

## Changelog for AC2019

Following feedback from participating schools, we have decided to revamp the format, design and difficulty of AstroChallenge. The list below is a summary of the proposed changes.

### Individual Round (Previously: MCQ Round)

From this year onwards, at least 10% of the multiple-choice questions in the Senior Category will be simple questions that focus on testing factual understanding and recall of astronomical basics. For the Junior Category, this percentage will be increased to 20%. This difference is due to the fact that participants in this category tend to be new and thus have a weaker grasp of basic astronomical knowledge.

Examples of these questions include:

- What are comets?
- How do planets form?
- A star has a parallax of 40 milliarcseconds. How far away is it?

### Team Round (Previously: DRQ Round)

We are keeping the format of the Team Round unchanged: there will be 5 main questions worth 20 marks each. However, the maximum score of the Team Round will now be 80 marks. Effectively, there are now 20 bonus marks available for teams to score in.

Questions in the Team Round are traditionally known to be more challenging than the Individual Round. This is in the hopes that participants can apply what they have learnt to novel situations. Thus, errors and mistakes are to be expected while attempting the Team Round. In making this change to the maximum score, we hope to make this point explicit to all participants, while sending a message to participants that it is OK to make mistakes in the process of learning.

Further, 20% of the Team Round's marks will be allocated to testing factual understanding and recall of astronomical basics. This will be done via short open-ended questions, compiled into 1 main question. For Juniors, a fraction of these questions will pertain to observational astronomy.

Examples of these short open-ended questions are:

- Refer to the following quote:

“The nitrogen in our DNA, the calcium in our teeth, the iron in our blood, the carbon in our apple pies were made in the interiors of collapsing stars. We are made of starstuff.”

– Carl Sagan

- Briefly explain how elements like nitrogen, calcium and iron are produced in massive stars.
- The quote is often shortened into “We are made of starstuff”. However, this general statement is untrue – not all elements originate from stars. Give 3 examples and briefly explain how these elements formed.

- (Juniors)
  - What is significant about zodiacal constellations, from an astronomical standpoint?
  - Give an example of a zodiacal constellation and sketch its outline. Include only the key stars of the constellation
  - Suppose I want to observe this constellation in the evening hours from Singapore. In what northern hemisphere season should I attempt this observation? We will define the start of each season to coincide with the beginning of its associated equinox/solstice.

#### Project Round

- No major changes to the Project Round are planned.

#### Observation Round

- To prevent excessive memorization of obscure objects, the Observation Round (Theory Paper) will only accept deep sky objects/asterisms if they
  - Have widely recognized standalone names and are easily visible (e.g. Coathanger)
  - Are listed in the Messier Catalogue (e.g. M42: the Orion Nebula)
  - Are listed in the Caldwell Catalogue (e.g. C76: the False Comet)
- NGC/IC/Col. Etc. Numbers quoted onto the exam script will NOT be accepted for the Observation Round (Theory Paper). Participants have to write either Caldwell Number, Messier Number or the popular name of the object.
- Double Penalties might be imposed for over-excessive fillings of star-chart with NGC/IC/Col. Etc.3
- NGC & IC objects will still obtain credit as per normal in the Observation Round (Practical Component) if they can be observed.
- Further, it will be possible to attain a perfect score in the Observation Round (Theory Paper) without resorting to obscure Messier/Caldwell objects. In other words, teams can do well by just knowing prominent deep sky objects/ double stars.

#### Finals

- No major changes to the Jeopardy Round and Buzzer Round are planned.
- The Game Round will be standardized into a Kahoot from AC2019 onwards.

#### Weightage

- The relative weightage of the rounds within the Preliminary component remains unchanged
- For determination of the final scores, the relative weights of the preliminaries/ jeopardy round/ game round/ buzzer round will now be 35%/40%/10%/15% respectively.