



CaKEd

CANSAT KIT FOR EDUCATION:
TEACHING SATELLITE
TECHNOLOGY TO SECONDARY
SCHOOL IN MALAYSIA

Dr Norilmi Amiliia Ismail





What is CaKEd?

CanSat Kit for Education is a learning tool to learn satellite technology. CaKEd comprises Hardware, Software and learning material to help student simulate a process of satellite development and enhance the 5c skills

CaKEd is the product of the research and have won innovation award, Gold for MTE 2019 dan silver for ITEX 2018

Target

CaKEd suitable for Secondary students (High School)

Julie Woodard

FIVE C's of an innovative environment

1.

Community

♥ provide learning opportunities beyond local borders. Go global.



2.

Creativity

♥ provide supplies and opportunities to build, create, invent and experiment.



3.

Critical Thinking



♥ provide opportunities to respond to thought-provoking questions.

4.

Communication



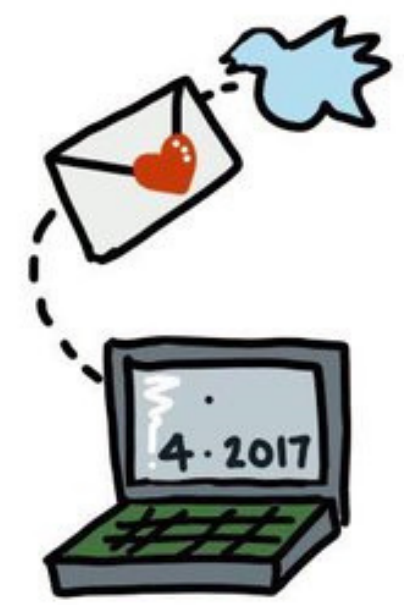
♥ provide clear, concise, and consistent communication.



5.

Collaboration

♥ Go beyond connecting with other educators and collaborate with them.



@woodard_julie

CanSat Innovation

01

Satellite Technology Module

Teaching and Learning module based on space technology. Various of activities has been included in the module to develop 21st century skills for High School student.

02

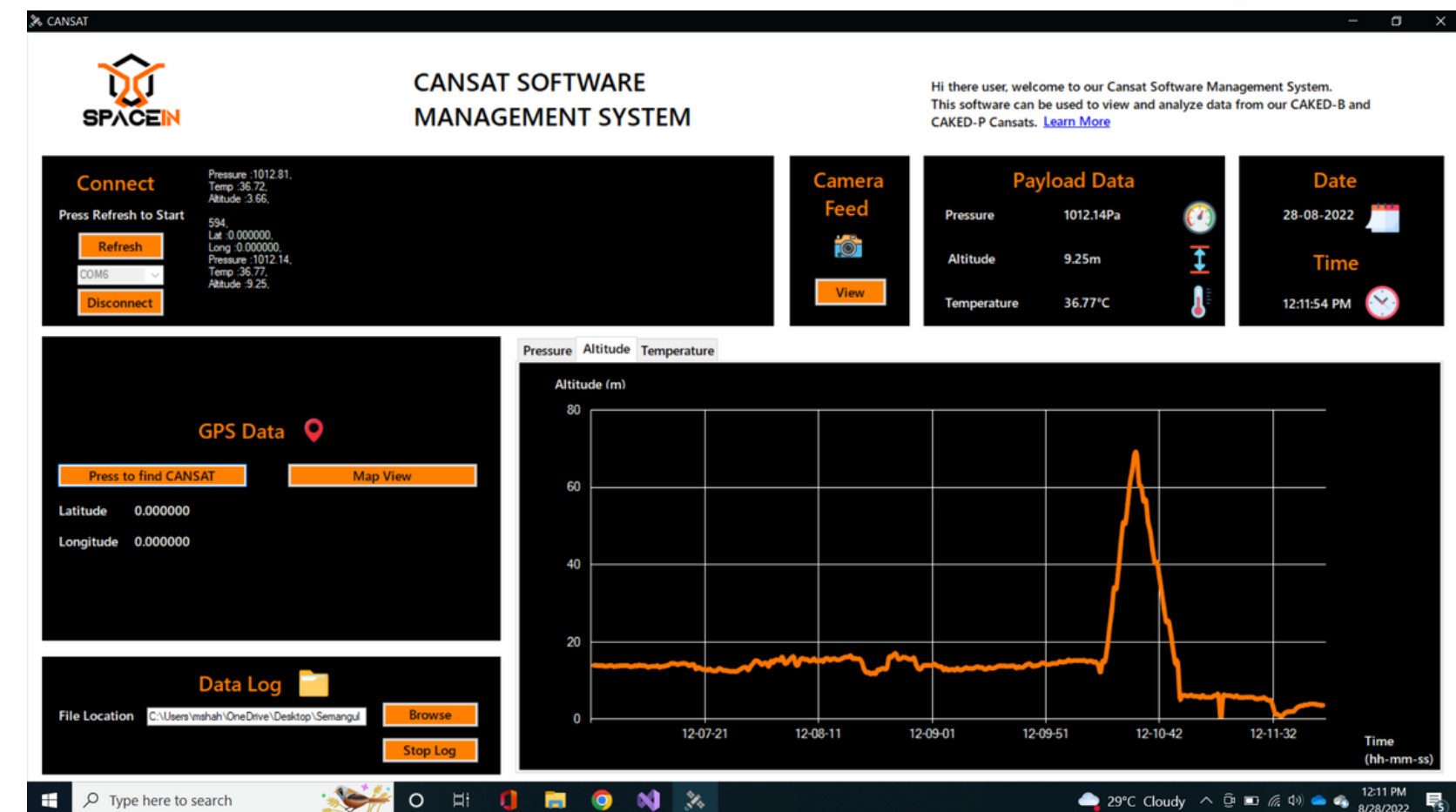
Comprehensive Learning activities

Not only cover space education, CaKEd can be an alternative to learning on IoT, has a database system to keep all data and has community learning based.



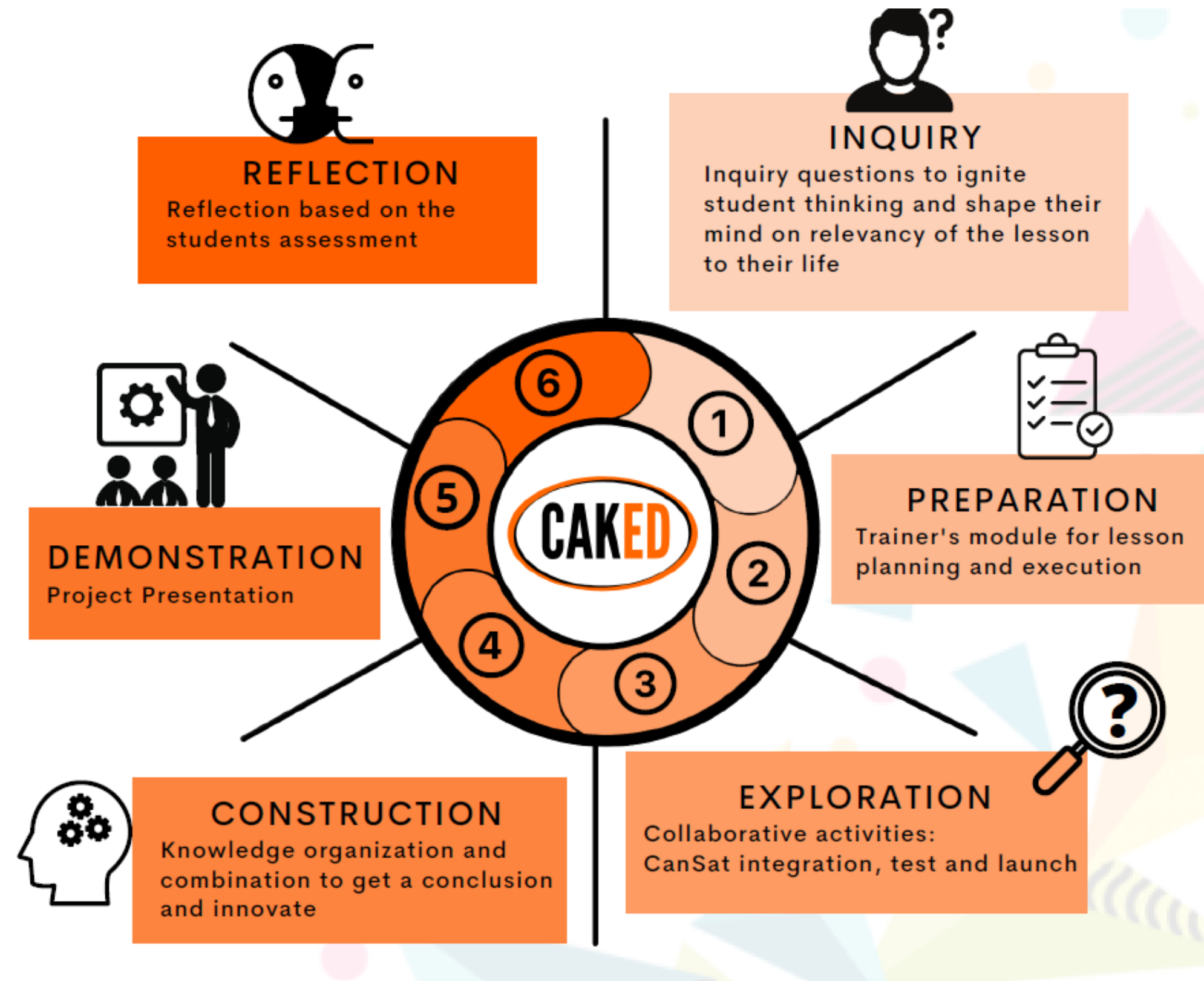
Features

- CAKED-B is suitable for beginners
- Easier to connect with other sensors
- Using LoRa Ai Thinker Ra-02 Module
- Regulated 9V input to 5V and 3.3V output
- Using Atmega328 TQFP as a microcontroller
- Nonreplaceable chip
- Programmable by USB
- Has ground station application to display the data
- Complete with learning and teaching module for secondary school



Learning cycle in CanSat.

- At the beginning of the workshop, Students will learn the basics or fundamentals of satellite design and also the application of the satellite. This activity can be done inside the classroom. (1 and 2)
- The student will integrate the CanSat in a team, build a mission, program and test the satellite. (3)
- The student will launch the Cansat, analyze the data and conduct a presentation (5)
- Give an assessment/survey to student in order to get feedback



Learning Module

3. TENAGA ELETRIK DAN KUASA

Tenaga dan kuasa diperlukan untuk sesuatu berfungsi.

SOALAN PENCETUS IDEA

1. Bagaimana kita boleh hidup dan melakukan pelbagai aktiviti?
2. Apakah yang berlaku sekiranya terputus bekalan kuasa di seluruh dunia?
3. Apa akan berlaku sekiranya tiada matahari?

KATA KUNCI

- Maksud tenaga
- Maksud kuasa
- Sumber tenaga
- Bateri
- Tenaga Solar

KRITERIA KEJAYAAN

1. Anda boleh menyenaraikan sumber-sumber tenaga
2. Anda boleh menerangkan perbezaan tenaga dan kuasa.
3. Anda boleh menerangkan bagaimana bateri berfungsi
4. Anda tahu pengendalian bateri dengan baik

01

Question to ignite student thinking

02

keywords

03

expected outcome

1.2 APAKAH ITU ANGKASA?

Cuba dongak ke langit. Apa yang kita boleh lihat? Ya, kita akan dapat melihat bulan atau bintang pada waktu malam atau matahari pada waktu siang dan semua objek ini dinamakan objek astronomi. Jika anda sedar, selain daripada objek yang kita lihat itu, terdapat ruang-ruang kosong. Ruang-ruang kosong inilah dipanggil angkasa. Jika dari bumi, ruang selepas atmosfera adalah ruang angkasa. Jika badan perundangan angkasa antarabangsa, angkasa bermula pada garis Karman, iaitu pada ketinggian 100 km daripada paras laut. Untuk melihat sejauh mana tingginya 100 km itu, mari kita lihat gambarajah di muka surat sebelah yang menunjukkan lapisan atmosfera bumi mengikut ketinggian dari aras laut.

Objek astronomi: Planet, bulan, bintang, Matahari, asteroid.
Atmosfera: lapisan gas yang melitupi Bumi.
Orbit: laluan satelit yang mengelilingi bumi atau planet lain.

Rakan pembelajaran

Anda boleh melihat bagaimana ramalan cuaca di buat di Jabatan Meteorologi Malaysia
<http://www.met.gov.my/>

Anda boleh belajar tentang penerokaan angkasa di Planetarium Negara.

Tahukah anda?

Badan yang menguruskan aktiviti angkasa di Malaysia adalah Agensi Angkasa Negara atau singkatannya ANGKASA



04

learning partner

05

trivia

Teaching Module

TEACHING GUIDE

(CanSat Kit for Educational)

Title :	Space and Me	Learning Outcomes:	At the end of the lesson, students are able to: 1. Give an example of the application of space technology that has been used in every daily life. 2. Describe how satellites work.
Time:	90 minutes		
Main Ideas:	Space and its technology in our daily life	Strategy & Teaching Method:	<ul style="list-style-type: none">● Interactive teaching Slide● Assessment● Quizzes● Animation Videos
Student Achievement:	1. Able to define the space 2. Able to mention some of the space technology used in our daily life. 3. Able to explain how the satellite works.		
Keywords:	Space, space technology		

Teaching Module

Time	Content	Teaching and Learning Activities	Material/Sources	6C's Skills	4 Learning Pillars
Time setting 10 minutes	1.1 Space Technology Brainstorming: a) Can we take a picture of the whole of Malaysia from an airplane? b) Can we know that there is another planet other than the Earth? c) How do we predict the weather for tomorrow? d) Back in the day, how did the sailors determine their ship's direction of travel?	<u>Teacher</u> 1. The teacher asks simple questions to students about what student expectations on this topic are: <ul style="list-style-type: none"> What do students want to learn? What do students want to know from the topic? What do students know about this topic only from the title? 2. The teacher can also ask students a trivia question related to space technology that will spark their ideas and get some hints about the topics. <ul style="list-style-type: none"> What technology that students know or usually use in daily life? Do students have their mobile phones and do students know how to use Google Map as a navigation tool? Does the student know how scientists discover that Earth is 	<ul style="list-style-type: none"> Section 1 and 2 of Slide 1 Toolkit 1.1: Space Technology Around Us! 	<ul style="list-style-type: none"> Critical thinking <p>Students process information using diagrams contained in Toolkit 1.1. All diagrams in Toolkit 1.1 are related to space technology (satellite) with human life. Based on the diagram, students solve problems by relating satellites with the employment sector using satellite services and filling logical answers into blank brackets.</p>	<ul style="list-style-type: none"> Learning to know <p>Students use their reasoning and think coherently and critically to answer the questions. Simple questions asked spark interest in discoveries and dive deeper into the knowledge delivered.</p>

Workshop Module

01

DURATION

Onsite - 2 Days

Hybrid - 1 to 2 weeks

02

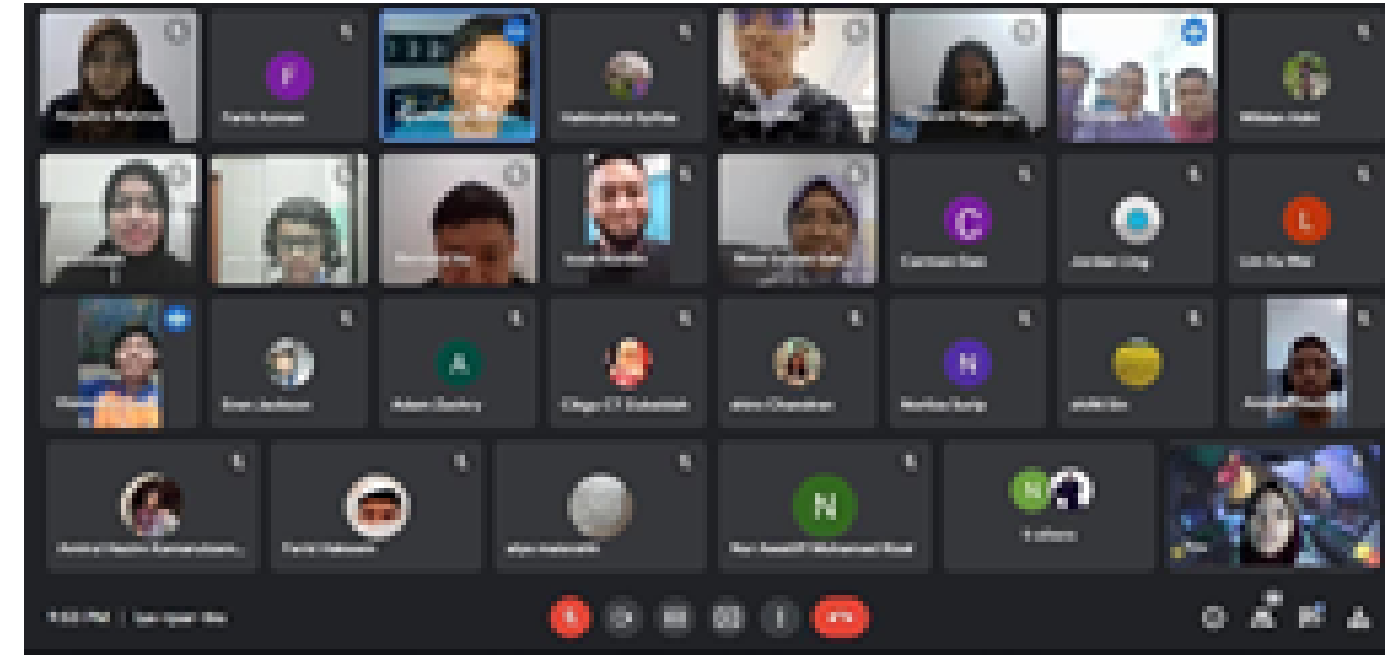
FORMAT

Onsite

- Introduction to Satellite Technology
- Satellite Subsystem
- CanSat Integration
- Introduction to Arduino Programming
- Launch
- Analysis

Hybrid

- Introduction to Satellite Technology - Video
- Satellite Subsystem -Video
- CanSat Integration
- Introduction to Arduino Programming - Live class
- Launch
- Analysis
- Presentation



Measat – National CanSat Competition

- Involve 52 groups around Malaysia (156 students)
- Hybrid mode for 10 Semi-Finalist
- Balloon Launch for 3 finalist



Techlympic – CanSat /CubeSat Challenge

- 54 schools from almost all states in Malaysia (216 students)
- Focus on data analysis and Presentation
- SDG



Techlympic – CanSat /CubeSat Challenge

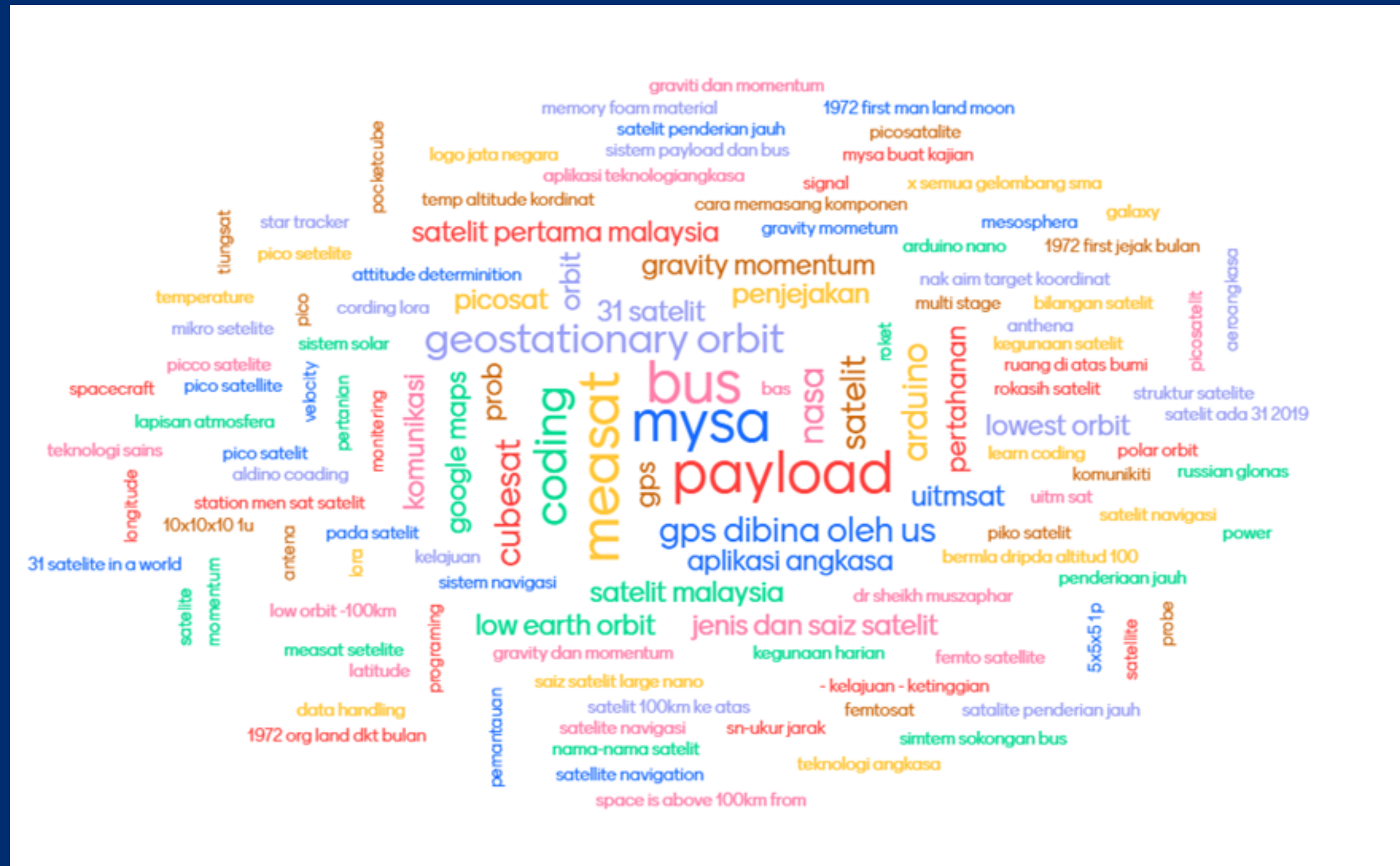




Previous Workshop



Feedback – Students

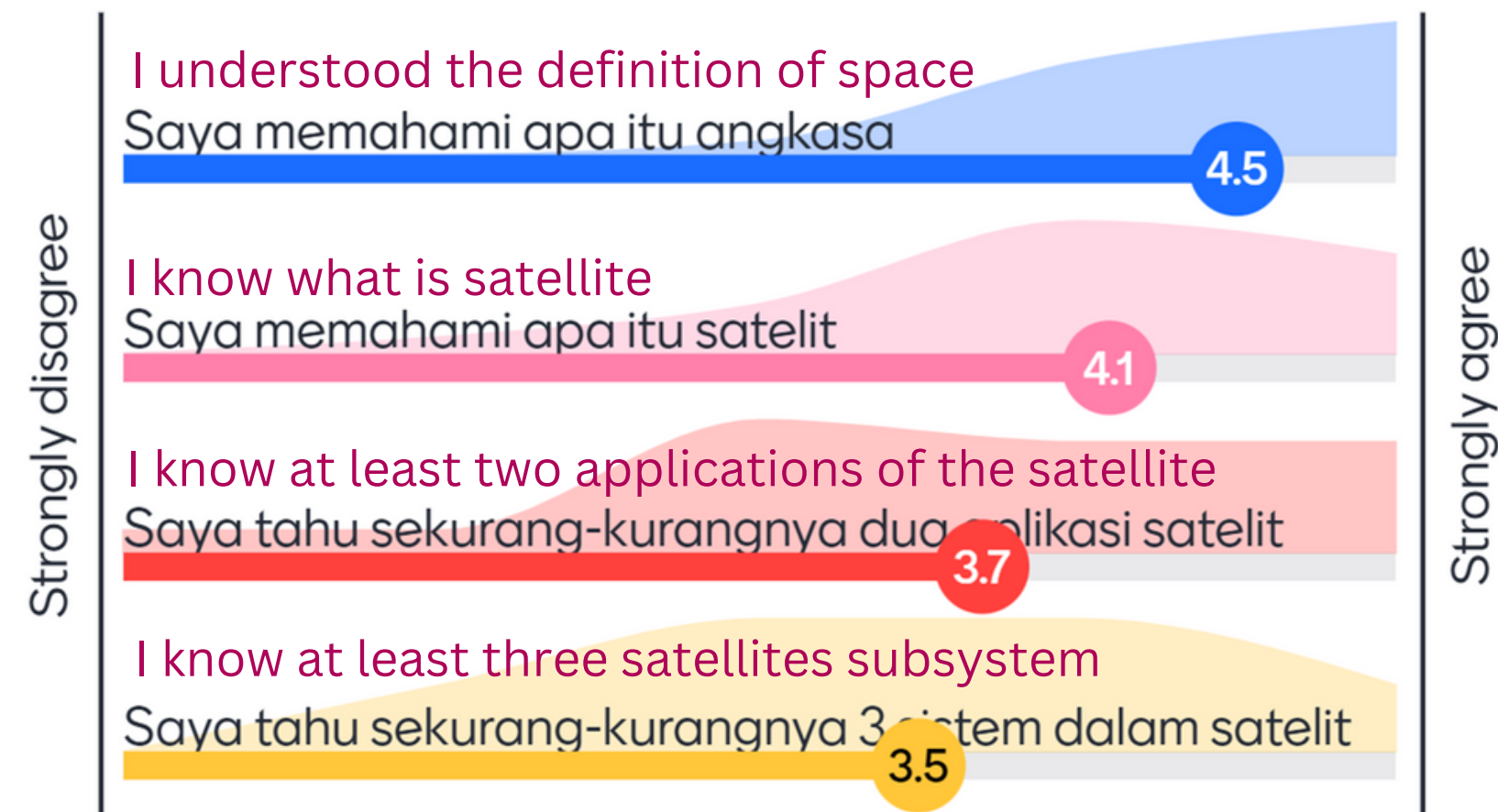


Keywords

Feedback – Students

Teknologi Angkasa

Satellite Technology

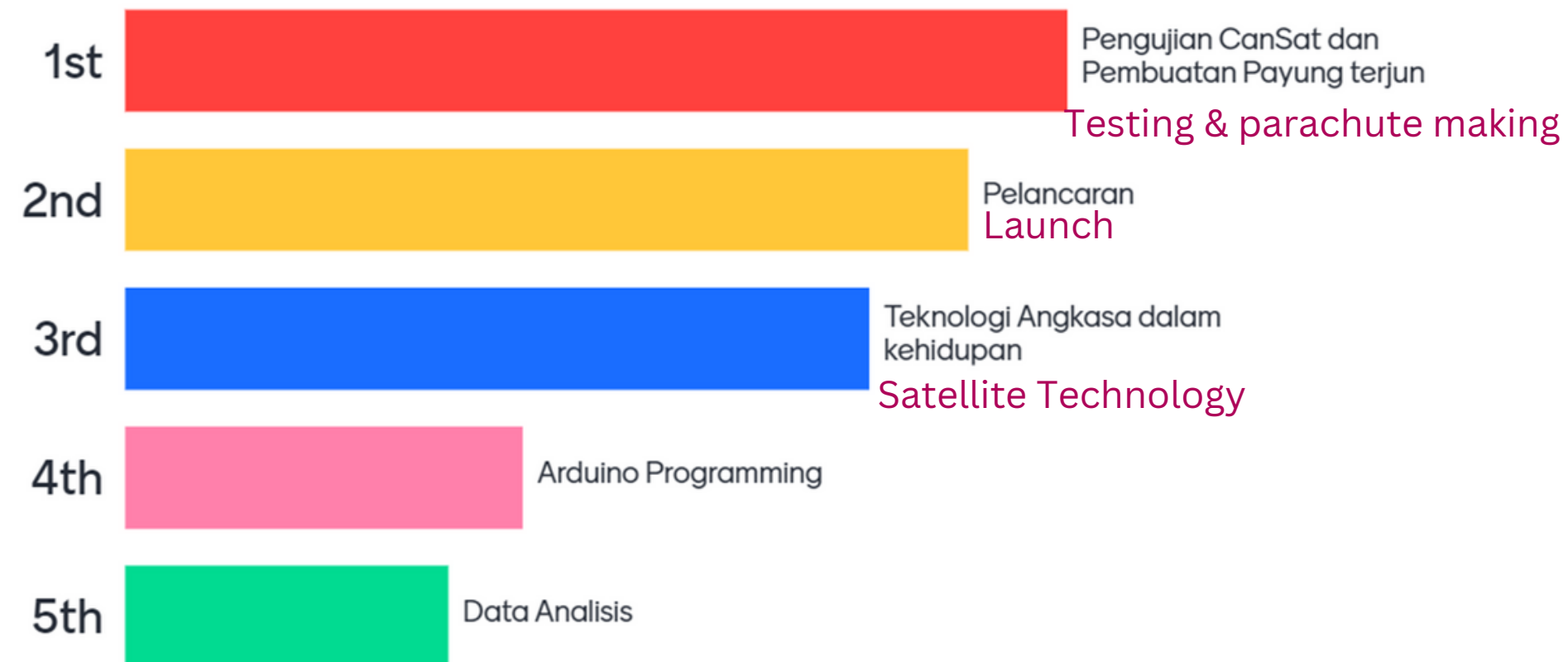


Keywords

Feedback – Students

Slot yang mana anda paling gemar

The most preferences topics



Keywords

Teachers Workshop



Feedback – Teachers

This CanSat Module is suitable for secondary school

The student may needs a special workshop on Arduino prior CanSat Workshop

The workshop can be conducted in 2 or 3 days

This workshop gives more understanding in satellite technology

The teaching modules help teachers to prepare for the lesson too

Conclusion

- CanSat module integration, test, and launch for hands-on collaborative project-based learning activities
- Interactive teacher's guide to strengthening student's understanding of STEM
- Increase understanding and interest to satellite technology





Thank you

norilmi@spacein.com.my