AstroChallenge 2018

To: Teachers-in-charge and Participants

On behalf of the organizing committee, I would like to thank you for your keen interest in **AstroChallenge 2018**. The following contents of this letter include important issues and rules to take note of:

1.) Location and time to report

Day 0 (1 June) 12:00 – **NUS, LT 27**

Day 1 (5 June) 09:00 – **NUS, LT 26 & 28**

Day 2 (9 June) 09:00 – **NTU, The Hive** (Finals will be held at **LT 22)**

The respective maps for NTU and NUS (see Appendix D) are included in this letter.

More information on the exact rooms in The Hive to report to on Day 2 will be revealed during the competition itself.

2.) Payment

The registration fee for each Junior or Senior team is **$60, or $15 per person** for groups with **3 or fewer members** at the point of registration. Payment is by cash only. Collection of payment will be done on Day 0 (1 June) during registration. This registration fee serves to defray the costs of the competition and does **not** include the costs of participants' meals. Participants will be ushered to the canteen for their meals. Please also note that an **additional administrative fee of $10 may be charged** if there is any change in team composition *after* the registration deadline.

3.) Attire

Participants are encouraged to wear school uniforms (secondary schools and junior colleges) or society T-shirts (polytechnics) so that they can be identified by their school.

4.) Schedule of Events

Please refer to Appendix A. Please note that the schedule may be subject to changes.

5.) Observation Round Location

The observation round will be held at the **Engineering Bridge outside LT 3 and 4 in NUS**. The equipment for the observation round can be deposited into tutorial rooms near LT 3 and 4 on Day 1 (5 June) itself before the activity. More information on depositing equipment will be given during the briefing on Day 0.

6.) Rules and Regulations

Please note that the Observation Round has been modified for AC2018. For more information, please refer to Appendix B, as well as our website. Further information about the Rules and Regulations will be posted on our website and Facebook Page.

In addition, **please note the changes in the score weightage in the preliminary and the finals rounds of AC2018** as compared to past ACs.

7.) Project Round

The video for the Project Round must be **submitted by Day 0 (1 June)**. The video file may be submitted via **email**, or loaded into a **thumb drive** which will then be copied over to our computers on Day 0.

Project Round materials and presentation meant for the **exhibition** segment are to be COMPLETED beforehand and **submitted on Day 2 (9 June)** during registration. Please refer to the general Rules and Regulations in Appendices B & C for more information. Further updates and information will be posted on our website and Facebook Page.

8.) Things to bring for the competition

1. Writing materials and **scientific** calculator (graphic calculators are **NOT** allowed).

We will be following the list of approved (**scientific**) calculator for national examinations which is available on the SEAB website (https://www.seab.gov.sg/docs/default-source/documents/guidelinescalculators.pdf)

2. Telescope for participants in the Senior category on **5 June (Day 1).**

3. Completed Project (video file) on **1 June**, materials for exhibition on **9 June.**

4. Money for meals (You will be guided to the canteen during meal times).

More details and updates on the aforementioned events will be provided on AstroChallenge website at http://www.astrochallenge.org.

Please contact us at astrochallenge@gmail.com if you have further enquiries. We look forward to seeing you at AstroChallenge 2018. Thank you.

Yours sincerely,

Tan Hong Kiat (Mr.)
Vice-President (Astro-Challenge)
AstroChallenge 2018 Committee

Appendix A – Schedule of Events

Day 0: 1 June 2018 – NUS LT 27

1200 – 1900	Registration, Payment and Project Round Part 1 submission*
1215 – 1600	Astronomy Crash Course
1600 – 1700	Schedule Briefing & Update of Changes
1700 – 1800	Conceptual Q&A with QMs
1800 – 1900	Dinner**
1900 – 2100	Observation Round Briefing (Senior Category)

*At least one representative from each school must be present for this day. Attendance is highly recommended, especially for participants with queries and/or are interested in the crash course.

**Students taking part in Junior Category may be dismissed at 1800H.

Day 1: 5 June 2018 – NUS LT 26 & 28

0900 – 1000	Registration (Equipment may be deposited at the designated tutorial rooms)
1000 – 1030	Opening Address
1030 – 1230	Multiple Choice Questions Round
1230 – 1345	Lunch
1345 – 1600	Data Response Questions Round
1600 – 1615	Observation Round Reminders (Senior Category)*
1615 – 1815	Observation Round – Theory Component (Senior Category)
1815 – 2000	Dinner Time & Telescope Setup (Senior Category)
2000 – 2200	Observation Round – Practical Component (Senior Category)

* Students taking part in Junior Category may be dismissed at 1600H

Day 2: 9 June 2018 – NTU, The Hive (Project Round); LT 22 (Finals)

0900 – 0915	Registration and Briefing
0915 – 1230	Project Round
1230 – 1430	Lunch time and (optional) Post-Mortem
1430 – 1645	Finals 1 (Junior Category)
1645 – 1715	Break & Refreshments
1715 – 1930	Finals 2 (Senior Category)
1930 – 2000	Prize Presentation

Appendix B – Rules and Regulations

Note: The following list comprises the rules for all the rounds in AstroChallenge. The organizing committee reserves the right to amend any of the rules contained herein. Participants will be notified of the relevant changes.

General rules

- Handheld communication devices or devices with storage and display capabilities (other than calculators) are not to be used during all the quiz rounds.
- Only scientific calculators found in SEAB's approved list of calculators are permitted. No other calculators will be allowed in this competition.
- Any team caught cheating will be subjected to disciplinary/remedial action, including immediate disqualification. The teacher-in-charge and their respective school will be notified in the event of cheating.
- The tabulation of total points is final. No further correspondence will be entertained.
- Top 50% of MCQ individual scores, Data Response Questions, Observation, and Project team scores will be released. Full release of results will only be made upon the teacher-in-charge's request, and each school may only view its own students' scores.

Rules and Regulations for Specific Rounds:

Multiple Choice Questions (MCQ) Round

Duration: 2 hours

- This is an individual round.
- A maximum of 5 members per team can take part. Participants may leave before the time limit, but may not leave within the last 15 minutes of the paper.
- The overall points for the MCQ round will be the average of the marks from the best 4 individuals in the team.
- There will be a total of 50 questions. Participants start off with 50 points. 2 marks will be given for a correct answer, -1 mark for a wrong answer and 0 marks for blanks. A maximum of 7 blank answers are allowed from each individual, after which all other blank answers are considered wrong.
- A "*Best Astronomer*" from each category will be selected based on the individual scores for this round. In the event of a tie, several tiebreakers (e.g. most correct answers) will be used to break the tie.
- The Junior Category MCQ paper will not be the same as the Senior Category MCQ paper.

Data Response Questions Round

Duration: 2 hours

- This is a group round.
- Most of the questions are on applications in astronomy.
- The team reserve cannot take part, unless one member of the team is absent and/or unwell. Only 4 participants per team may take part in Data Response.
- The points awarded to the team for this round is the total sum of marks awarded in each question.
- There will be a total of 5 Data Response Questions. Each question is independent of the other 4 questions.

Observation Round (Senior Category only)

Duration: 2 + 2 hours (Theoretical + Practical)

Venues:
Theory – NUS LT 27
Practical - NUS Engineering Bridge outside LT 3 & 4

- This is an inter-school round.
- Each school may send **only 5 people** to participate in this round. The school can choose these 5 people out of all its participating teams. The score obtained by these 5 people will be the score awarded to all teams for that school.
- This year, there are two components for Observation Round, namely the theory and practical component.

Theory Component

- This year, the theoretical observation round will be held after the Data Response Questions Round. This comprises a written test and/or the use of stargazing software and/or indoor practical tests.
- Personal stargazing software and applications (e.g. Google sky maps) are NOT permitted during the theoretical observation round unless specified. However, printed/written material such as observation plans and finder charts **may** be permitted for specific components.
- The stargazing software that may be used in the theoretical observation round is Stellarium (http://www.stellarium.org/). The question may involve finding deep sky objects or pointing out particular stars and constellations (analogous to practical observation round).
- Participants are highly recommended to familiarize themselves with the program prior to the competition, and take note of the following additional settings:

- Unless otherwise stated, time zone and location are set to those of Singapore.
- Time will not be paused.
- What will be shown: stars, planets and deep sky objects (subject to sky condition settings), cardinal points, the ground.
- What will NOT be shown: labels for celestial objects, constellation lines, celestial coordinates grid.
- Only keyboard navigation - directional arrow keys, PgUp & PgDown to zoom – is allowed.
- Sky and viewing options settings: Atmosphere: on, Light pollution: 6, Labels and Markers: all off, Projection: Stereographic.
- If tested, the telescope and miscellaneous settings in the Oculars plugin will be revealed on the day itself.
- If the Oculars plugin is not used, participants may switch between Equatorial and Azimuthal Mount mode as they deem fit.
- For further information, please see our website for a briefing about the Observation Round.

Practical Component

- The practical component of the observation round is held after dinner.
- Participants may bring along **any reference materials, subjected to approval**. These materials must be submitted to the quizmasters beforehand for review.
- Participants are expected to complete their observation log sheets (provided). They will also be tested on their telescope handling and alignment skills. Judges will verify each object found by the team.
- GOTO-enabled mounts/scopes and any form of computerized mounts/scopes are **NOT allowed** to be used during this round, **unless the motor and computer are switched off and the scope operated manually**.
- Participants are expected to pack their equipment in shock-absorbing material to ensure it will not be damaged during transportation.
- The organizers, judges, NTU and NUS will **not** be liable for any loss or damage of equipment at any point of time during the competition.
- This round is dependent on the weather and in case of bad weather, the organizing committee reserves the right to call off or replace the round.
- The organizing committee of AstroChallenge 2018 cannot be held liable for the weather.

Project Round

Please refer to Appendix C for AstroChallenge 2018 Project Round Entry Rules and Regulations.

Final Round

Duration: 2.5 hours (projected)

The **top five teams** (based on all the rounds from the Senior and Junior Categories) will take part in this round. In addition, there will be a **sixth team** composed of **4 individuals** with the highest MCQ scores from different schools that are not already represented in the finals. Should there be less schools than available slots, the next highest scoring individuals will be selected.

- Only 1 team from each school per category can qualify for the Final Round.
- Only 4 participants are allowed for each team. The fifth member is not allowed to sit together with the team.
- In the event that 2 or more teams from a school qualify for the Final Round, only the top team will participate in the Final Round.
- Should a qualifying participant from the 6th team be absent, the next highest scorer will be selected to participate.

Round 1: Jeopardy Round

- Each member of the team is to answer questions without help from the other members.
- Questions in this round are categorical and largely contain questions pertaining to practical astronomy.

Round 2: Game Round

- The rules regarding this round will be revealed on the day itself.

Round 3: Buzzer Round

- The Quizmaster will indicate who has hit the buzzer first before the team is allowed to answer the question. There will be visual or other sensory cues to determine which team hits the buzzer first.
- Teams are expected to answer immediately after buzzing in. Judges reserve the right to penalize teams that do not answer within a reasonable amount of time.
- The team will be given a time limit to answer the question. If the answer is incomplete or not given after the time limit, the team is deemed to have given an incorrect answer. The question may then be opened to the rest of the teams.
- In the event of a dispute, the judges and organizers reserve the right to have the final say in the accuracy of the answer, and the award of points. The judges' decision is final.

Score Weighting for Preliminary Round

	Junior	Senior
Round 1 – MCQ	35%	25%
Round 2 – Data Response	30%	20%
Round 3 – Observation	-	30%
Round 4 – Project	35%	25%
Total	100%	100%

Score Weighting for Final Round (for both Juniors and Seniors)

50% Final Round 1: Jeopardy Round (Individual and Team Segment)
30% Final Round 2: Game Round
20% Final Round 3: Buzzer Round

Score Weighting for Grand Total (for both Juniors and Seniors)

20% Preliminary Round
80% Final Round

The weighting for AstroChallenge 2018 is provided to serve as a strategic guide for participants. The organizers reserve the right to amend the weighting pursuant to its discretion.

Appendix C – Explain Like I'm 5 (ELI5)

Your team is to **choose and answer one challenging question in the field of astronomy, cosmology and astrophysics**. However, you are to convey the answer using a simple video format, aimed at educating typical young audiences. As such, please ensure that your explanation is as concise and accurate as possible, while being extremely easy to understand.

You will find the list of questions below, of which your team is to select **1 out of the 30** questions.

Summary of Instructions

1. Your task is to explain an astronomy/astrophysics concept simply. (*Imagining yourself as a school teacher or a parent talking to a 5-year-old child will help*).
2. There are two segments to this challenge: The video submission and live booth.
3. You will first choose **1 out of the 30** questions to **explain in a video** of **no more than 5 minutes in duration.**
4. Following which, you will then submit this video for assessment to be reviewed by the organisers of AC2018. The deadline of submission is on **1 June 2018, 1800h** (Day 0).
5. The target audience for the video is students from Primary schools with the aim of educating them on astronomy, and thus should be in an appropriate tone and mode of presentation.
6. On **9 June**, you will **set-up a booth and present a discussion of the question** to judges. In this segment, you are to set-up an exhibition to **elaborate more** about your topic **in greater depth**, which your team might not have conveyed in the video.
7. The presentation should be **no longer than 8 minutes** and should be a **supplementary component**, not a re-screening of your original video.
8. In both segments, you may wish to use **any form of visual and audio aids** that you deem appropriate for the discussion.
9. For the full instructions for the project round, please refer to our website http://astrochallenge.org.

Should you wish to seek any clarifications, you may contact Hong Kiat at +65 9451 4854 or email tanhk@u.nus.edu, or write in to astrochallenge@gmail.com.

S/N	Question
1.	How serious must an asteroid threat be so that it is justified for us to take action to mitigate its threat?
2.	Are all stars like our Sun?
3.	What is wrong with the geocentric model?
4.	Barred and unbarred spirals, elliptical and irregular galaxies, to name a few, why do galaxies come in different shapes and sizes?
5.	How unique is our Solar System, all things considered?
6.	The Summer Triangle is made up of three stars: Altair, Deneb, and Vega. Why are these three stars specifically used, and why do we not instead use other stars to form the Summer Triangle?
7.	How accurate is astrology and what is its relation to astronomy?
8.	What is factually wrong with some space-based sci-fi movies?
9.	What are some of the weirdest stars out there?
10.	How sure are we about the cosmological principle?
11.	What is the Big Bang and why is it so important to study it?
12.	What do you think is the most important discovery in astronomy?
13.	Where is North in space?
14.	With the lack of timezones in outer space, how is time determined?
15.	Suppose we wanted to build a colony. Is building one on the Moon viable? How about on Mars? How about elsewhere?
16.	What happens to our body when we die in space?
17.	Why have we not found life outside of Earth?
18.	Why are Jupiter's moons so different in number and type?
19.	How have today's telescopes improved on Galileo's telescope?
20.	Which would be better for astrophotography: a DSLR or a CCD?
21.	I only have a pair of binoculars (at best). What astronomy can I do in Singapore? [1]
22.	What features can I see in the spring/summer/fall/winter night sky? (Pick 1 season) [2]
23.	What is light pollution and how is it measured? [3]
24.	During stargazing, someone commented: "Ooh this object in space looks so amazing! How did you know how far this object is?". How would you answer this question?
25.	How do we know that there are aliens out there?
26.	What is the astronomical bases behind some of the public holidays in Singapore?
27.	How does gravity affect the habitability of a planet for Earth-like organisms?
28.	How does solar activity affect Earth?
29.	What is the most efficient way for interplanetary travel?
30.	What is an ephemeris and how is it used?

Footnotes:

[1] An observation log should be produced during the live presentation at AC Day 2.
[2] For the live presentation on AC Day 2, build upon your video by giving an actual night sky talk for X date at Y time. X date should lie within the season you chose for your video presentation.
[3] For the live presentation on Day 2, you should answer the follow-up question: What can I observe in my light polluted sky? An observation log will be helpful in scoring in this segment.

Weightage:

Video Segment (40%)

Communication (Language and Ease of Understanding)	30%
Content	40%
Visual Aid/Presentation	20%
Teamwork	10%

Live Presentation Segment (60%)

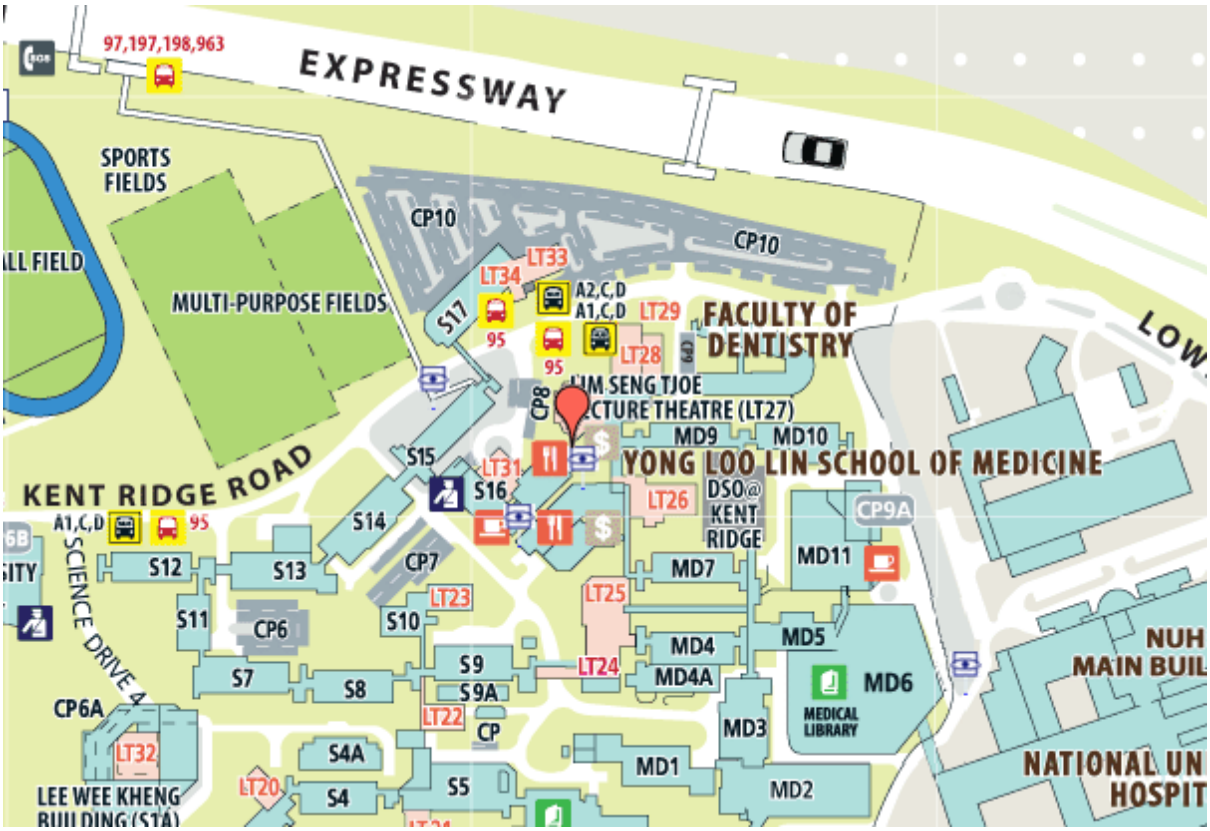
Communication (Language and Ease of Understanding)	30%
Content (includes Q&A, up to 10% deduction)	40%
Visual Aid/Presentation	20%
Teamwork	10%

Project Round Grading Rubrics

Criterion	Weightage	Approaching Expectations 0 – 3	Meeting Expectations 4 – 7	Exceeding Expectations 8 – 10
Accuracy and Depth of content	40 %	Content of video is inaccurate with grave conceptual errors; content fails to go beyond the superficial or is plagiarised from source materials. Narrow scope with limited variety of concepts and ideas.	Content of video is somewhat accurate with few factual errors; Analysis of topic is limited or paraphrased from source materials, with a fair variety of concepts and ideas.	Content of video is largely accurate with negligible factual errors; Analysis of content boasts originality with an excellent presentation portraying a large variety of concepts and ideas.
Clarity and Engagement	30%	Participants speak haltingly or mumble and are difficult to understand; does not engage viewers.	Participants speak clearly and intelligibly most of the time; engages viewers to a certain degree.	Participants speak clearly and fluently throughout at a suitable pace; deeply engages viewers.
Creativity and Originality	20 %	Method of video presentation is overused or cliché.	Method of video presentation is refreshing but uninspiring.	Method of video presentation is novel and innovative.
Teamwork	10 %	Few members are actively involved in the video presentation. There is a huge disproportion in the allocation of work amongst all members	Only some members are actively involved in the video presentation. There is a certain degree of disproportion in work allocation amongst members.	All members are actively involved in the video presentation. There is fair allocation of work amongst all members.

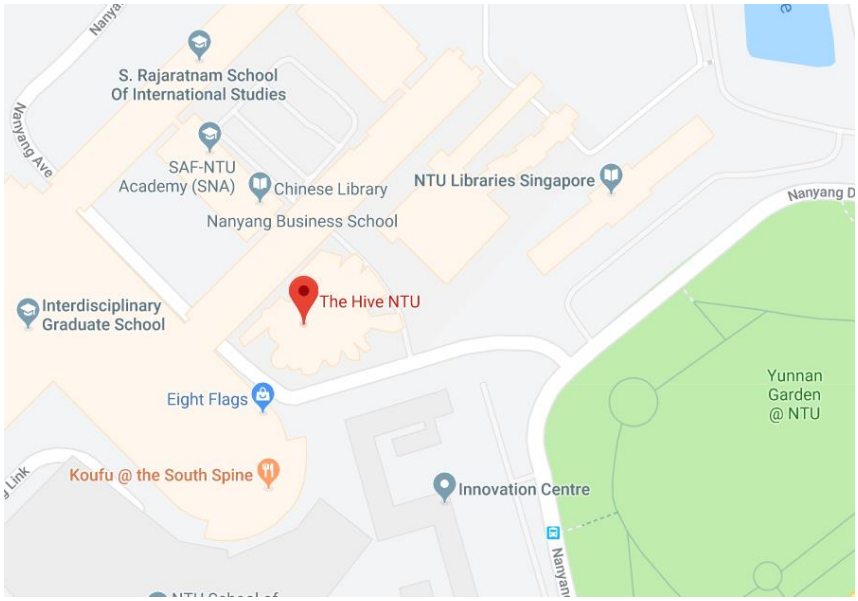
Appendix D – Maps of Competition Venues

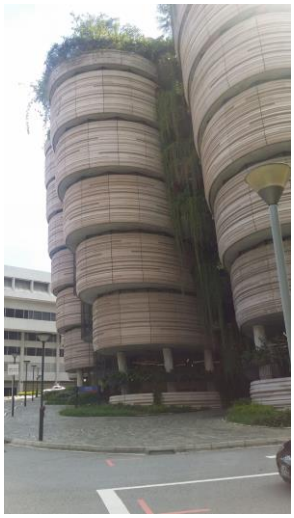
Map of NUS - NUS LT26/27/28 (For Day 0 and 1)



If you need direction to go to LT27/LT28 NUS from Kent Ridge MRT by bus 95 or NUS Internal Shuttle Bus A1 or D2, please refer to this link: http://goo.gl/maps/I21VO. Do note that LT 28 is just beside LT 27, and LT 26 is right up the stairs beside LT 27, right beside the Science canteen (Frontier).

Map of NTU – The Hive (For Day 2)





Take bus 179 from Pioneer MRT exit A or Boon Lay MRT bus interchange and stop at the Innovation centre bus stop. The Hive is the building shown in the picture on the right and can be seen from the Innovation centre bus stop.