office: Chapel Cottage, Kemsing Road, Wrotham, Kent TN15 7BU. [www.physicspartners.com](http://www.physicspartners.com).

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