2022

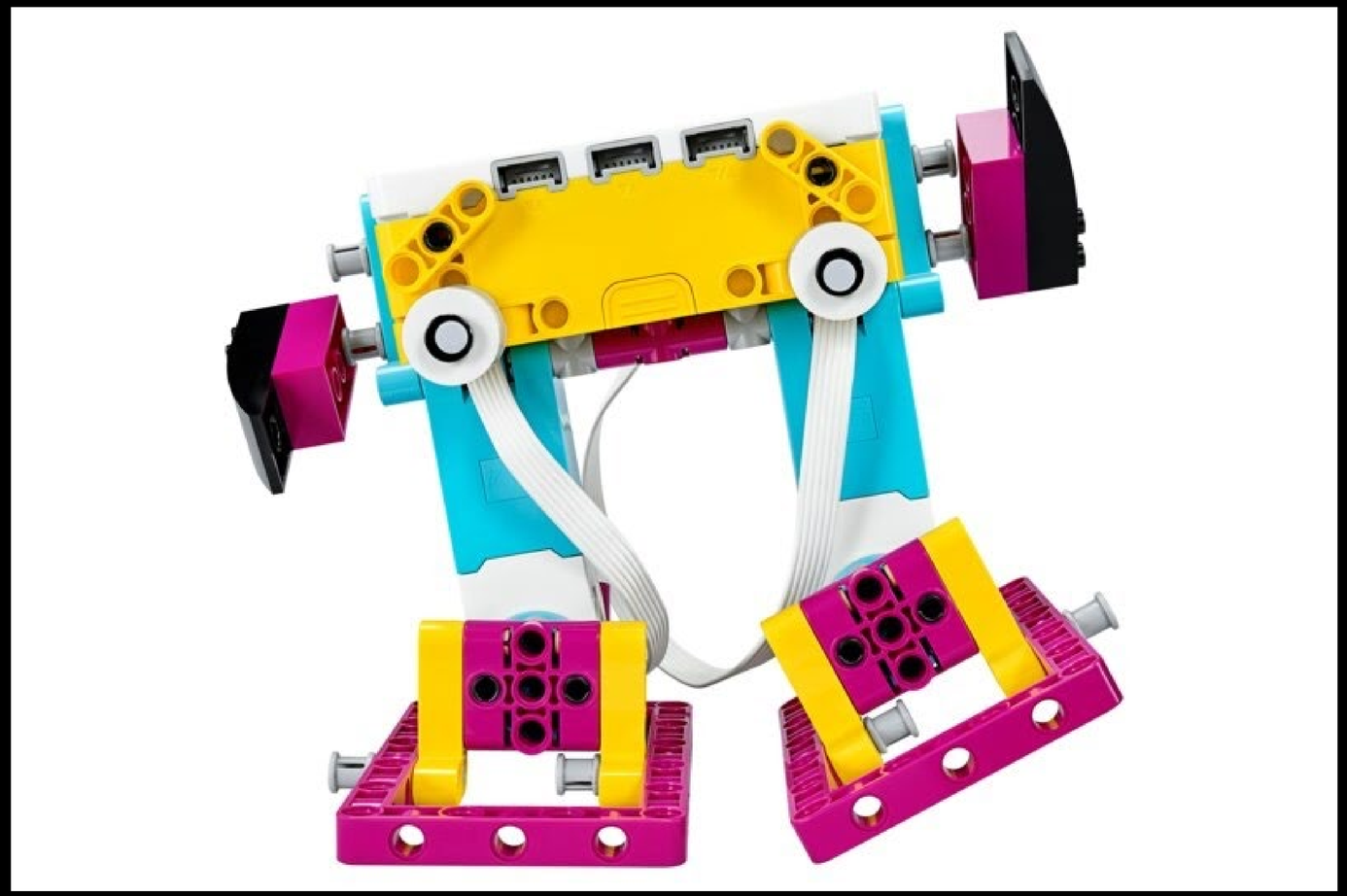
Spike Challenge

mta

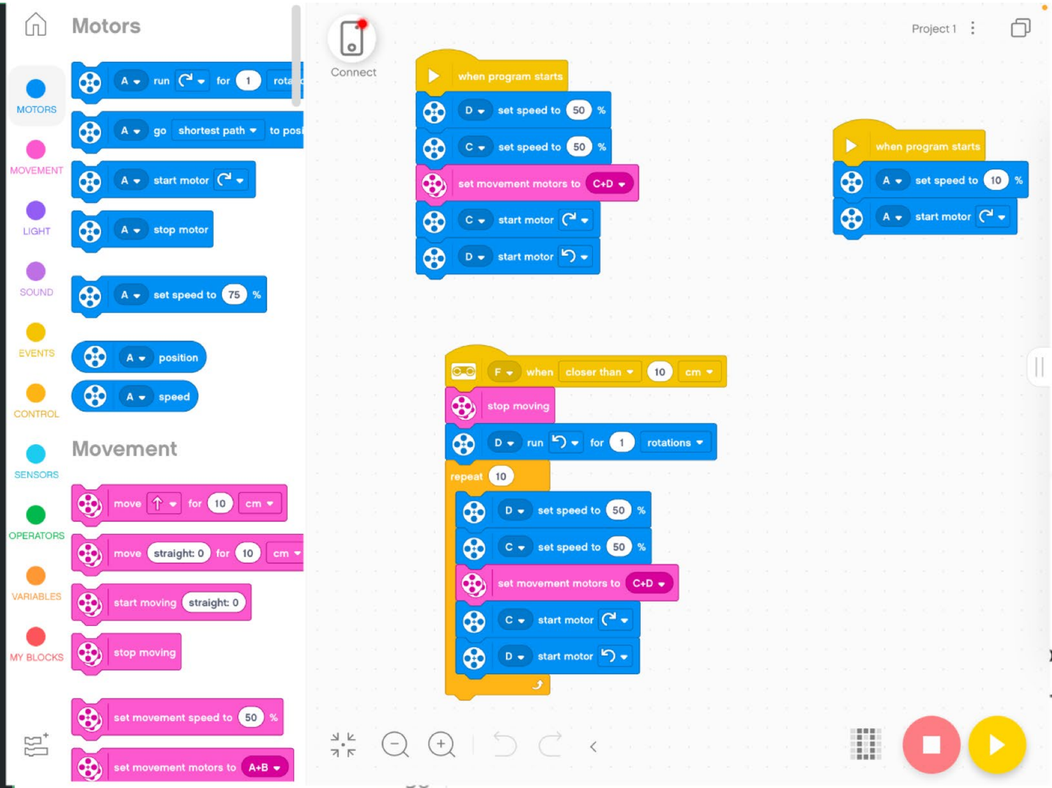
modern teaching aids

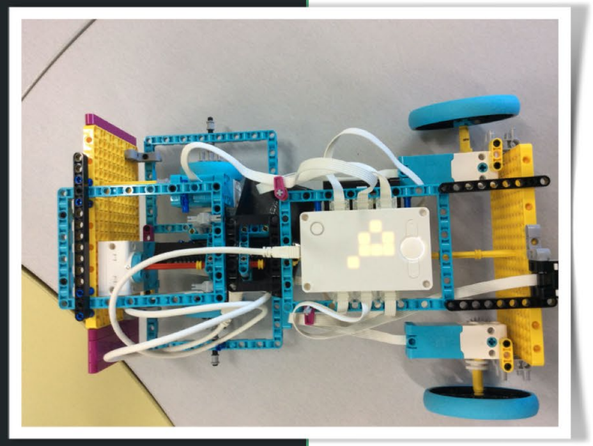
LEGO education

spike™ Prime



- 81 teams
- 270 students
- 58% female
- 42% male
- 1000’s of lines of code and one robot





```
ort_range=True)
_range=True)
```

```
motorPair.set_default_speed(30)

colour = colourSense.get_color()

if not(colour == None):
    print(colour)

#print(distance)

if (colour=='red'): #detects crystals
    motorPair.move(8.5 * math.pi / 4, 'cm', steering=100)

if (distance == None)or(distance > 10): #detects for nothing
    motorPair.start()

elif (distance2 == None) or (distance2 < 6):
    turning = 1
    motorPair.move(8.5 * math.pi / 4, 'cm', steering=-100)
```

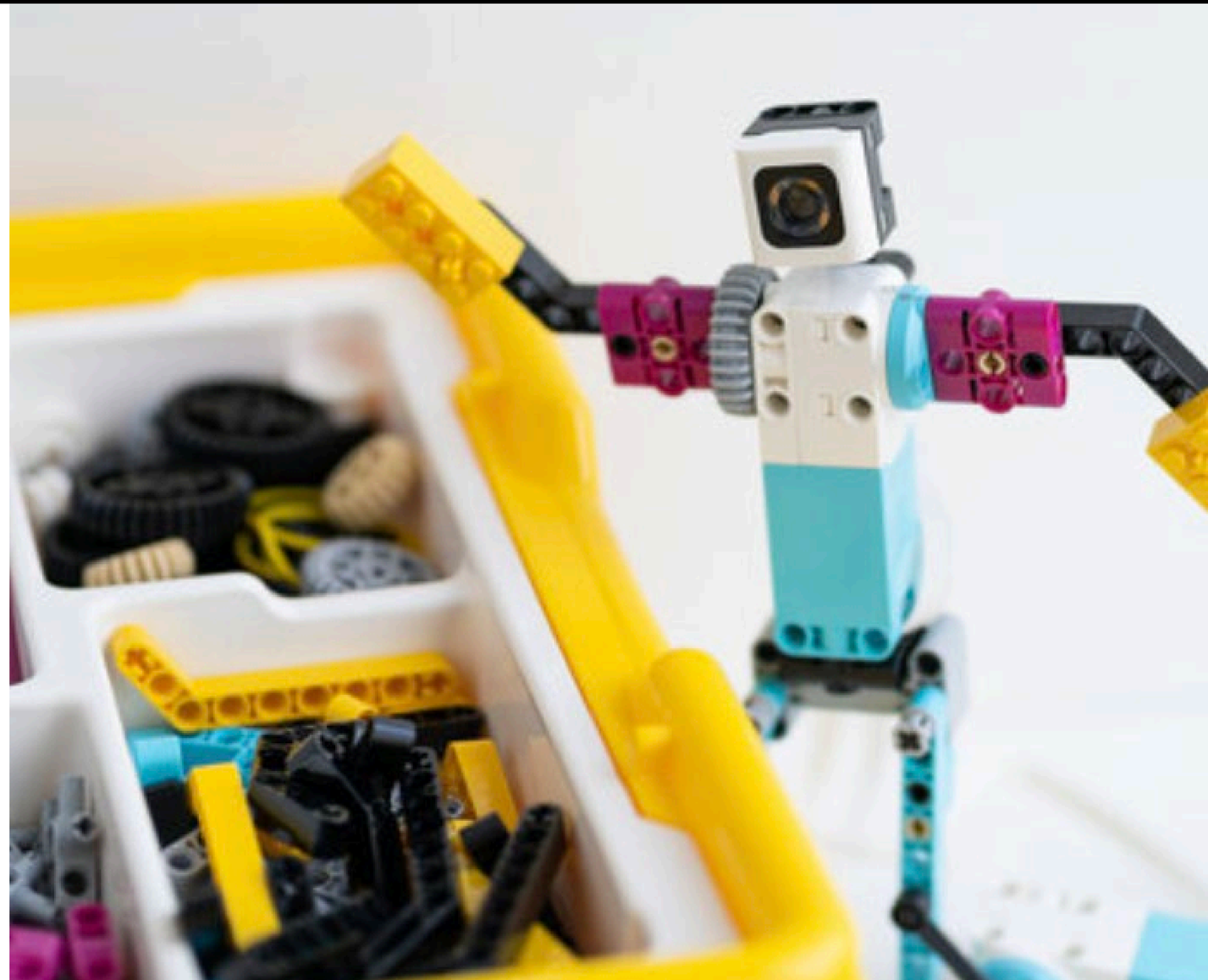
LEGO® Education SPIKE™ Prime Challenge

Explore the field of STEM and robotics and design a robot that can take you on ajourney using the LEGO® Education SPIKE™ Prime set

The Brief:

As an engineer in a top robotics laboratory, you have been asked to join a new and exciting research opportunity; to develop and build a new vehicle for taking people on **journeys.** Your robot could travel to the depths of the ocean, journey to the planets or even through time!

Where can your imagination take you!



Journey

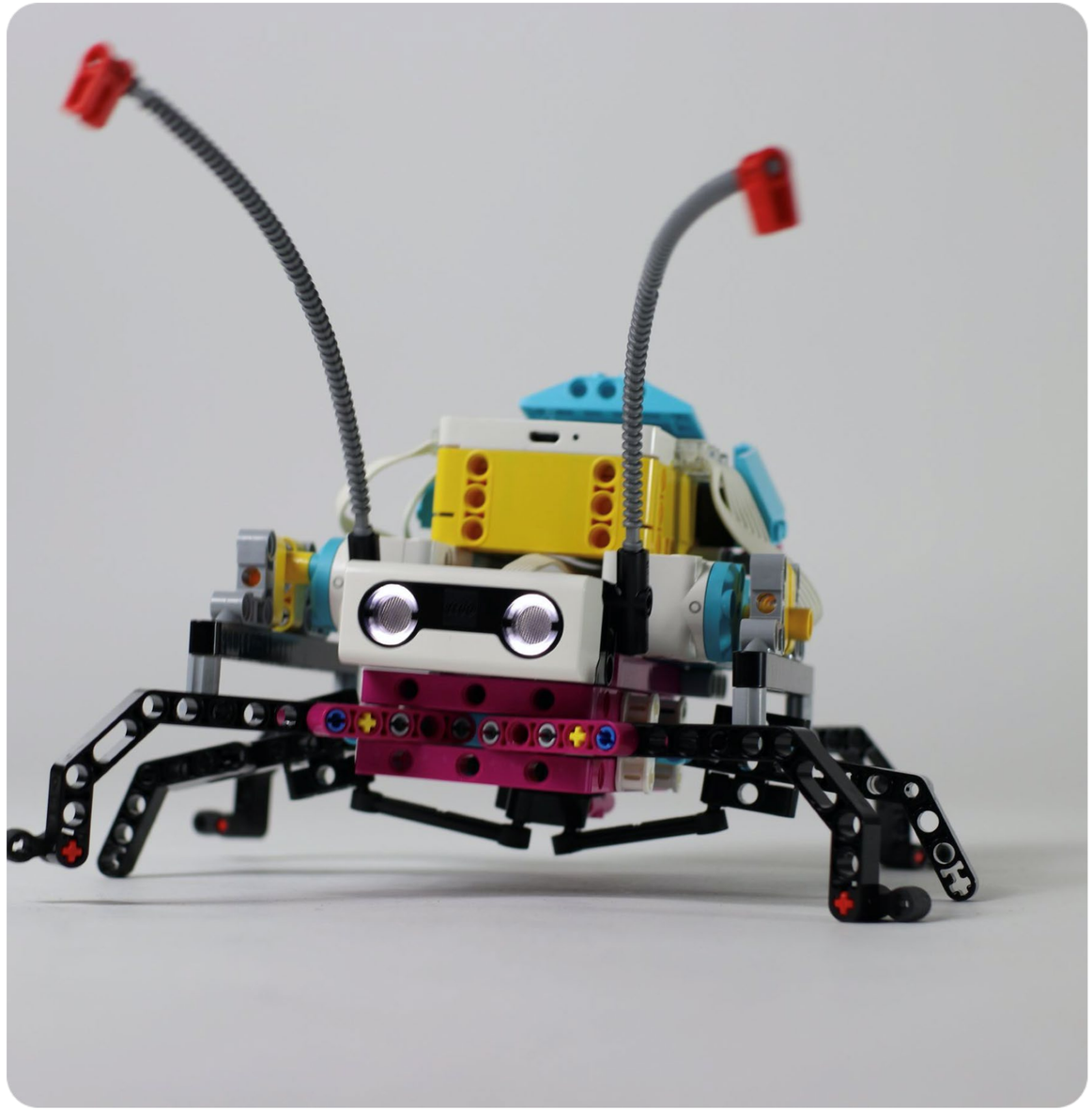
Noun:
An act of travelling from one place to another

Verb:

- Travel somewhere
- Any course or passage from one stage or experience to another
- The act or an instance of travelling from one place to another; trip
- To travel over or through
- A passage

Where will your journey take you…..

- a new frontier
- the future
- the past
- a vehicle to meet someone’s need
- life cycles
- stories from other cultures
- a book
- geological features
- the universe
- microscopic worlds



Journeys Across the Curriculum

Geography: investigate areas such as climate, topography and map skills

History: investigate past, present and future

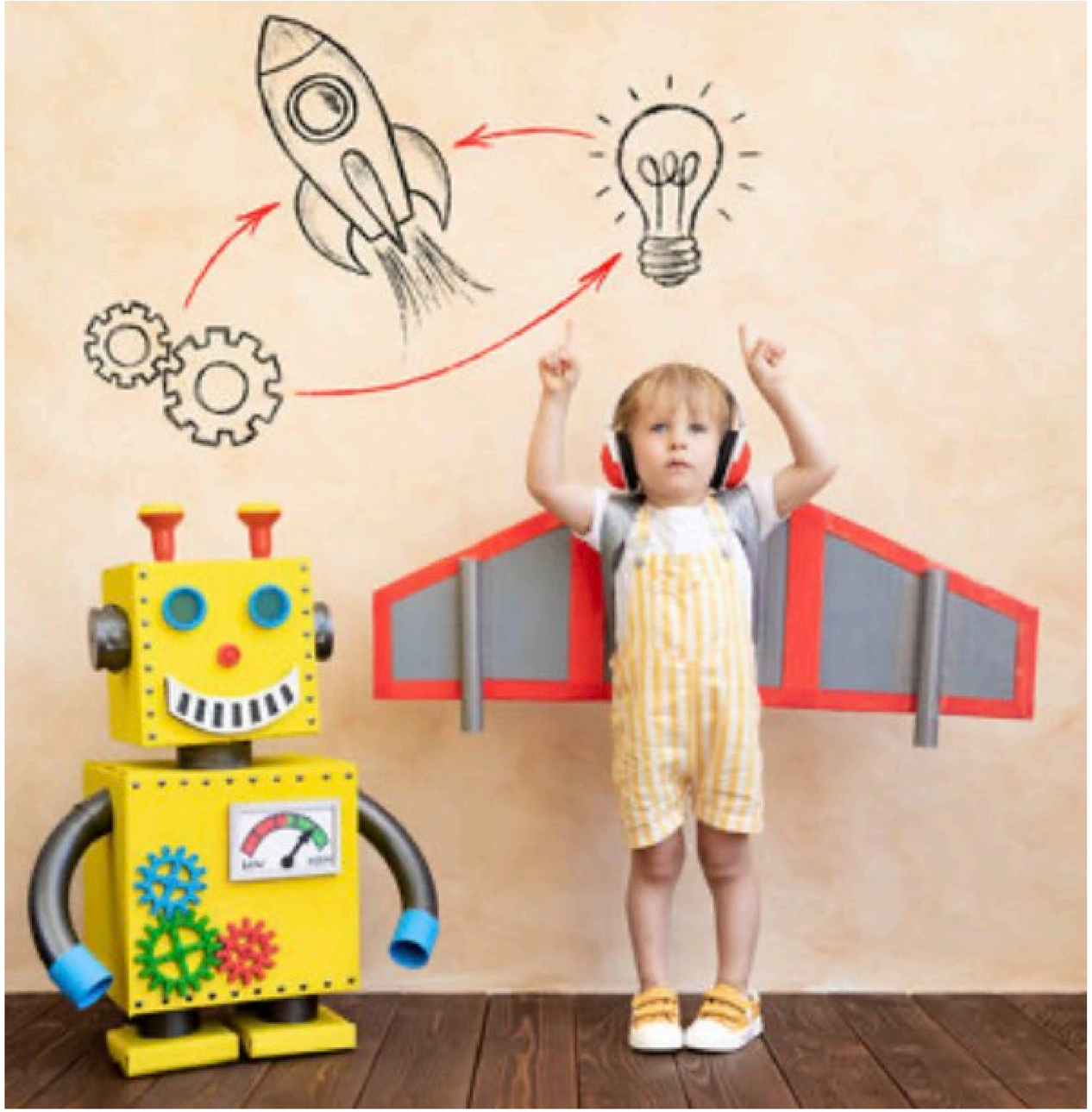
Literacy: study a variety of text types and genres

Maths: calculate distances, time taken and the cost of journeys, algorithms

Science and Technology: study the transport and power networks needed to make journeys; travel to different environments (micro and macro), design a vehicle to meet a need for someone, an industry etc.

Creative Arts: translate stories of journeys into music, drama, art or dance (OnStage)

This is not an exhaustive list.



set (includes Spike expansion set). You will need to:

- Work as a team to research, design and build a prototype of your robot.
- Document your research, designs and programming (show us your design thinking throughout the process).
- Submit images and video of your robot on the journey.
- Present your documentation through a video (include slides, short videos of how it works, the design, how it might move and its functions).
- Be creative. Showcase how it works and its special

1. This needs to be **your own design**. You are encouraged to research and find examples of what others have already done, but your final product should be your own: not a copy of someone else's idea.

2. You will create a **Technical Paper** to show evidence of:

- ☑ **Research**. Show links, images, notes, sketches, your builds (did they change?). What features of the LEGO® Education SPIKE™ did you really enjoy using when designing and building your robot and for its journey?

- ☑ **Planning** your design and programming – justify your decisions. Think about why you chose this design, and how will it work?

- ☑ **Features of your journeying robot.** What makes it useful and what special features, and where does it is travel? For example, a journey through time to investigate….., a journey deep in the ocean using powerful propellers… a unique vehicle that takes a journey somewhere?

- ☑ **Programming -** explain how the motors and sensors are used to add interest to the journeying robot. Anything else that you think would be important.

What to Include in your challenge submission:

1. **A video (max 3 minutes)** of you demonstrating your robot as it explores.

2. **An introduction/overview** where each team member discusses their role. What roles did each team member have during the challenge – designer, engineer, builder, programmer? Did the roles change?

- ☑ A discussion about why you think you robot is a good example of an **exploration robot.**

- ☑ Describe the interesting design features of the **exploration robot:** did you use motors, sensors, LEGO® elements and how do they add interest?

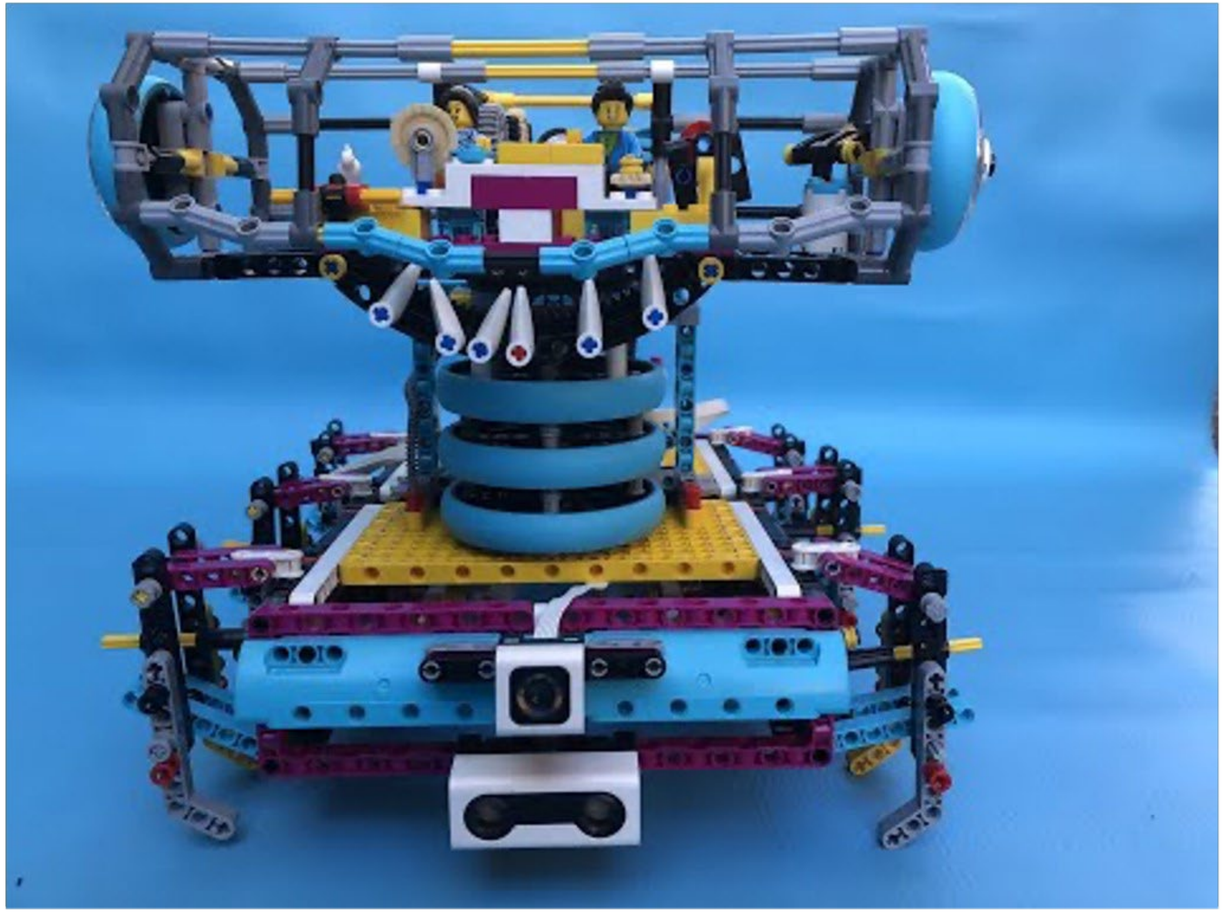
- ☑ Each team member should discuss what they found challenging and what they enjoyed the most (e.g. the build, designs, research, programming).

- ☑ Your robot in action. Zoom in and out to show your **new exploration robot in action.**

RoboCup Technical Paper

Ideas ***10 points*** (at a level appropriate to the age of students)	The idea fulfils some of the brief. **(0-4)**	The idea fulfils most of the brief. **(5-7)**	The idea has nailed the brief! **(8-10)**	**/10**
Evidence of Idea Development ***10 points***	No (or little) evidence of idea development, research or planning. **(0-3)**	Some evidence of idea development, research or planning. **(4-6)**	Clear evidence of planning, which shows research and planning leading to a clear development of ideas. **(7-10)**	**/10**
Design Build ***20 points*** (at a level appropriate to the age of students)	A simple design build that lacks stability or reliability. **(0-6)**	The design build has potential but needs further work to ensure stability and reliability. **OR** a stable and reliable design build which is fit for purpose but lacks complexity. **(7-14)**	• The Design Build shows ingenuity and clever design. • It is fit for purpose and is solid and reliable. • It shows innovation. **(15-20)**	**/20**
Programming ***20 points*** (at a level appropriate to the age of students)	• Simple programming. • There is little explanation of the program. **(0-6)**	• Programming includes some level of complexity (eg loops, subroutines, decision making, variables). • The program usually works effectively. • Some explanation of the program's complexities. **(7-14)**	• Includes a high level of complexity. • It is reliable and works effectively. • The programming choices are explained and justified. **(15-20)**	**/20**

Project Management ***10 points***	No (or only a little) evidence of teamwork roles or Task planning **(0-3)**	Evidence of teamwork roles **OR** Task Planning/Scheduling but it may not be clear how this enhanced the project. **(4-7)**	Clear evidence of teamwork roles **AND** Task Planning /Scheduling which contributed towards a successful project. **(8-10)**	**/10**
Video				
Task Success ***25 points***	The robot is unable to complete the task successfully. Some progress is demonstrated **in the video.** **(0-8)**	Successful completion of a *simple task.* This is demonstrated **in the video.** **(9-17)**	Completion of *complex task(s).* This is demonstrated **in the video.** **(18-25)**	**/25**
Video presentation ***5 points***	Beginner presentation skills demonstrated in the video. **(0-1)**	Intermediate presentation skills demonstrated in the video. **(2-3)**	Advanced presentation skills demonstrated in the presentation. **(4-5)**	**/5**



Prizes:

Highly Commended - certificates

1st, 2nd and 3rd - medals and trophies
1st prize also receives a Spike kit from MTA

NSW ran the competition as an open competition with no age criteria's.

Celebrate

Wherever your journey takes you ……
Go Boldly