

## Posters



# Session 1



# Astronomy in The Malaysian National School Syllabus

Wan Mohd Aimran Wan Mohd Kamil 

Dept. of Applied Physics, Faculty of Science and Technology  
Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia  
email: [aimran@ukm.edu.my](mailto:aimran@ukm.edu.my)

**Abstract.** This is a preliminary survey of astronomy topics incorporated into the Malaysian national school syllabus. Topics directly relevant to astronomy are situated within the general science subject from Year 4 (age 10 years old) until Year 9 (age 15 years old) and are grouped under four main themes: Earth-Sun-Moon system, the Solar System, Stars, and Exploration of Outer Space. Contemporary topics such as exoplanets and astrobiology are not explicitly mentioned, but students are required to engage in hypothetical thinking by speculating on planetary diversity and its implications for life in the Universe. We characterize the astronomy content in the Malaysian national school syllabus to be life-centric and relatively open-ended.

**Keywords.** Astronomy curricula, astronomy education, Malaysia

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## 1. Introduction

A formal introduction to astronomy usually begins in a school classroom, whereby it is taught either as a standalone subject, or inserted discretely into other subjects such as science, geography and physics. Previous IAU Colloquiums devoted to the teaching and learning of astronomy have included reviews of astronomy topics contained in the school syllabi of China, Hungary, USA, Germany, Japan, Bulgaria, India, Egypt, and Thailand (Pasachoff & Percy 1990), as well as of France, Russia, UK, and Europe (Gouguenheim, McNally & Percy 1998). By presenting a brief overview of astronomy topics incorporated into the Malaysian national school syllabus, we intend to add Malaysia to the list of countries above, thus contributing to a more complete picture of the place of astronomy within the school syllabus across different countries, which facilitates comparative studies by future researchers.

## 2. Methodology

The syllabi for primary (Years 1 to 6) and lower secondary (Years 7 to 9) science subjects prepared by the Curriculum Development Division, Ministry of Education Malaysia were used as primary evidence to examine the incorporation of astronomy and astronomy-related topics in the national school syllabus (Ministry of Education Malaysia: Curriculum Development Division 2015–2020).

## 3. Discussion

Alternative ways of parsing the astronomy content in the Malaysian national school syllabus includes:

- (a) *Spatially*. Beginning with Earth before ‘moving’ outwards step-by-step to encompass larger distances and ‘space environments’ such as the Earth → Moon

→ Sun → planets → minor bodies such as asteroids and comets → stars. The extension into new 'space environments' in a sequential fashion provides a 'big picture' that links and integrates individual topics on astronomy that spans several years of study (from Years 1 to 9).

- (b) *The balance between pure and applied topics.* For instance, under Earth, mineral resources and geological disasters are discussed; under Earth-Moon-Sun system, the Islamic lunar calendar and space weather are discussed; under the Solar System, planetary habitability and the risks of collisions from asteroids are discussed; and under Stars, the utility of constellations as indicators of time and direction, and the importance of the Sun as proxy for stellar population are discussed.
- (c) *The opportunity for practical observations.* Although practical observations are not explicitly stressed, students are encouraged to perform simple observations such as changes in shadows as proof of the rotation of the Earth, the changing phases of the Moon, the appearance of lunar and solar eclipses, and the identification of equatorial constellations.
- (d) *Benchmarking with Big Ideas in Astronomy.* (Retrè *et al.* 2019) The greatest overlap occurs for Big idea 2 – Astronomical phenomena can be experienced in our daily lives, Big Idea 3 – The night sky is rich and dynamic, and Big Idea 7 – We all live on a small planet within the Solar System. Little or no overlap occurs for Big Idea 6 – Cosmology is the science of exploring the Universe as a whole, and Big Idea 10 – We may not be alone in the Universe.

#### 4. Conclusion

Since astronomy content are inserted into the general science subject and since all students regardless of their subsequent specializations must take the general science subject, it is expected that a typical Malaysian student will have a basic familiarity with the Earth-Moon-Sun system, the Solar System, Stars and Exploration of Outer Space. Therefore, these topics represent the baseline for astronomical literacy of Malaysian students, specifically and the Malaysian public generally. Recognizing this baseline can help focus and streamline the planning, execution and evaluation of astronomy education efforts in Malaysia by various parties such as astronomy educators, amateur astronomers, and planetarium and observatory officials.

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