Astronomy Olympiad Guide

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Contents

Annual Astronomy Competitions in Singapore

Competition	**Participants**	**Date (2026)**	**Format**
Singapore Astronomy Olympiad (SAO)	∼255 (2025)	Early March	2-stage olympiad consisting of a MCQ first round held online in schools and an open-ended IOAA-style second round that selects students for IOAA.
Astrigue	∼130	∼11 April	Team competition with a poster and MCQ round. Top teams from four schools will participate in a game show-style final round. Open to secondary students only.
AstroChallenge	∼270	Late May / Early June	3-day team competition with a poster, team, practical and MCQ round. Top teams from six schools will participate in a game show-style final round.
Int'l Olympiad on Astronomy and Astrophysics (IOAA)	288 (2025) across 68 countries	14–25 October*	The most prestigious competition for high school students. Held across a period of 12 days, the competition has theory, data analysis, planetarium and practical.
Astro Showdown	60 current signups	Late Nov**	Online open-book gamified team competition where teams unlock progressively more challenging problems to score points under time pressure.

1 SAO Guide

1.1 Round 1

There are 40 MCQ questions with 4 options and you have to pick the correct option. A correct answer awards 1 mark and an incorrect answer awards -0.5. So unanswering problems is a strategy here.

The problems are sorted roughly in difficulty order (though it's a weak correlation). The difficulty is roughly AstroChallenge Junior MCQ round (so do look at the 2020–2023 editions of those). The problems are slightly easier than APOW.

All students will be expected to take the assessment at the timing and venue stipulated by the school.

The maximum score attainable is 40 and the lowest is -20. As a rule of thumb:

- >12 is a decent score, probably can get bronze.
- >18 is a good score and will probably get silver.
- >29 will probably get you into the second round if not better.

You should answer every question you have narrowed down into two or fewer options and unanswer the rest.

The main topics tested are orbital mechanics and light and radiation, so do make sure you're good at the basics (especially 1.1–1.3 and 4.1–4.2).

1.2 Round 2

Round 2 is a challenging, two-part round that is modelled after IOAA. The format changed last year and may change again this year.

Note: the top 20 (or more depending on the format of R2 this year) will qualify for R2. You need a telescope to participate in this round, so you probably need to make arrangements with the school or SAO organisers for this. The organisers help set up the telescope for you at the start of the event.

1.2.1 Part 1 – The Theory

The theory is held in a lecture hall in RI and is very fast paced. **Bring a calculator (non-graphing).** You need at least two ideally, and should familiarise yourself with doing equations quickly on a calculator because the pace is fast.

The theory test has two parts: "Theory" and "Data Analysis". The theory part consists of roughly five questions and is out of around 100. The questions are all long-form and heavily math-based, though more qualitative problems are expected this year too (similar to the old 9-mark SAO questions). The most important topics are orbital mechanics, light & radiation, cosmology/relativity, and the celestial sphere. Differential equations are tested.

The data analysis is out of about 30 marks and is relatively simple compared to theory. If you're in junior years or lack deep physics background, this is your time to shine. You do need basic statistics. Expect topics like exoplanets, star clusters, or galaxies.

During the data analysis, they provide many graphs and information—extract the right info properly. You'll often be required to plot a graph. It's usually fun solving the problems, as the solutions can be elegant yet complex.

1.2.2 Part 2 – The Practical

The practical section is held in the open in RI, and you need to bring a telescope. If you expect to qualify for Round 2, prepare this early. Choose your telescope wisely (see "Tips and Tricks" later).

During the round, they hang pieces of paper around RI about 100 meters away, as substitutes for deep-sky objects. Bring glasses if needed. Only 5–7 people are tested at once, so you might wait a while for your turn. When it's your turn, attach your eyepiece and bring along your calculator and pen.

You'll receive a worksheet split into at least four sections of 3–7 marks each, with 5 minutes per section. It starts with the facilitator asking you to find a specific object based on description. You must identify it among 12–20 printed "objects" (mostly Messier, some fake like M111, planets, and Caldwell). You earn one point for finding and one for centering it. Then, the facilitator grades you directly.

The remaining 60% of the section involves calculation and Q&A, mostly about Chapter 9 (The night sky and DSOs). Difficulty lies between R1 and R2. You have only 5 minutes per section; don't spend more than 90 seconds on the first part or you'll run out of time.

This repeats at least three more times. The mark weightage of Practical is similar to Data Analysis, but Theory remains the largest component.

2 Awards

The total number of awards depends on the number of participants. In 2024 there were 216, and about 255 in 2025. For R2 qualifiers, only R2 scores were used for the overall calculation (subject to change).

2024 Results

- Top 5 qualified for IOAA – 2.3%
- Top 15 received Gold – 6.9%
- Top 37 received Silver – 17.1%
- Top 67 received Bronze – 31.0%

2025 Results

- Top 5 qualified for IOAA – 2.0%
- Top 19 received Gold – 7.5%
- Top 49 received Silver – 19.2%
- Top 85 received Bronze – 33.3%
- Three additional students received Honourable Mention.

Note: medal percentages for SAO are expected to decrease in 2026, although this may be offset by higher participation.

IOAA is by far the most prestigious award attainable through SAO. Aim for it even if you're unsure of getting Gold. If you qualify for Round 2, you can only get Gold or Silver; otherwise, up to Silver.

3 Tips and Tricks

For Round 1

1. Experience and practice are extremely important. Do APOWs and study their solutions.
2. Learn the necessary content; if time allows, explore beyond.
3. Don't be afraid to guess. If you're >33% sure, answer it.

For Round 2

1. For theory, do past SAO problems. Familiarise with advanced formulas.
2. For DA, practise interpreting graphs and data.
3. Manage your time carefully.
4. For practical, study Chapters 9 and 4; APOW questions are useful.
5. Pick a refractor telescope—small, light, with fine adjustment knobs. At least 100× magnification.
6. Regularly go stargazing with your telescope.

Others

1. Form astronomy friend groups and stargaze together.
2. Build a team for Astrigue or AstroChallenge.
3. Networking helps—you'll get updates and opportunities.
4. Understand the test format well.
5. Meet people during competitions.
6. Most importantly—have fun!

Fun fact: During the practical round, one of the blue tacks of the DSOs came off, dangling mid-air—it wasn't a tested object, so they simply fixed it later.

4 Rough Distribution of Questions

Topic	R1	R2 Theory	R2 Prac	Important Notes
1 – Orbital Mech	20	15	<5	1.1–1.2 important in R1, 1.3–1.6 in R2.
2 – Solar System	10	<5	<5	
3 – Stellar Evolution	15	10	<5	
4 – Light + Radiation	20	25	10	Appears in nearly every question; know mag system well.
5 – Astrochem / Bio	5	5	<5	
6 – Celestial Sphere	10	15	<5	Spherical trig is important.
7 – Cosmo / Relativity	5	15	<5	FLRW and relativity.
8 – Practical Astro	0	<5	40	Telescope setup.
9 – Night Sky + DSOs	15	10	45	Especially galaxies.