



ASTROCHALLENGE 2025

PROJECT ROUND INFORMATION SHEET

Round Instruction

Each project consists of the preparation and submission of a poster deliverable as well as the participation in the physical poster exhibition on Day 2 (**6th June 2025**) of AstroChallenge 2025.

General Instructions

1. Each team is required to select and complete **ONE (1)** question only, out of the **15** questions presented on page **4** on the various subfields of astronomy for the project round.
2. It should be noted that the criteria for completing each question may vary. Participants are advised to thoroughly examine this document as part of their preparation for the project round.
3. **Teams from the same school must choose different questions.** Failure to do so will result in a penalty.

Poster Deliverable

4. Each team will be required to submit the following deliverables for their project:
 - The electronic version of their **poster** in **pdf format**, which must be **single-sided A2 sized**.
 - A **separate word document** which contains the **list of citation** for any non-original work, which can be as long as necessary.
 - The completed **Declaration of AI Use in Project Round**, clearly disclosing any use of AI tool in your work. The template is attached as **Appendix A**.
5. Teams are required to declare the question that they are attempting, through the link that will be sent to them in the official AstroChallenge Telegram Channel, by **11th May 2025, 2359 hrs (UTC+8)**.
6. Teams are to submit both deliverables by **18th May 2025, 2359 hrs (UTC+8)**, to astrochallenge@gmail.com.
7. Please refer to the **Citation Guidelines** on page **6** this document for detailed instructions regarding the **list of citation**.

Poster Exhibition

8. Teams are expected to bring a physical copy of their poster to the poster exhibition on Day 2 (**6th June 2025**) of AstroChallenge 2025.
 - Teams are expected to arrange for the printing of their posters **on their own**.
 - Posters should be printed **in colour, single-sided on one piece of A2 sized material**.
9. Throughout the duration of the poster exhibition, teams are expected to give presentations and participate in the Q&A sessions multiple times to different groups of judges.
 - The duration allocated for each team's presentation to each group of judges is strictly limited to **five (5) minutes**.
 - Following the presentation, a question-and-answer (Q&A) session will be conducted by the judges, lasting about **ten (10) minutes** for each group of judges.
 - Teams may bring any additional items or props to their exhibition, as aids in their presentation.

- Any additional items or props should not simply serve to make the poster bigger. They should be complements to the poster. The AC Project Committee reserves the right to refuse the use of any additional items or props if it is deemed to serve the sole purpose of making the poster bigger.
- All team members must participate in all the presentation and Q&A sessions. Failure to do so will result in a penalty in their score.

Additional Notes

10. **Late submission.** A penalty of 20% per day will be applied to late submissions or any subsequent submissions of missing components.
11. **Consistency.** It is important to ensure the consistency between the poster submitted electronically and the physical copy brought to the project exhibition.
12. **Legibility.** Please make sure that words, infographics and information on the poster is completely legible.
13. **Citations.** The submission of the list of citation for any non-original work is **mandatory** to avoid committing plagiarism. Please refer to the **Citation Guidelines** for detailed instructions.

Non-adherence to these submission guidelines may lead to significant penalties, including the possibility of receiving a zero score for the project round segment.

Use of AI generation/assistance

- **Prohibition of Plagiarism.** Utilising AI to claim authorship of work that is not originally yours, including paraphrasing AI-generated content or altering original sources, constitutes plagiarism and will be penalised.
- **Acknowledgment of AI Assistance.** Clearly disclose any use of AI tools in your work, specifying how it was used and its role in the creation process. **Please refer to the template for Declaration of AI Use for Project Round on Appendix A.** Failing to do so is equivalent to plagiarism and subject to similar penalties.

Other Instructions

The content of posters and presentations must remain appropriate. For inquiries or guidance on proceeding with a question, participants are encouraged to contact astrochallenge@gmail.com. The AC Project Committee is available to provide assistance, and no penalties will be imposed for seeking clarification via email.

Questions

Each team is to attempt **ONE (1)** of the questions below. Each team is required to create a **single-sided A2 sized poster** aimed at explaining the selected topic to a general audience, including students from secondary schools, polytechnics and junior colleges. The presentation should be crafted in a tone and manner that is accessible and engaging for the public.

1. How can we determine the chemical composition of stars? Explain the physics behind emission and absorption spectrum, as well as helioseismology.
2. The cosmology community is puzzled by the Hubble Tension. Explore what is Hubble's parameter and the tension associated with it.
3. Humans should expand more resources on colonising Mars instead of fixing existing issues on Earth. Why or why not?
4. Alien life in our solar system might exist in the form of extremophiles. How are extremophiles different from us humans?
5. What is the motivation behind the theory of general relativity? How did it turn out to be a better encompassing theory about the universe? Are our previous understandings of gravitation still relevant to us today?
6. What is the cosmic distance ladder?
7. Suppose there is a rich investor looking to buy an observatory. Choose your favourite observatory and pitch it to the investor. What is the current primary purpose of this observatory? Is it unique in any way compared to other observatories? Have there been any important discoveries? What can the investor possibly do or expect from his investment?
8. What is the Olbers's Paradox?
9. Describe and elaborate on a space mission that is your personal favourite. It can be manned or unmanned. Why do you like it? Is it historically and/or scientifically significant? If so, how?
10. What are the advantages and limitations of observing on different parts of the electromagnetic spectrum? How are telescopes designed differently as a result?
11. If you had to create your own version of the Drake equation to estimate the number of extraterrestrial civilisations in the universe, what factors would you consider? How are these factors significant?
12. How can we determine the existence of extrasolar planets?
13. Explain the concept of stellar nucleosynthesis. How does it contribute to the diversity of chemical elements in the universe?
14. Why is it that there are leap years in the Gregorian calendar? Are there examples of calendars where leap months exist? Why?
15. What are the geocentric and heliocentric models? Why was the geocentric model superseded by the heliocentric model, which was subsequently superseded by newer models?

Grading Rubrics

Note that the AC Project Committee reserves the right to change any of the weights or otherwise with or without prior notice should the AC Project Committee deem it prudent to do so at any time.

- **Poster (30%)**
 - Visual Clarity (20%)
 - * Well-arranged and appropriate number of figures/images (not cluttered, not too scanty or overwhelming in number).
 - * Sharp, clear figures/images (not blurry or pixelated).
 - * Legible fonts (readable at a distance 1 metre away when printed as A2 size poster).
 - * Well-structured content that is intuitive to follow through (images and text combined).
 - Accuracy (30%)
 - * Information is factually accurate.
 - Depth of content covered (20%)
 - Creativity (10%)
 - * Content is not purely descriptive or expository.
 - Relevance (15%)
 - * Content presented answers the chosen question.
- **Presentation (30%)**
 - Accuracy and Depth (with respect to the poster and the question) (15%)
 - Relevance (with respect to the poster and the question) (15%)
 - Communication Clarity (40%)
 - * Content is well-delivered and can be understood by general public with little knowledge in astronomy (avoid excessive use of jargon).
 - * Presentation makes a clear and sufficient reference to the posters.
 - * Flow of presentation is smooth and clear (between the presenting team members).
 - Audience Engagement and Creativity (30%)
 - * Presentation is audible.
 - * Presentation is engaging (avoid re-reading the poster and any additional creative aspect to the presentation would be appreciated).
 - * Presentation is confident (team members are well-acquainted with the content they are presenting, with little/no script reading and stuttering).
- **Q&A (30%)**
 - Relevance (40%)
 - * Answers are relevant to the questions posed by the judges.
 - Accuracy (40%)
 - * Answers are factually correct.
 - Conciseness (30%)
 - * Answers are straight to the point.
- **Teamwork (10%)**
 - Participation Rate (20%)
 - * All team members are present (team with missing members without valid reasons, such as a Medical Certificate, etc, will be penalised).
 - Contribution (80%)
 - * All team members are contributing to roughly equal extent during presentation and Q&A.

Citation Guidelines

Please refer to this page on the citation guideline for the AstroChallenge 2025 Project Round. *Do note that this is a simplified guideline and is only for the purpose of the AstroChallenge Project Round. This is not a complete guideline for citations in formal writing.*

Requirements

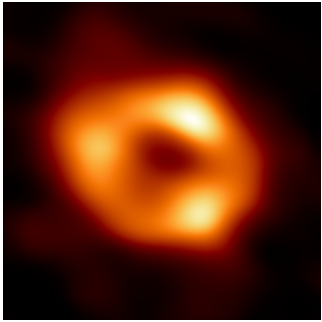
- Include at least 3 citations in the references.
- To submit the list of citations in a separate word document of any non-original work.
- References should be in APA format.
- In-text citations are not required.

Please refer to the following for examples of APA citation format.

Format

Author's surname, initial(s). (Year). Article Title. *Journal Title*, Volume Number, page number. DOI/URL.

Examples

References from	Citation
Paper on Gravitational Waves by Kip S. Thorne	Thorne, K. S. (1995). Gravitational waves. <i>arXiv preprint gr-qc/9506086</i> .
LIGO website (note that the date of publication cannot be found, hence we will put (n.d) for year).	LIGO. (n.d) What is an Interferometer? Retrieved from https://www.ligo.caltech.edu/page/what-is-interferometer#:~:text=Interferometers%20are%20investigative%20tools%20used,%2Dmeter'%2C%20or%20interferometer .
A picture of the black hole from the Event Horizon Telescope (EHT). 	EHT. (2022). First Image of the Black Hole at the centre of the Milky Way. [Image]. https://eventhorizontelescope.org/blog/astronomers-reveal-first-image-black-hole-heart-our-galaxy

For more details on citations in formal writing, please refer to <https://libguides.nus.edu.sg/citation/apa>.

General Guidelines and Tips!

Here are some suggestions on how **you** can produce a good submission!

To start...

- **Envision your desired outcome.**

Delve into a selection of captivating subjects and engage in comprehensive research to grasp the essential themes your project must communicate. Challenge yourself to present these themes in a manner that is distinctive and comprehensible.

- **Remember your target audience.**

Your aim is to demystify complex concepts for the public and your peers. Simplify the terminology to ensure your explanations resonate with those not well versed in astronomy.

- **Captivation is key.**

Human attention is fleeting, so it's essential to construct a project that garners and maintains interest.

- **Plan your time wisely.**

Start your work early. We can tell last-minute works from well-prepared works.

The poster...

- Display both the question prompt number and the query text prominently on the poster.
- Ensure legibility from at least 1.5 meters away by selecting colour schemes that enhance the clarity of your text against poster background.
- Use vocabulary that is accessible and clear to a diverse audience.
- Opt for visuals and graphics that can convey complex information effectively, as they can often communicate more than extensive text.
- Avoid overcrowding your poster with information; it should serve as an overview rather than a comprehensive report. Consider supplementary verbal explanations or props for additional details.
- Dedicate sufficient time to the creation of your poster; rushed efforts often result in diminished quality.
- Craft your poster to capture and retain audience interest, using succinct messaging and minimal statistical data where possible.

The presentation...

- Wear your school-related attire on the day of presentation.
- Conduct rehearsals to refine your presentation skills.
- Make strategic use of props, data, and your poster to create a dynamic and informative presentation.
- Engage in thorough research that goes beyond the information on your poster, equipping yourself to handle potential questions with confidence.

Use of assets/materials

- **Acknowledgment of sources is mandatory.** Attribute all sources. Please read the citation guidelines carefully and acknowledge any sources used appropriately. Please use the template for Declaration of AI Use on Appendix A to acknowledge how generative AI has been used in the project.
- **Adherence to copyright laws cannot be overstated.** Avoid the outright reproduction of material found online, even if it falls under Copyleft or Creative Commons License. Strive for authenticity and respect intellectual property at all times.

— END OF DOCUMENT —

Appendix A: Template for Declaration of AI Use in Project Round

Please fill in the required information and sign to indicate that you have read and accepted the following statements. Your submission will not be accepted without this declaration.

By listing our names and signing below, we confirm that we have:

(Choose all that applies)

- ☐ used Generative Artificial Intelligence (GAI) as permitted to assist in generating key ideas
- ☐ used GAI as permitted to assist in generating a first text
- ☐ used GAI to refine syntax and grammar for correct language submission
- ☐ not used GAI assistance in any way in the development or generation of this assignment

We also declare that we have:

1. Fully and honestly submitted all references used to complete the project,
2. Wherever GAI assistance has been employed in the submission in work or paraphrase or inclusion of a significant idea or fact suggested by the GAI assistant, we have acknowledged this in this document; and that,
3. Apart from the abovementioned declarations, the submission is wholly our own work.

Participant names and signatures:

	Name	Signature
1.		
2.		
3.		
4.		
5.		