

BAAO Junior Astro Competition Nov 2022

This is the fourth year of the JAC competition. The new Competition platform appears to have functioned well. Certainly fewer questions and difficulties, although not without an odd moment of alarm when the class is walking through the door. The results are downloaded by teachers themselves for their own school. Certificates are also downloaded from there.

The students who took part in this competition should be praised not only for their success in using their imagination to come up with ideas to answer a few tricky questions, but also for their sense of adventure and purpose in being willing to give it a go when it may not be a subject they are currently studying. To be willing to try this out can be an important step in developing the right sort of attitude to difficult academic matters. The questions are much about knowledge of course, but there are some which require a logical approach and a process of elimination. But this is all about participation and it is not one of the BPhO challenges as are the paper competitions.

An analysis of individual question is not being provided here. **We would prefer that students are not prepared on the particular previous year's questions** from this competition as it then loses its broader purpose of enthusing and challenging students in the subject through their own interests and effort. To have to rewrite 60 questions each year is a burden, and for the students the purpose of the competition is lost if it is just another training and preparation exercise for an exam. We want them to observe the sky, read around the subject, see it in the newspapers in its broader non classroom aspects, and to see this as a fun competition and working with their friends rather than an exam preparation exercise. What we want to come out of it is interest rather than success: to follow up some of the ideas and see that they can work things out from scratch rather than just know the facts. **To that purpose we would be grateful if teachers did not give out copies of these questions to next year's students. There is a sample paper on the BPhO website.**

This year as last, the the competition was open to Year 9, 10, 11 students (Groups A, B, C). These groups are declared by the students when they login. They are not accurate, but probably most students get it right. When the grade boundaries were set, and then subsequently checked against the self-declaring Year 10 cohort in Group A (51% of the entry), there was little difference in the percentages in each medal group.

There is no real difference between the two sections of the paper in terms of questions asked although a small number of more difficult questions might be found in paper 2 (averages of 56% and 46.5% respectively)

Entry cohort

After a few cuts there are **1298 entries** (957 in 2021, 873 in 2020, 847 2019).

The **number of schools entered is 50** (36 in 2021, 33 in 2020, 28 2019).

These figures include 6 overseas schools entering 72 students in total (5.5%).

Table 1. Declared gender:

Male 636	Female 616	Undeclared 46 / 1298 entries
49.0 %	47.5 %	3.5 %
61.8 % in 2021, 46.0 % in 2020	33.9 % in 2021, 53.4 % in 2020	4.4 % in 2021, 0.6 % in 2020

It is encouraging to see the gender balance here. Many interpretations can be inserted here, but further work is needed to say anything of import.

Table 2. Group entries

Group	Entered	Mean mark	Mean mark (Male)	Mean mark (Female)
Year Group A (ages 13-14)	300	44.2%	49.7% (135)	39.1% (152)
Year Group B (ages 14-15)	677	50.9%	55.3% (346)	45.4% (306)
Year Group C (ages 15-16)	317	58.7%	64.6% (152)	53.5% (157)
Year Group D (ages 16-17)	2			
Year Group E (ages 17-18)	2			
Total	1298		633	615

Grade Awards

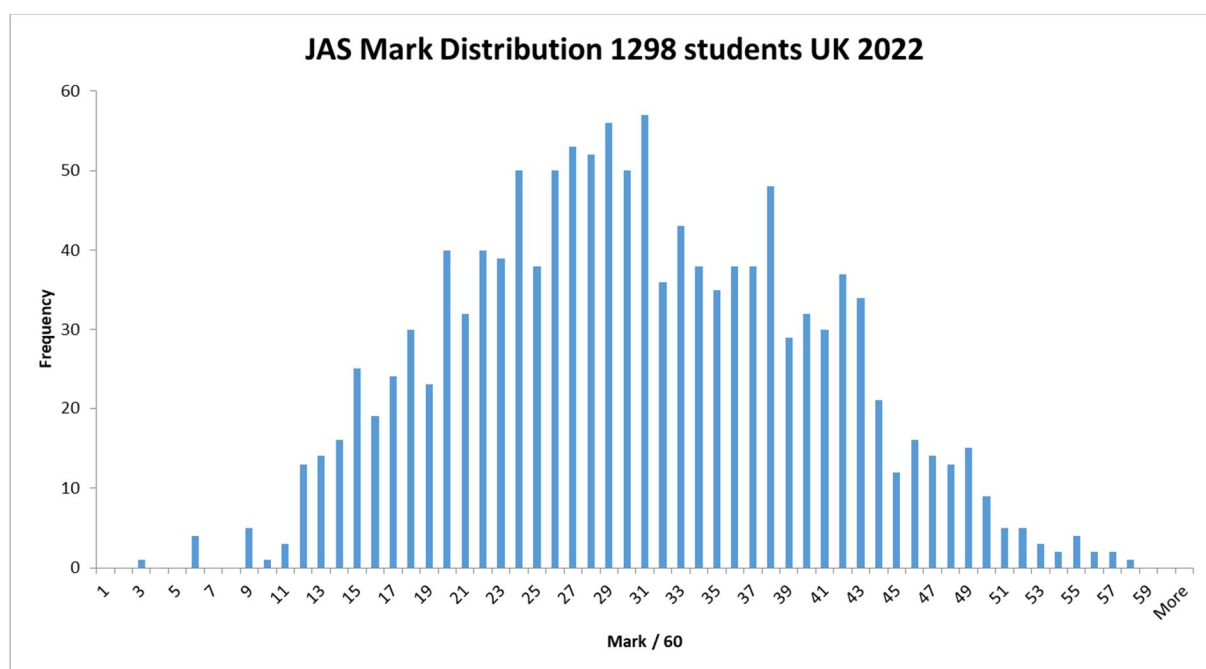


Figure 1. Mark distributions for the (largely) three year groups entered in 2022.

Overall the average score of the two papers from all candidates is $30.4/60 = 50.7\%$ ($27.3 / 60 = 45.5\%$ in 2021), ($23.8/60 = 40.0\%$ in 2020 and $25.7/60 = 43\%$ in 2019).

The grade boundaries are given in **Table 3**. These are based on all results. The intention is to be encouraging, as this is about participation, rather than worrying too much about the marks achieved.

Table 3. Grade Boundaries and candidate numbers in each award level.

Award	Range	No. of candidates	2022 % candidates	2021 % candidates	Boundaries from 2020	% of total candidates	Boundaries from 2019	2019 % candidates
Gold	42 – 60	195	15.0 %	15.5 %	32–60	15 %	37-60	9.4 %
Silver	32 – 41	367	28.3 %	30.6 %	25–31	27 %	29-36	24.0 %
Bronze	16 – 31	653	50.3 %	49.4 %	14–24	50 %	16-28	59.4 %
Participation	0 – 15	82	6.3 %	4.5 %	0–13	8 %	0-15	7.2 %
		1297	100 %	100 %				

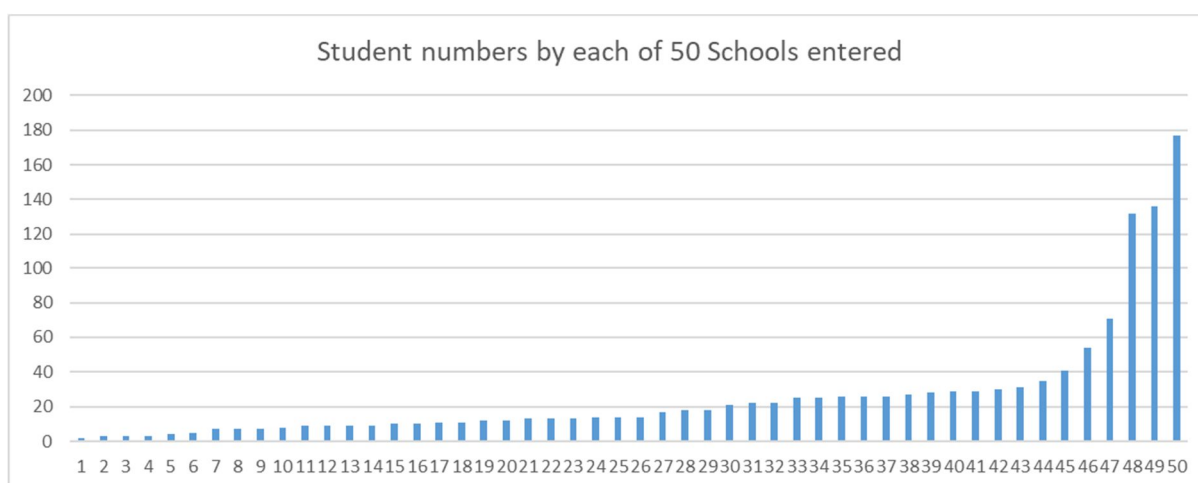


Figure 2. Candidate numbers entered by the 50 participating schools.

In general, schools do not enter large numbers in the year group. The competition is approachable by a wide range of students and, being somewhat anonymous, allows students to participate without worrying about the risk of failing. It is to be hoped that in the future schools will enter a larger number of candidates and reduce the safety aspect of only putting in candidates whom they think will succeed, simply encouraging more to have a go. Whilst 1298 students is a good number, we would certainly hope we will be able to build upon this. Students need these competitions to encourage a self-belief in their ability to work out possible answers from the clues given. They should leave the competition discussing some of the questions and wanting to find out more. If that is the result than it has been a success.

Comparing the two papers appears to indicate that they were of similar difficulty. It is difficult to judge the level of the paper in advance. With hindsight it is much easier.

This is fourth year of the competition and there is interest from students. We hope that numbers will continue to increase and that it will encourage students to observe the night sky and follow up on a subject in which they already have some investment in knowledge and skills.

We do not want students to prepare for this as an exam and so we do not send out the questions and answers for the past years. Anyhow, some of them might be used again! There is a mock paper on the BPhO website.

The papers are written by Dr Chris Crowe, Dr Alex Calverley and Mr Charlie Barclay

Contributions and ideas are welcomed for next year's paper.

Robin Hughes BPhO December 2022