AstroChallenge 2019

To: Teachers-in-charge and Participants

On behalf of the organizing committee, I would like to thank you for your keen interest in **AstroChallenge 2019**. The following contents of this letter include important issues and rules to take note of:

1.) Location and time to report

Day 0 (31 May) 14:00 – **NTU, LT 27**

Day 1 (3 June) 09:00 – **NTU, Tan Chin Tuan LT**

Day 2 (8 June) 09:00 – **NUS, E5-03-19 to 03-23 and LT6**

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

2.) Payment

The registration fee for each Junior or Senior team is **$70, or $20 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 (31 May) 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 **in NTU**. The equipment for the observation round can be deposited into **Tan Chin Tuan LT** on Day 1 (3 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 format of AstroChallenge has been modified from prior years. For more information, please refer to Appendix B, as well as a summary of changes on our website. Further information about the Rules and Regulations will be posted on our website and Facebook Page.

7.) Project Round

The video for the Project Round must be **submitted by Day 0 (31 May)**. The video file may be submitted via **email**, uploaded **online** and shared with us, or loaded into a **thumb drive** which will then be copied over to our computers on Day 0. Please note that the video file **should NOT exceed 1 GB in size**.

Project Round materials and presentation meant for the **exhibition** segment are to be COMPLETED beforehand and **submitted on Day 2 (8 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

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

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

b. Telescope for participants in the Senior category on **3 June (Day 1)**.

c. Completed Project (video file) on **31 May**, materials for exhibition on **8 June**.

d. Money for meals (you will be guided to the canteen during mealtimes).

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 2019. Thank you.

Yours sincerely,

Wan Si Chen (Mr.)
Chairman
AstroChallenge 2019 Committee

Appendix A – Schedule of Events

Day 0: 31 May 2019 – NTU, LT 27

1400 – 1800	Registration, Payment and Project Round Part 1 submission*
1415 – 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: 3 June 2019 – NTU, Tan Chin Tuan LT

0900 – 0930	Registration (Equipment may be deposited at the designated area)
0930 – 0945	Opening Address
0945 – 1145	Individual Round
1145 – 1300	Lunch
1300 – 1500	Team Round
1500 – 1530	Observation Round Reminders (Senior Category)*
1530 – 1800	Observation Round – Theory Component (Senior Category)
1800 – 1930	Dinner Time & Telescope Setup (Senior Category)
1930 – 2200	Observation Round – Practical Component (Senior Category)

* Students taking part in Junior Category may be dismissed at 1530H

Day 2: 8 June 2019 – NUS, E5-03-19/23 and LT6

0900 – 0915	Registration
0915 – 1200	Project Round
1200 – 1400	Lunch
1245 – 1315	Junior Post Mortem (optional)
1315 – 1400	Senior Post Mortem (optional)
1400 – 1630	Finals 1 (Junior Category)
1630 – 1700	Break & Refreshments
1700 – 1900	Finals 2 (Senior Category)
1900 – 1930	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 Individual Round, Team Round, Observation, and Project 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:

Individual Round

Duration: 2 hours

- 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 Individual Round will be the average of the marks from the best 4 individuals in the team.
- There will be a total of 50 MCQs in this round. Each MCQ contains 5 options.
- Participants start off with 50 points.
    - 2 marks will be given for a correct answer.
    - 1 mark will be deducted for a wrong answer.
    - 0 marks will be given for blanks.

  A maximum of 7 blank answers are allowed from each individual, after which all other blank answers are considered wrong.
- The first 5/10 questions in the Senior/Junior Individual Round will exclusively focus on testing astronomical basics and recall of fundamental astronomy facts.
- 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 Individual Round paper will not be the same as the Senior Category Individual Round paper.

Team Round

Duration: 2 hours

- 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 the Team Round.
- The points awarded to the team for this round is the total sum of marks awarded across all questions, up to a maximum of 80 marks.
- There will be a total of 5 structured questions. Each structured question will contain around 20 marks, up to a total of 100 marks. The first structured question will contain short open-ended questions that focus on testing factual understanding and recall of astronomical basics.

Observation Round (Senior Category only)

Duration: 2.5 + 2.5 hours (Theoretical + Practical) (approx.)

Venues:
Theory – NTU Tan Chin Tuan LT
Practical – NTU EEE rooftop / Nanyang House courtyard

- 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.
- There are two components for Observation Round, namely the Theory and Practical component.

Theory Component

- The Theory Component will be held after the Team Round. This comprises a written test and 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 Theory Component unless specified.
- 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 be paused.
- What will be shown: stars, deep sky objects, planets (subject to sky condition settings), 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.
- Unless otherwise stated, viewing options will be standardized as follows:
  - Atmosphere: On.
  - Light pollution: 3.
  - 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 closer to the date.

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 2019 cannot be held liable for the weather.

Project Round

Please refer to Appendix C for AstroChallenge 2019 Project Round Entry Rules and Regulations.

Final Round

AstroChallenge 2019

Duration: 2.5 hours (projected)

The **top five teams per category** (based on all the preceding rounds from the respective category) 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

- Individual
  - 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.
- Team
  - The team is expected to work together to select and answer 2 questions.
  - Questions in this round are categorical and largely contain questions pertaining to theoretical astronomy
- Estimation
  - Teams will concurrently estimate the value of 4 astronomical quantities.

- Questions in the Individual and Team Component are worth 20 points, while each question in the Estimation Component is worth up to 5 points. The full score in this round will be 140 points.

Round 2: Game Round

- The Game Round will comprise of 20 questions done via the Kahoot format
- The full score in this round will be the top scoring final team's score.
- The audience may concurrently take part in this round.
- Should the audience prove disruptive to the conduct of the Game Round, organisers reserve the right to suspend the audience participation component of this Round.
- The exact 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.
- Each question will award up to 20 points. Incorrect answers may be penalized by up to 10 points.
- There will be 18 questions in this round. Since each question may award a maximum of 20 points, the full score in this round will be $\frac{18\times20}{6} = 60$ points.
- 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 Rounds

	Junior	Senior
Round 1 – Individual	35%	25%
Round 2 – Team	30%	20%
Round 3 – Observation	-	30%
Round 4 – Project	35%	25%
Total	100%	100%

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

35% Preliminary Rounds
40% Jeopardy Round
10% Game Round
15% Buzzer Round

The weighting for AstroChallenge 2019 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 a typical member of the public. 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 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 AC2019. The deadline of submission is on **31 May 2019, 1800h** (Day 0).
5. The expected target audience for the video are members of the public, **including** students from secondary schools, polytechnics and junior colleges. Videos should thus be in an appropriate tone and mode of presentation.
6. In particular, the inclusion of excessive inside jokes that are not comprehensible to members of the public may lead to penalties.
7. Videos should not be excessively large – we recommend a 1 GB maximum. Videos larger than this limit often encounter playback issues.
8. Videos/presentations that are targeted to younger age-groups are more than welcome.
9. On **8 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.
10. The presentation should be **no longer than 6 minutes** and should be a **supplementary component**, not a re-screening of your original video. Thus, teams are **strongly encouraged to split their content wisely**.
11. In both segments, you may wish to use **any form of visual and audio aids** that you deem appropriate for the discussion.
12. Should you wish to seek any clarifications, you may write in to astrochallenge@gmail.com.

AstroChallenge 2019

S/N	Question
1	Advertise the Dec 2019 solar eclipse to local Singaporeans. [1]
2	"Why do I see so few stars in Singapore, yet online pictures show a sky full of stars?"
3	Choose a celestial object and explain its mythological and/or astronomical significance.
4	Is the night sky today forever?
5	Are exoplanets common? How do we know which stars have exoplanets?
6	Why can we only see half of the moon? Are both halves the same?
7	What is Kessler syndrome and why does it pose a threat to space flight?
8	How do you achieve orbit from the surface of the Earth?
9	How has the Universe changed since its start?
10	How are different types of stars born?
11	Advertise a stargazing location on Earth. The location should be reasonably accessible to Singaporeans.
12	What is a year? How do we know 1 year has passed?
13	Introduce a classical instrument to do with astronomy and explain how to use it. Assess its modern-day relevance and usefulness.
14	What are Cepheid variables and what is their significance?
15	What are some of the coordinate systems used for interplanetary and/or interstellar travel?
16	How can we use constellations to navigate on Earth?
17	Pick a famous astronomer and describe his/her contributions to Astronomy
18	What are planetary nebulae and why are they so colourful?
19	What is the concept of the Great Filter? Is there one ahead of us?
20	Why are most rockets multi-staged? Are there alternatives?
21	How can climate change be caused by celestial events? Is the current climate crisis caused by such celestial events?
22	Why is Eta Carinae famous? Is our sun like it?
23	How massive can stars be? Is there an upper/lower limit and if so, why?
24	What are some possible ways of colonising Mars?
25	Why do stars have different colours from each other (blue, red, white, etc)?
26	What lines of evidence prove flat-Earthers are wrong?
27	What are some challenges facing interstellar travel, and how can we mitigate them?
28	Why do we think that Earth revolves around the Sun, rather than the other way around?
29	Why are the inner planets so different from the outer planets of the Solar System?
30	What are some features of the Moon that I should look out for over a course of a month?

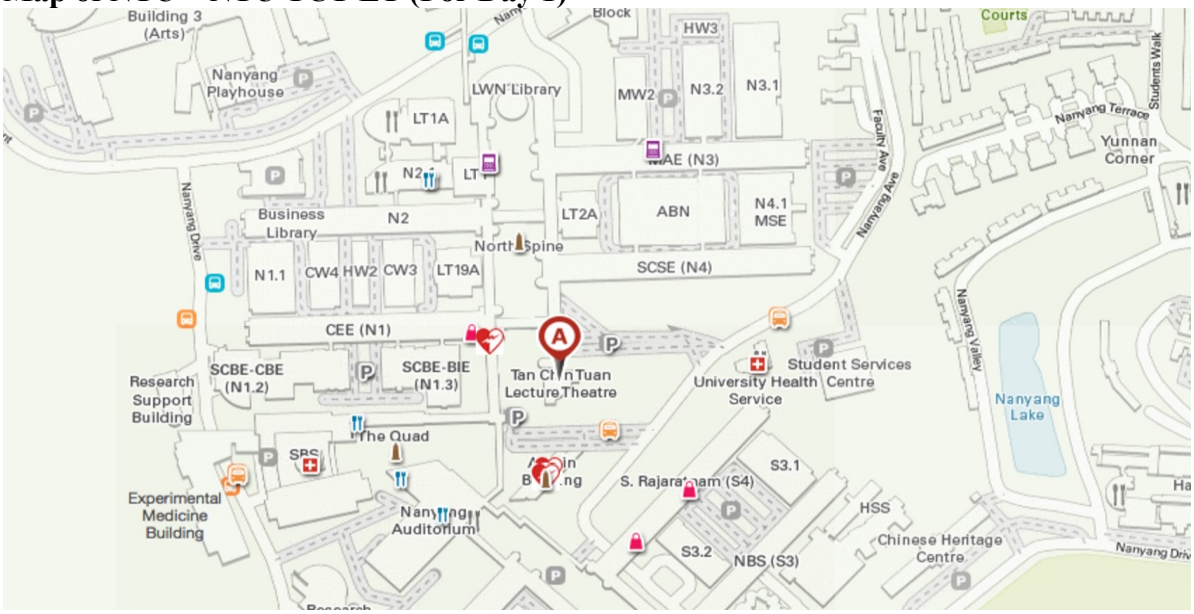
Additional Notes:

[1] While no bonus points will be awarded, organizers will like to note that due to the high-profile nature of this event, videos/presentations for this question will likely be useful for publicity events within your respective school later in the year.

AstroChallenge 2019

Appendix D – Maps of Competition Venues

Map of NTU – NTU TCT LT (For Day 1)



For directions to TCT LT from Pioneer MRT by SBS Bus 179, kindly refer to this link: http://goo.gl/S2i3p4.

Map of NUS – E5-03-19/23 and LT6 (For Day 2)

If you need directions to go to LT6 NUS from Clementi MRT by buses 96/188/189, please refer to [this link.]
Alternatively, one may reach LT6 via Internal Shuttle Bus A1 from Kent Ridge MRT