

September 2022

Dear Colleague,

Welcome to the British Physics Olympiad (BPhO) 2022/23. The BPhO provides a series of competition papers for Years 10 - 13 to stretch and challenge talented young physicists. In recent years the competitions have attracted entries from 30-40,000 students. We are supported by a number of sponsors, including the Universities of Oxford and Cambridge (for Training Camps), National Physical Laboratory, The Worshipful Company of Scientific Instrument Makers, The Royal Astronomical Society and several academic book publishers.

In July, a team of five BPhO finalists represented the UK in the International Physics Olympiad (IPhO) which was held online, our team meeting in Cambridge. The IPhO hosted remotely by Switzerland included 400 students from 70-80 countries. The UK team won two Silver and three Bronze medals. In July 2023 the IPhO takes place in Japan and, for a chance to compete, students must enter BPhO Round 1 in November. If **teachers** are interested in participating or observing the students during training when the teams are assembled, or at the IPhO, please email Contact@BPhO.org.uk and express your interest. Meeting the students and helping them to develop their skills is a rewarding experience, as they gain confidence and develop their understanding of the subject. This also gives teachers the opportunity to develop their knowledge of school physics. You do not have to be an expert. Few of us are, but we can still help the students on the teams.

Dates (N.B. the order of the SPC and the IPC papers has been swapped for 2023 to reduce end of term congestion)

Competition	Year group	delivery	Length of "Paper"	Competition Date
Physics Challenge	Year 13 or below	Downloaded	1 hour	Sept - Dec 2022
BAAO Astro Challenge	Year 13 or below	Downloaded	1 hour	Sept - Dec 2022
BPhO Round 1	Year 13 or below	Downloaded	2 h 40m + 5m reading time	Fri 11 th Nov 2022
BAAO Junior Astro Challenge online	Year 10 & Year 11	online competition	2 x 25 min	Fri 4 th - Wed 23 rd Nov 2022
Senior Physics Challenge online	Year 12	online competition	2 x 30 min	Mon 23 rd – Fri 27 th Jan 2023
BAAO Astrophysics Olympiad	Year 13 or below	paper printed & posted	3 hour + 15m reading time	Mon 23 rd Jan 2023
Intermediate Physics Challenge online	Year 11	online competition	2 x 30 min	Mon 30 th Jan – Friday 3 rd Feb 2023
BPhO Round 2	Year 13 or below	paper printed & posted	3 hours	Mon 30 th Jan 2023
Intermediate Physics Challenge	Year 11	Downloaded	1 hour	Friday 3 rd March 2023
Senior Physics Challenge	Year 12	Downloaded	1 hour	Friday 10 th March 2023
Junior Physics Challenge online	Year 10	online competition	2 x 25 min	Fri 28 th April - Wed 17 th May 2023
Experimental Project	Year 12/13 & Year 10/11	Downloaded		June - Dec 2023
Computational Challenge	Year 11/12/13	Project		April – Sept 2023

We have new platform. Teachers register at [Registration form for Teachers](#). The competitions are being uploaded and you can register for each one as they appear without having to enter your details each time.

Please do not use Gmail, Hotmail, etc. for this. We will

Students may not order papers. Please keep papers secure.

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The competitions

The BPhO now runs thirteen competitions for students in Key Stages 4 and 5. All the individual papers are free except BPhO Round 1, and the four online Challenges which require a school registration fee. A summary of the competitions is provided on the accompanying A3 sheet, also downloadable from our website. Further details, past papers and extension work can also be found there: <http://www.BPhO.org.uk>.

For international schools, the dates may be two or three days later.

The September **BPhO Physics Challenge** is used by some schools as a resource and by others as a selection process for BPhO Round 1 in November. **BPhO Round 1** was taken by 2300 students last year and is the initial competition paper for selecting a team for the IPhO (July) and EuPhO (June). The top 100 plus Round 1 students are invited to take **BPhO Round 2** in January 2023, and the **BAAO Astrophysics Olympiad**, followed by invites to 28 students to attend the Oxford Training Camp over the Easter holiday. All competitions can be taken by younger age groups but not by older ones.

The **Intermediate Physics Challenge** (GCSE) is taken in March 2023. This paper provides thought provoking questions for strong students with an interest in physics and problems, to develop their skills. Similarly, the **Senior Physics Challenge** (AS), taken the week after, provides a competition environment for those students who want to raise their game and see where they stand amongst the top end of their age group.

The British Astronomy & Astrophysics Olympiad (BAAO)

The BAAO is run as part of the BPhO: the International Olympiad on Astronomy & Astrophysics (IOAA) will be run from Poland in late August 2023. The team of five, this year in Georgia, won one three Silver and two Bronze medals. We are looking to offer places to Y13 students (or younger) who take Round 1 in November and the BAAO paper in January. Fourteen students will then be invited to a training camp in Oxford at Easter.

The sort of students who do well are good physics problem solvers who have an interest in astronomy, although may have no previous experience! They should be encouraged (but not required) to take the Astro Challenge Paper in September but are required to take the BPhO Round 1 Paper in November. Good, keen physicists do very well. Few past team members would have considered themselves astronomers in any sense, but they are problem solvers and interested in new ideas. The majority are probably limited to knowing the names of the planets, and little more!

Studying the past papers, which are available online, would be strongly recommended for all of our problem competitions. All our competitions are about solving problems and this skill is learned by practising over a period of time.

How to enter

We have an online entry system **for teachers**. This is a new platform and teachers need to register on this by filling in the form [Registration form for Teachers](#): Generally one teacher per school, to avoid confusion. But a second teacher can register. This system is used to enter, download papers, mark schemes and certificates for the competitions, whilst also being the online competition platform. Further details can be found at www.bpho.org.uk, on the BPhO front page.

How to prepare

Past papers are available online, together with the solutions. Students should attempt **at least two or three past papers minimum**, and be given the solutions after each one after they have tried the questions, in order to ensure that they know what to expect. Get a small group of your students to work together on a few problems themselves, to develop their skills and interest in a competitive but friendly atmosphere.

It is important that students realise that these written competition papers are taken by the top physics student problem solvers of their age in the country, and that gaining a modest mark still includes them in the very top rank of participants. They should not expect to think that because they are an A/A* candidate in their usual exams that they will gain a high mark in these challenging papers. Modern A level papers are not about problem solving. Different skills are required but the physicist needs many skills to succeed. Nor should they think that because they have scored a low mark on a particularly challenging problem specific paper, that they are a weak physicist or that they

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will do poorly in the national exam system. These papers and questions are quite different. They require practice and determination. They should be told initially that one of the challenges is simply being willing to take the risk and have a go. Please encourage your students to do so.

Background

We want to provide opportunities for students to develop their physics and gain confidence in their subject. Finding a paper particularly challenging is not going to demoralise a student who expects to find it particularly challenging. The papers should contain some approachable questions, but also some designed to stretch the students until the elastic snaps. They are expected to be left to think and discuss one or two of the questions after the competition, or else it is merely more of the usual exam experience. They do not need to achieve 90-100% to be satisfied. The intellectual satisfaction of solving a problem that is worth solving, when the results do not affect the student's career, should be developed. In order to gain insight into the physics when it becomes difficult requires resilience or the student will never be able to stand the heat.

The way to understand a topic more deeply is (i) to try problems which are demanding in gathering the ideas together, (ii) to develop determination and perseverance particularly, (iii) having an approach (drawing diagrams, etc.), (iv) doing problems that are worded in a clear and unambiguous way but do not lead the student in to the answer, (v) are intellectually demanding.

Contacting Us

The BPhO is run by volunteers, all teachers, and we may struggle at times to provide a fully responsive service to every request. But we hope that we get the key things right. It is a struggle at busy times and emails get missed. Do not hesitate to email again. You can also email in to discuss the physics in a question. This is the part that we enjoy.

If you have any questions about the administration competitions or want any information, please contact the BPhO office at Contact@BPhO.org.uk

If you would like to be involved in any small way, or have a physics question, then send an email to Robin Hughes at Contact@BPhO.org.uk. If you think that you have a good question idea for a paper, we would be delighted to hear from you. We do not expect polished questions.

Kind regards,

Lena Shams
Administration Secretary
British Physics Olympiad