

Time	Session						
09.15 – 09.55	Registration and welcome, refreshments and exhibitor stands						
10.00 – 11.15 WORKSHOP ONE	Workshop 1a Electricity and Transmission KS3-4	Workshop 1b GCSE Physics Required Practicals and how these skills are assessed in exams KS4	Workshop 1c Using Isaacphysics.org in your GCSE and A level Teaching KS4-5	Workshop 1d Hooked on Springs KS3 - 4	Workshop 1e Coaching physics teachers KS3 - 4 - 5	Workshop 1f Ultrasound transmitters and receivers - make & take KS3-4-5	Workshop 1g Cloud Chambers make & take KS4-5
11.20 – 11.45	Refreshment break and exhibitor stands						
11.50 – 12.50	KEYNOTE – Small Science – Big Future... Dr Annela Seddon, Senior Lecturer and Director of the Bristol Centre for Functional Nanomaterials, University of Bristol						
12.50 – 13.40	LUNCH and exhibitor stands						
13.45 – 15.00 WORKSHOP TWO	Workshop 2a Shocked and Stunned - static electricity KS3-4	Workshop 2b Repeat GCSE Physics Required Practicals and how these skills are assessed in exams KS4	Workshop 2c Gender Balance and Classroom Practice KS3-4-5	Workshop 2d Mystery boxes – Analogues, observations and problem solving KS2-3-4-5	Workshop 2e Using smartphones in practical physics lessons KS3-4-5	Workshop 2f Transverse & Longitudinal Waves KS3-4-5	Workshop 2g Teaching electricity; new challenges for students from KS3 (or even younger) to A-level.
15.10 – 16.25 WORKSHOP THREE	Workshop 3a Repeat Shocked and Stunned – static electricity KS3-4	Workshop 3b Repeat Hooked on Springs KS3-4	Workshop 3c Repeat Teaching electricity; new challenges for students from KS3 (or younger) to A-level	Workshop 3d Repeat Mystery boxes – Analogues, observations and problem solving KS2-3-4-5	Workshop 3e Understanding and implementing Science capital in your practice KS2-3-4-5	Workshop 3f Repeat Ultrasound Transmitters and receivers - make & take KS3-5	Workshop 3g Repeat Gender Balance and Classroom Practice KS3-4-5
16.25 – 16.30	Evaluation forms and goody bags						
CLOSE							

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WORKSHOP SESSION ONE CHOICES (10.00 – 11.15)

1a Electricity and Transmission – Dorian Pascoe, IOP School based Physics Coach, Totnes Progressive School, Devon.

This session is for new or training Physics teachers, experienced teachers not specialist in Physics and interested technicians. It is aimed at the delivery of electricity in KS3 or 4, with a focus on 'getting the basics right' and how this applies to higher level ideas like mains AC, transformers etc. Try some hands-on practical, and discussions surrounding; making the most of demos, tackling the concepts, and cracking the maths! (KS3-4)

1b GCSE Physics Required Practicals and how these skills are assessed in exams – Lewis Matheson, IOP School based Physics Coach, Beechen Cliff School, Bath and Director, GCSE and A level Physics Online Ltd.

All students sitting GCSE exams will be assessed on their practical skills through written questions - an area they tend to find difficult to prepare for. In this workshop there will be opportunities to discuss the Required Practical activities, how these can be used to teach the required skills and how students can approach practical exam questions with confidence. (KS4)

1c Using Isaacphysics.org in your GCSE and A level Teaching – Alex Calverley, Physics Teacher, Royal Grammar School, Guildford

In this session, you will see how you can use Isaac Physics books and online resources in your GCSE and A-level teaching. You will also learn how to set (FREE) online homework assignments for your students and see their marks before you get into the next lesson. Less time marking; better feedback! This session will be in a computer room though you may wish to bring your own tablet or laptop. Please create an account with isaacphysics.org before the event. (KS4 – KS5)

1d Hooked on Springs – Jeremy Thomas, IOP School based Physics Coach, Abingdon School.

This workshop is based on an IOP Coaching session for non-subject specialist teachers and designed to show that stretching springs is much more important than they first thought! Starting from discussion of historical reasons for Hooke's interest in springs, the workshop also covers practical skills, graphical data analysis, springs as an elastic store of energy and applications in teaching vectors. Finally, the importance of the application and development of Hooke's Law in A-level Physics and beyond will be discussed. (KS3 -4)

1e Coaching physics teachers – Alessio Bernardelli, IOP Coach supporting School based Physics Coaches, Professional Practice Coach and TalkPhysics.org Editor.

An opportunity to meet and discuss with other teacher-coaches. If you are a teacher, but also lead CPD sessions for teachers of physics, you are most welcome at this workshop. We will take a topic, outline some activities that might be used in a session with teachers, and discuss alternatives, models, problems, strengths and means of presentation. If you are not currently a coach, but see yourself developing into this role, you would also be welcome. (KS3-4-5) **Please think of a misconception in physics that you found in your students and/or the teachers you coach and explain how you helped them to reflect on it and generate a conceptual change in their thinking. You could bring along props, demos, or resources you used to illustrate your practice.**

1f Ultrasound transmitters and receivers - make & take – Richard Grimmer, IOP Teacher Network Coordinator, Surrey and South London.

In this workshop, we will be making ultrasound transmitters and receivers. These can be used to show wave reflection, to measure the speed of sound, and to show diffraction, superposition, and interference effects, including emulating Young's Slits. Simple soldering is involved. (KS3-4-5)

1g Cloud Chambers – make & take – Darrell Hamilton, IOP Teacher Network Coordinator, Sussex and Kent

Making something abstract concrete is a useful tool for those teaching physics. Cloud chambers allow students to see the paths that ionising radiation has travelled. In this workshop you get to make and take away a pocket-sized cloud chamber. (KS4 - 5)

KEYNOTE (11.50 – 12.50): Small Science – Big Future...

Keynote Speaker: Dr Annela Seddon, Senior Physics Lecturer and Director of the Bristol Centre for Functional Nanomaterials, University of Bristol

- How can nanophysics help with photovoltaic power generation?
- Graphene, a nanomaterial – good for water purification?
- How can physics on the nanoscale be applied for health and medicine?

Annela develops activities for use in schools and will show us some demos and models to illustrate how such questions can be explored by students, for example in the Y10 curriculum. Nanoscience and Nanotechnology allow scientists the chance to bring together Physics, Chemistry, Biology and Engineering to understand the world on this very small scale. Objects begin to behave in a weird and unpredictable way! How do scientists measure and understand these strange properties, and hope to apply them to solve some global problems?

WORKSHOP SESSION TWO CHOICES (13.45 – 15.00)

2a Shocked and Stunned – Liz Nourshargh, IOP Teacher Network Coordinator, Buckinghamshire and Milton Keynes

During this workshop, for all teachers of Physics (including non-specialists), we will look at where static electricity fits into the curriculum. Participants will have the opportunity to try out demonstrations using the Van der Graaf generator and household items. (KS3-4)

2b REPEAT GCSE Physics Required Practicals and how these skills are assessed in exams – See 1b for full description (KS4)

2c Gender Balance and Classroom Practice – Jessica Hamer and Sarah Cosgriff, IOP Coaches (Improving Gender Balance)

Despite our best intents, some groups may not be as engaged as others in the classroom. By looking at what might be holding some groups back and how teachers and schools can inadvertently add to these barriers, we can discover how we can be knocking those barriers down. Supported by research from the Institute of Physics, participants reflect on what can be done in the classroom to encourage participation and progression of all. (KS3-4-5)

2d Mystery boxes – Analogues, observations and problem solving – Joe Roving, IOP School based Physics Coach, Exeter Maths School

Mystery boxes highlight the creativity of thought that is needed to solve real world physics problems. In the first part of the workshop we will look at how large and small scale physicists are unable to 'open the box' and find a definitive confirmation of their ideas and theories. Instead, we can use evidence from testing, experimentation and research to generate innovative theories. These ideas or theories must be open to future revision, or rejection, as our understanding of the world changes with further developments. In the second part we will look at some other ways to apply the model for problem solving, developing knowledge of fields, forces and electricity.

This session is suitable for use with Primary upwards. Joe uses the main activities with all ages and the latter part of the session will segue into presenting a variation of the activity that is more 11-18. (KS2-3-4-5)

2e Using smartphones in practical physics lessons – Alessio Bernardelli, IOP Coach supporting School based Physics Coaches, Professional Practice Coach and TalkPhysics.org Editor.

In this workshop, we will explore useful and engaging ways to use smartphones in physics. Examples of practical activities will be given and there will be plenty of hand-on activities to model how to make the most of your students' devices both at GCSE and A-level. The focus will be on all three key stages, particularly KS4-5). Please bring your own fully charged device to this workshop. (KS3-4-5)

2f Transverse and Longitudinal Waves – Dorian Pascoe, IOP School based Physics Coach, Totnes Progressive School, Devon and Joanna Kent, IOP Coach supporting School based Physics Coaches and Improving Gender Balance Coach. **Please note that Jo will be accompanied by her assistance dog.**

This workshop covers ideas about transverse and longitudinal waves including: how to effectively demonstrate both types of waves; free simulations to help illustrate tricky ideas and how to use them effectively; fun practical activities and demonstrations using standard laboratory equipment and everyday items – and much more! (KS3-4-5).

2g Teaching electricity; some new challenges for students from KS3 to A-level – Trevor Plant, IOP Regional Education Manager (South) and IOP Coach supporting School based Physics Coaches.

After a short discussion on issues in the teaching of electricity and some possible solutions, you will have the opportunity to try a ‘hands-on’ approach to some challenges that you could adapt for your own teaching. (KS3, or even younger to A-level).

WORKSHOP SESSION THREE CHOICES (15.10 – 16.25)

3a REPEAT Shocked and Stunned – See 2a for full description. (KS3-4)

3b REPEAT Hooked on Springs – See 1d for full description. (KS3-4)

3c REPEAT Teaching electricity; some new challenges for students from KS3 to A-level – See 2g for full description. (KS3-4-5)

3d REPEAT Mystery boxes – Analogues, observations and problem solving – See 2d for full description. (KS2-3-4-5)

3e Understanding and implementing Science capital in your practice – Shane Clark, IOP School based Physics Coach, Cheney School, Oxford.

“Science capital is the sum of all the science-related knowledge, attitudes, experiences and resources that an individual builds up through their life. This includes what science they know about, what they think about science, the people they know who have an understanding of science, and the day-to-day engagement they have with science”, so, what is your students science capital? And, how can you improve your students science capital?

In this workshop, we will look at how we can ‘measure’ your students science capital using an assessment “tool” and use this to develop strategies in your practice to enhance and develop your students engagement and understanding of science. A range of approaches and examples will be demonstrated and shared with participants, for example using ‘science in the news’ to engage and enlighten our students. (KS2-3-4-5)

3f REPEAT Ultrasound transmitters and receivers - make & take – See 1f for full description. (KS3-4-5)

3g Gender Balance and Classroom Practice – See 2c for full description. (KS3-4-5)

This event is organised and run by the Institute of Physics and is generously hosted and supported by Charterhouse School.

Contact education-south@iop.org for any booking queries or see www.bit.ly/SPNSouthPhysicsDay to book

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Contact education-south@iop.org with your name, job title, contact details and school name and we will get in touch to discuss the opportunities with you.