STEM, Coding and Robotics Technology Quiz Book

YOUNG ENGINEERS
SINGAPORE

ABOUT YOUNG ENGINEERS

The 21st century introduced us to many social and cultural experiences with rapid technological development. Young Engineers STEM and coding curriculums are based on the most crucial skills students need to prosper in our current world. Skills include; high-order thinking, critical and creative thinking, acquiring information systems and media literacy, developing individual and social responsibilities; and lifelong learning.

The Young Engineers programs are based on the "spiral education method," in which, the student is introduced to complex terms and information from a different perspective at different levels. Our pedagogical level of programs and the methods we use are always updated in order to give our students the tools they need to succeed now and in the future. Most importantly, by incorporating inquiry based principles and a highly adaptable framework to suit students of various needs, Young Engineers' STEM and coding programs help to foster a love of learning. The most important gift an education should give a student is a love of learning.

Learn more about us at www.youngengineers.sg

RECOGNITION & ENDORSEMENTS

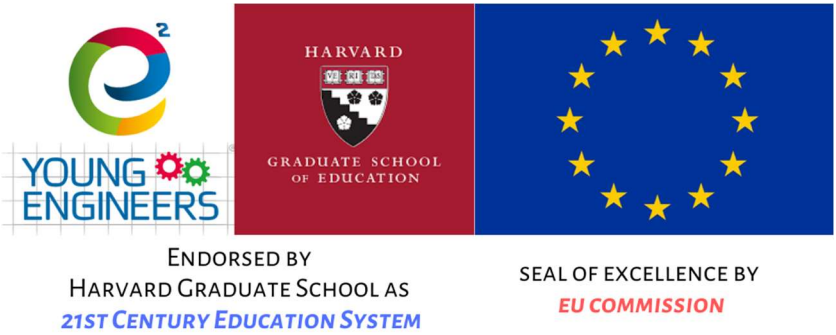
In 2011, e² Young Engineers' s CEO Amir Asor was awarded by Prince Charles with the Youth Business International Entrepreneur of The Year honour, highlighting the impact e² Young Engineers has made on individual students and their communities. In an effort to provide children across the world the opportunity to benefit from the e² Young Engineers program, the company began franchising the business in 2012. e² Young Engineers has spread to 45 different countries throughout the globe. In 2017, Young Engineers was involved in breaking the Guinness World Records for the tallest tower made from building bricks reaching 36 meters (118 foot).

In 2018, Prince William met with our CEO to learn more about Young Engineers and the newest development, Algobrix, revolutionary coding program without using any screens or tablets.

At Young Engineers, our STEM, Robotics and Coding programs are endorsed by Global Education Innovation Initiative (GEII), a collaboration between Harvard Graduate School and Singapore's

National Institute of Education (NIE) as the 21st century education system.

Young Engineers also received the Seal of Excellence by EU Commission for our high quality and innovative proposals judged by impact, excellence, quality and efficiency of implementation.



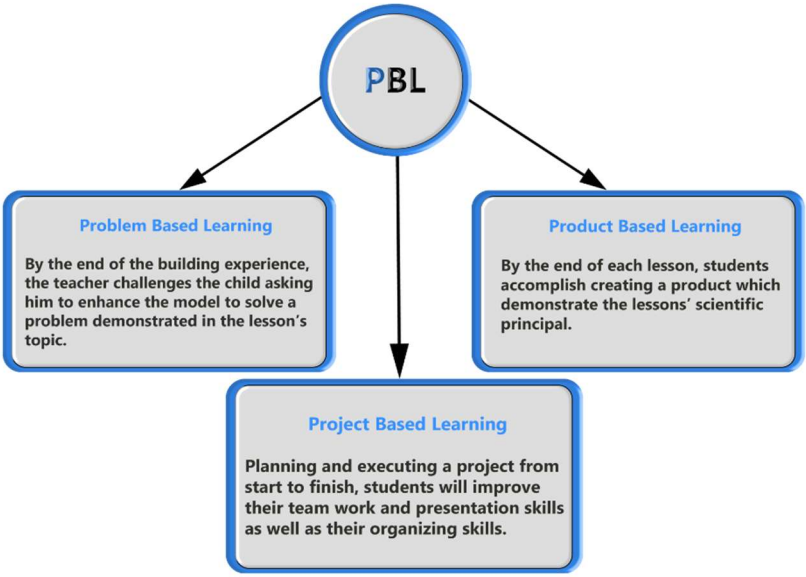
Sources:

https://globaled.gse.harvard.edu/how-are-they-selected
https://globaled.gse.harvard.edu/e2-young-engineers-esye

https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/seal-excellence_en

What is STEM?

S.T.E.M. is an acronym for Science, Technology, Engineering and Mathematics. It is a multidisciplinary subject where the students get to expose to all these 4 subjects in every lesson. It is also a philosophy of modern education that embraces teaching skills and subjects in a way that resembles real life application. STEM education is evolving into an integrative curriculum aimed at preparing students for the challenges of the 21st Century. A problem-based, product-based and project-based STEM education program prepares our students to become critical thinkers, creative and innovative problem solvers, researchers, engineers, and designers.



Why is STEM important for our students?

Every job within the 21st Century is likely to require some amount of skill in science, technology, engineering and math. The emergence of engineering and technology within the mathematics and science curriculum make it necessary to provide for more meaningful and engaging skillsets that are critical to success in the 21st Century. These skillsets include the ability to think critically, solve complex problems, and drive advancements in science and technology. STEM is not just about science and math, it is about being ready for **careers and life**.

In Singapore, STEM is part of the Applied Learning Programme (ALP) that the Singapore Ministry of Education (MOE) has been promoting since 2013, and currently, all secondary schools have such a programme. It is expected that by 2023, all primary schools in Singapore will have an ALP. There are no tests or exams for ALPs. The emphasis is for students to learn through experimentation – they try, fail, try, learn from it and try again. The MOE actively supports schools with ALPs to further enhance and strengthen their capabilities and programmes that nurtures innovation and creativity.

https://www.channelnewsasia.com/news/singapore/all-primary-schools-to-set-up-applied-learning-programmes-by-10014282

What is coding?

Coding is computer programming. It is string of text that written in specific format in defined sequence, a set of precise instructions for computer machine to understand.

Why we need to do this?

Machine needs to be instructed on what and how to perform the task. The computer machine will run lines of code in order to perform a simple task. There are many programming languages like Python, C++, Perl, Visual Basic, Java and many more, we can use to code.

Many of the parents do not know that coding is compulsory for all upper primary schools in year 2020. This news was released on 11 July 2019 by Ministry of Education (MOE)

https://www.straitstimes.com/tech/coding-classes-for-all-upper-primary-pupils-from-2020

STEM Quiz

1. “Give me a lever long enough and a fulcrum on which to place it so that I can move the world.” Who said this word?

    a) Isaac Newton

    b) Albert Einstein

    c) Archimedes of Syracuse

    d) Thomas Edison

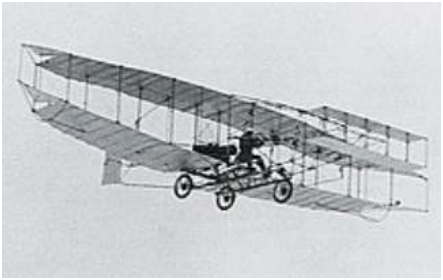
2. Who was the first man to design a flying aircraft?

    a) Orville Wright

    b) Leonardo Da Vinci

    c) Sir George Cayley

    d) Thomas Edison



3. What are the energy involved in launching a catapult?

    a) Kinetic energy

    b) Potential energy

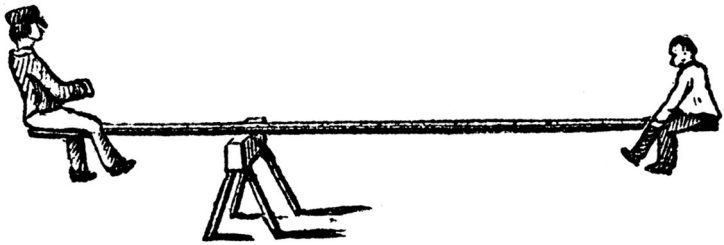
    c) Elastic energy

    d) All of the above

4. Who will move downwards

    a) Jack

    b) Peter



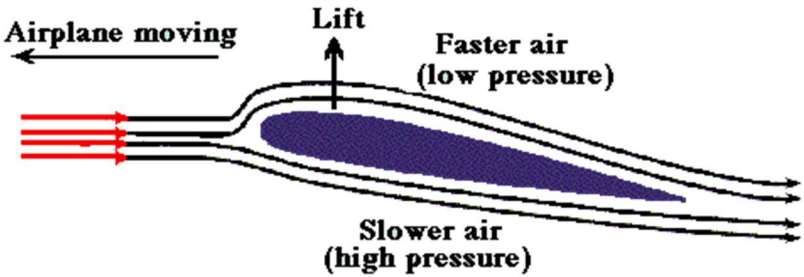
Jack = 50kg Peter = 40kg

Hint: Based on lever principle

5. Lift force is a combination of action-reaction law (Newton's third law of motion) and the Bernoulli principle.

    a) True

    b) False



6. What is the force that slows down a man falling out of plane with a parachute?

    a) Air Resistance

    b) Lift force

7. What is the force that pull us down to Earth and stops us floating into space?

    a) Air Pressure

    b) Gravity

8. What are Forces measured in?

    a) Isaac

    b) Newton

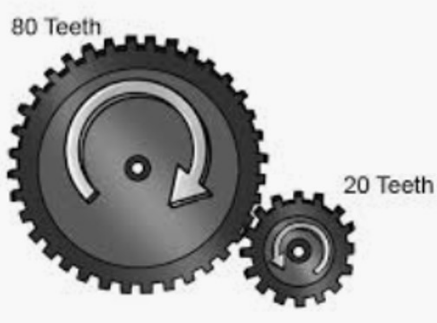
    c) Friction

9. When the 80 teeth gear turns in a full rotation, 20 teeth gear will turn _____ full rotations.

    a) 60

    b) 4

    c) 12



Hint: A ratio is a comparison of two quantities by division

10. What is the ratio of John's weight of 50kg to Selena's weight of 30kg?

    a) 5:2

    b) 3:5

    c) 5:3

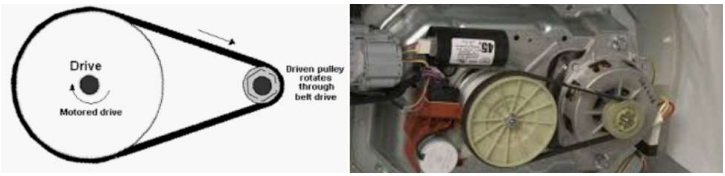
Hint: The gear ratio concept can transfer to the above.

11. What is the rpm for Gear B?

    a) 240 rpm

    b) 60 rpm

    c) 120 rpm



Hint: Belt transmission used in washing machine to drive the spin function. The speed is known as Rotation per minute (rpm).

12. Mary ran on a track of 1600 meters in 10 minutes. What is her running speed in meter per minute (m/min)?

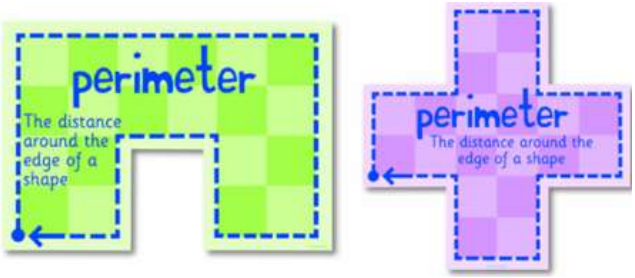
    a) 32 m/min

    b) 16 m/min

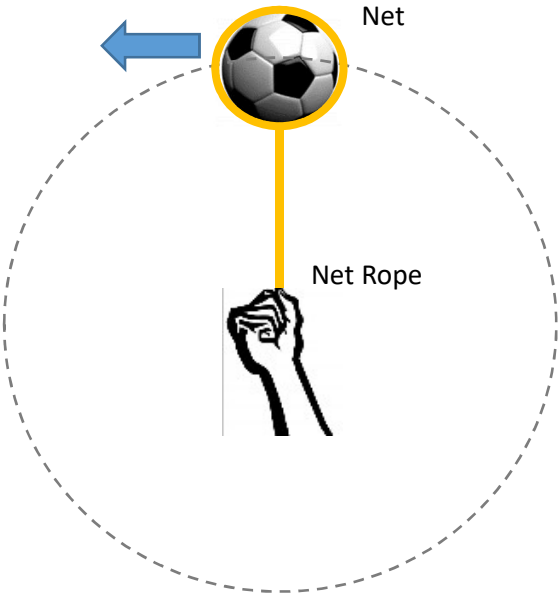
    c) 160 m/min

13. What is the perimeter of the iPad?
    a) 180 cm
    b) 78 cm
    c) 58 cm

Hint: Perimeter is the sum of all sides around the figure.



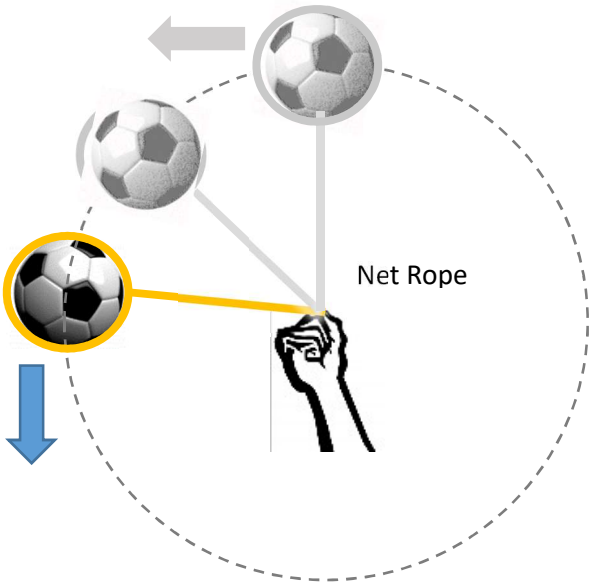
14. Have you try swinging a ball in the net in circular path?



Hint: Learn about Centripetal Force

Try it! What do you feel?

Yes, you will feel the tension on the net rope that you are holding on to.



The faster you swing, the _____ tension on the net rope.

The slower you swing, the ball will _____.

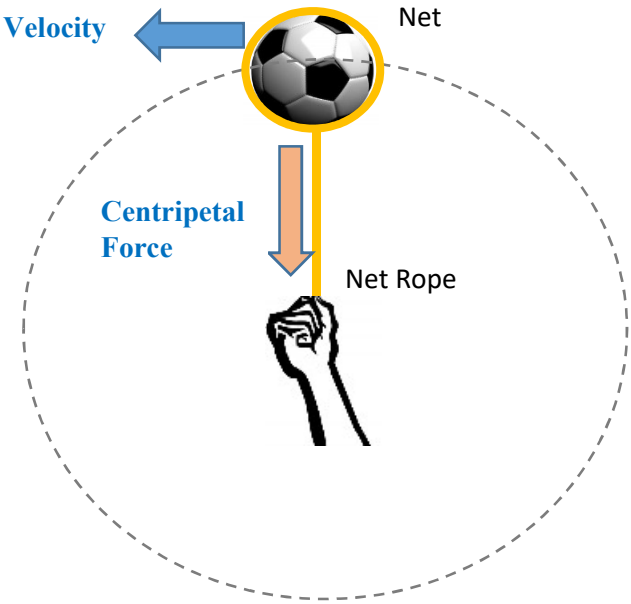
Oops……Be Careful!

Yes, the ball will stop moving in circular path if you swing slowly.

FACTS

When an object is moving in a circular path, the net force is called the centripetal force.

The **centripetal force** is the tension on the net rope. It is also known as **"center seeking"** force, and is always pulling an object towards the center of a circle.



Velocity: The speed of an object moving in a given direction.

When you release the net rope, the ball will move in the direction of the blue arrow. This is obeying the Newton's first Law of Inertia.

Try swinging the ball by changing the rope length.

What will happen if you shorter the net rope?

What will happen if you lengthen the net rope?

What will happen if you release the rope end that you are holding?

Situational Teaser

Well, putting a bucket with water over your head and flipped it.

You can imagine as the photo below.

How do you get a swing bucket of water over your head and not get wet?

Try it out!

Coding & Technology

Learn about Coding

Make a guess.

What type of car uses these tyres?

Take 10 second, to write down what comes to your mind.

Facts

These "slick" tyres are key for F1 race. Slick tyres do not have any grooves or patterns on them which enable more surface contact to the track surface. The tyres are designed for speed performance. With faster speed, the tyres will wear off faster.

The other award in F1 race is pit stop award.

The world record for pit stop was 1.91second.

A long blink of your eyes, you will miss it!

Can you imagine how it can be done?

The moment the F1 car arrived at pit stop, the 21-crew team acted on their roles simultaneously. Great teamwork and focus on speed!

In any situations, there could be a few to many potential solutions to solve the situations. It depends on what resources you have and think of a way to maximize the outcome with what you have.

Project-based learning

Do it Yourself (DIY) to build your own race car, track and pit stop!

STEP 1: Ideate

Draw out the race car that you would build.

You can do research online by yourself. Alternately, you can discuss with your parents or siblings if you want to do in a team to get more ideas.

What's next?

After you have an idea of what you want, you are to work out what you may need to build the DIY model.

Some helping questions:

What materials you can use to build?

What do we need to get the car moving?

List of items:

1. Lego Build blocks, the motor, control hub
2. Recycle materials for pit and track
3. WeDo Programming tool
4. _____
5. _____
6. _____
7. _____
8. _____

You may use what you have at home to build this.

STEP 2: Prototype

After you prepare what you need, you can start building!

We love to build and play, to learn how each model can be restructured to add on new ideas as we play along. In the phase, be prepare to build and dismantle as and when need to.

Set a time period to complete the build based on the To Do list.

Think about the steps you need to take.

STEP 3: Coding

For the programming, we will use Lego WeDo software to set up the controlling of the motorized car.

https://education.lego.com/en-us/downloads/wedo-2/software

In WeDo 2.0, pseudocode can also be used to describe each step of a sequence. There are no specific rules to follow when writing pseudocode.

What is Pseudocode?

Pseudo Code is a way to explain a program so that people can understand it. Good pseudocode respects program structures, but uses common words.

Imagine the motorized model car is at the start line to perform the test runs. Assume the model car will run 5 laps and then stop. Each lap will take 3 second to complete.

To translate what we describe into coding, we can use Algorithm or Pseudo code.

Algorithm Discussion	Pseudocode
1. Start 2. Start the motor and set speed 3. Wait for 15 second 4. Stop the motor	1. Start 1.1 Move motor(A,PW(8)) 1.2 Wait (sec(15)) 2. Stop motor(A)

Algorithm discussion is to think through the step by step method to achieve what we want.

Pseudo Code is a mathematic notation yet readable description of what a computer program or algorithm must do.

Learn about WEDO programming

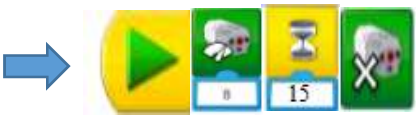
Command Name	Icon	Note
Start		Will appear at the beginning of the program. Press it to activate the program.
Start by pressing a button		To edit a key, press and hold the icon until a keyboard appears. Then select the desired key.
Pause (Delay shift to the next command for a defined period of time)		Various appendices can be added to the command, such as a value appendix or sensor appendix. The number in the value appendix relates to seconds.

Command Name	Icon	Note
Motor turns (Activate motor/s to the right)		Direction can be changed by pressing the icon
Motor turns (Activate motor/s to the left)		Direction can be changed by pressing the icon
Motor Stop (Stop motor operation)		
Power (Activate motor/s at a defined power)		Power is defined by the number appendix. Power values range between 1-9.
Motor time limit (Activate motor for a defined period of time)		Duration is defined by the number appendix, where the number defines the number of seconds.

The WEDO program screen will be as follow:

PseudoCode

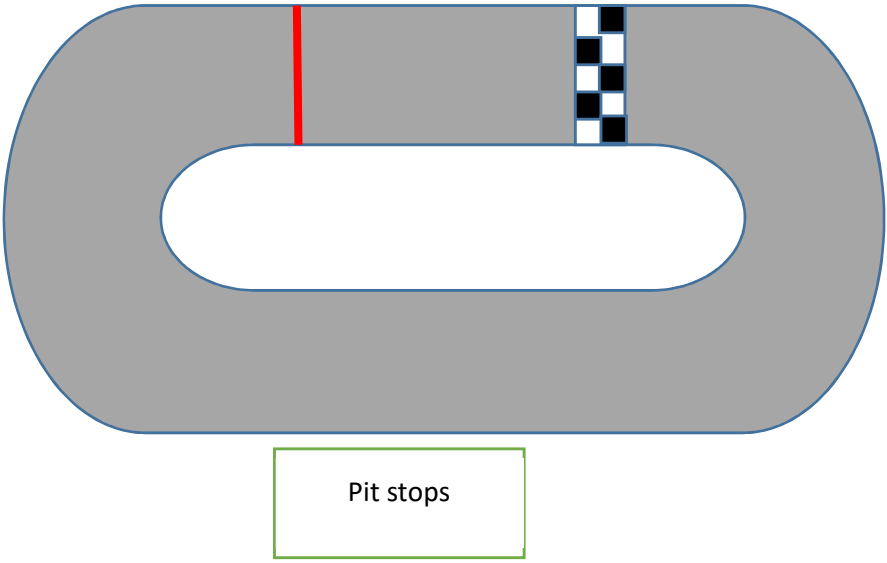
1. Start
   1.1 Move motor(A,PW(8))
   1.2 Wait (sec(15))
2. Stop motor(A)



STEP4: Playing / Testing

GET READY to start the race.

The model car will run for 10 laps and move into pit stop for 2 seconds to change the tyres and then move on. Every 10 laps, it will move into pit stop, this will repeat until the car race finish after 50 laps.



Try out to the Algorithm and Pseudo Code yourself.

Have fun!

Learn about Technology

Describe 3 things about the picture.

Facts

Some, if not most of you have also experienced the transition from wired to wireless devices. The wired keyboard, mouse, headset and many more, now can be connected wirelessly.

Bluetooth is a wireless technology standard used for exchanging data between **fixed and mobile devices over short distances, within 10 meters.** It uses short-wavelength UHF radio waves in the Industrial, Scientific and Medical radio bands (ISM), from **2.400 to 2.485 Gigahertz (GHz)**

This technology allows the connection of short-range devices, up to 7 devices concurrently, to transfer small bits of data at very low energy, thus is known as ad-hoc Personal Area network (PAN).

Understanding what you have learned

You can listen to music and talk to your family and friends using Bluetooth headset, connected wirelessly to your phone.

Quiz1 : One of the BT applications is for cable replacement?

True / False

Quiz 2: You can create ad-hoc personal area network with your BT devices at home?

True / False

Quiz 3: You can connect up to 3 BT devices concurrently?

True / False

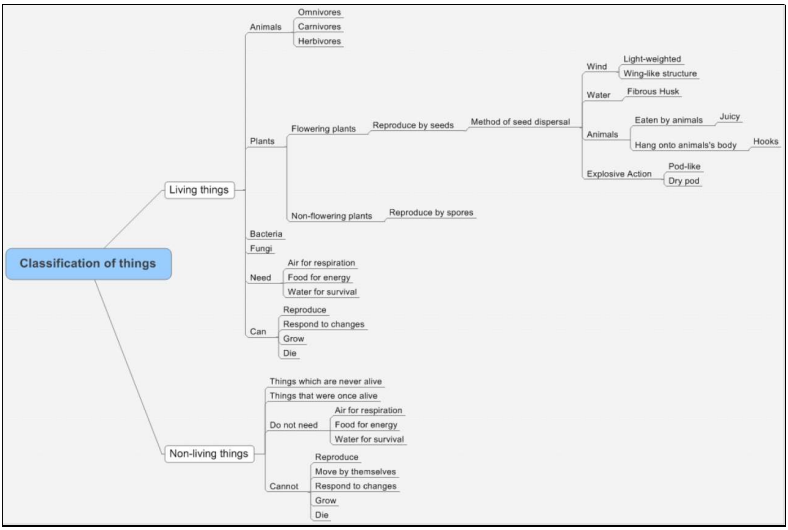
Quiz 4: BT devices operate in 2.4GHz radio frequency band?

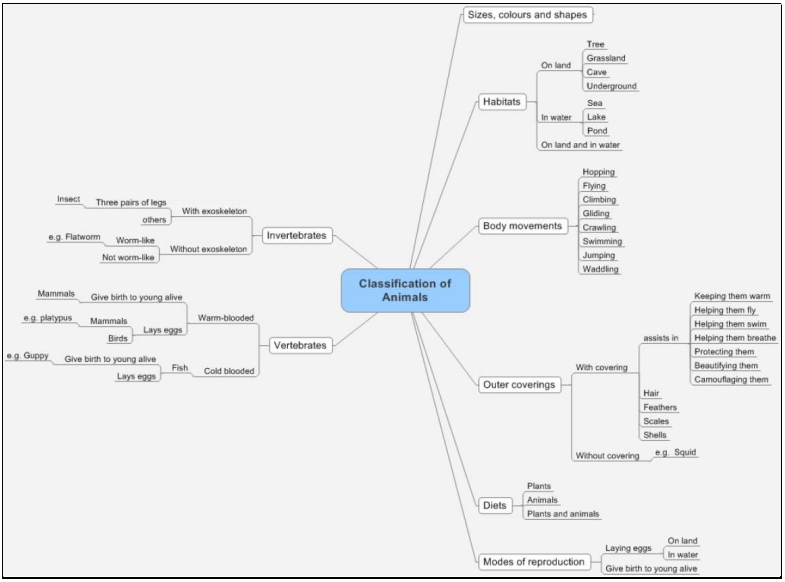
True / False

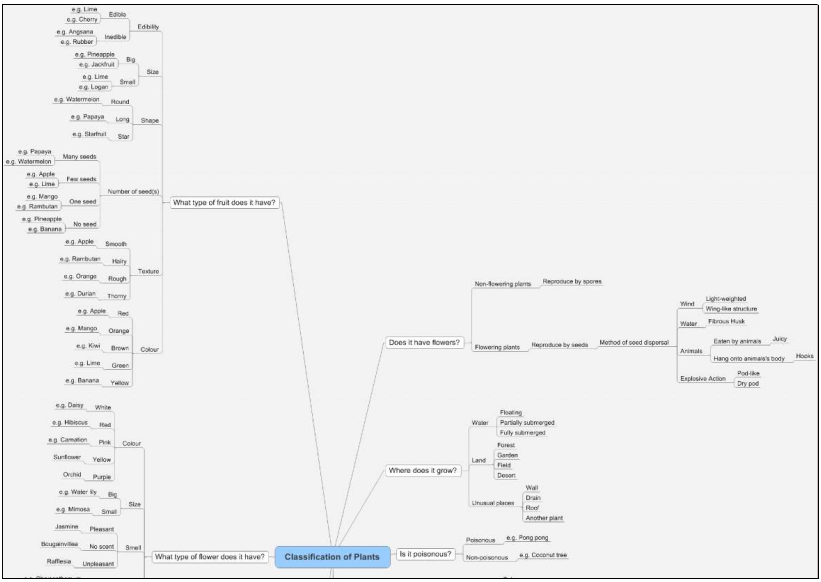
Quiz 5: You can also share file between BT devices? For example, sending photo from your phone to your friends phone via BT.

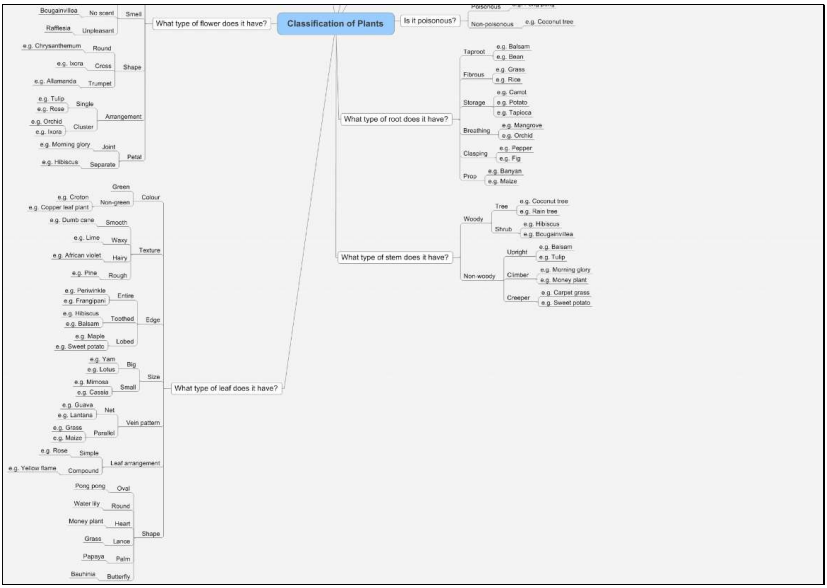
True / False

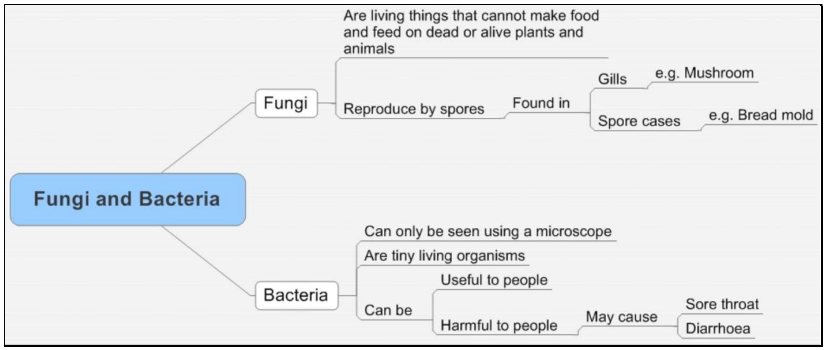
Primary School Science Mindmaps (Bonus)

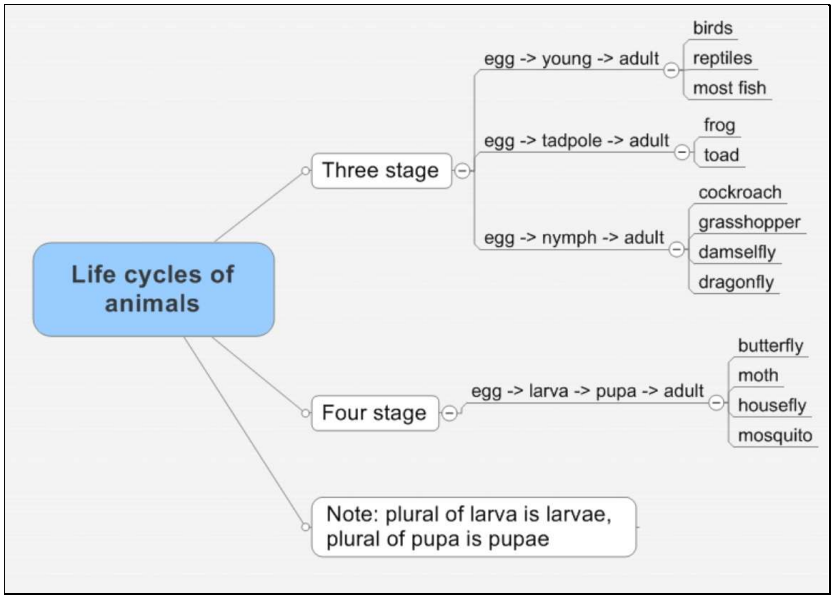

Classification of things
Living things
Animals
Omnivores
Carnivores
Herbivores
Plants
Flowering plants
Reproduce by seeds
Method of seed dispersal
Wind
Light-weighted
Wing-like structure
Water
Fibrous Husk
Animals
Eaten by animals
Juicy
Hang onto animals's body
Hooks
Explosive Action
Pod-like
Dry pod
Non-flowering plants
Reproduce by spores
Bacteria
Fungi
Need
Air for respiration
Food for energy
Water for survival
Can
Reproduce
Respond to changes
Grow
Die
Non-living things
Things which are never alive
Things that were once alive
Do not need
Air for respiration
Food for energy
Water for survival
Cannot
Reproduce
Move by themselves
Respond to changes
Grow
Die

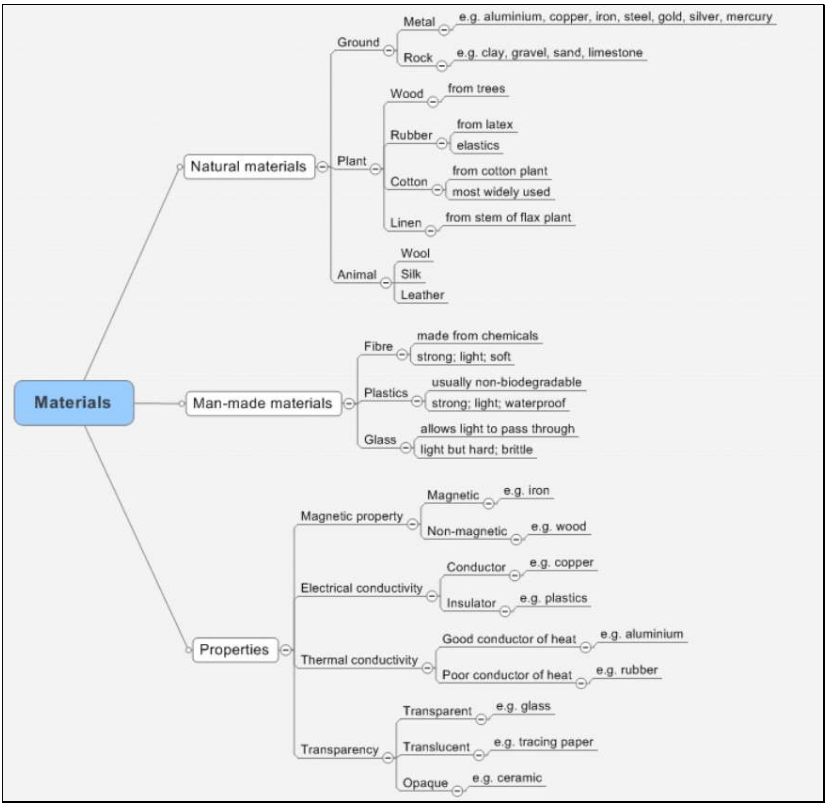

Classification of Animals
Sizes, colours and shapes
Habitats
On land
Tree
Grassland
Cave
Underground
In water
Sea
Lake
Pond
On land and in water
Body movements
Hopping
Flying
Climbing
Gliding
Crawling
Swimming
Jumping
Waddling
Outer coverings
With covering
assists in
Keeping them warm
Helping them fly
Helping them swim
Helping them breathe
Protecting them
Beautifying them
Camouflaging them
Hair
Feathers
Scales
Shells
Without covering
e.g. Squid
Diets
Plants
Animals
Plants and animals
Modes of reproduction
Laying eggs
On land
In water
Give birth to young alive
Invertebrates
With exoskeleton
Insect
Three pairs of legs
others
Without exoskeleton
Worm-like
e.g. Flatworm
Not worm-like
Vertebrates
Warm-blooded
Mammals
Give birth to young alive
Birds
e.g. platypus
Mammals
Lays eggs
Cold blooded
Fish
e.g. Guppy
Give birth to young alive
Lays eggs

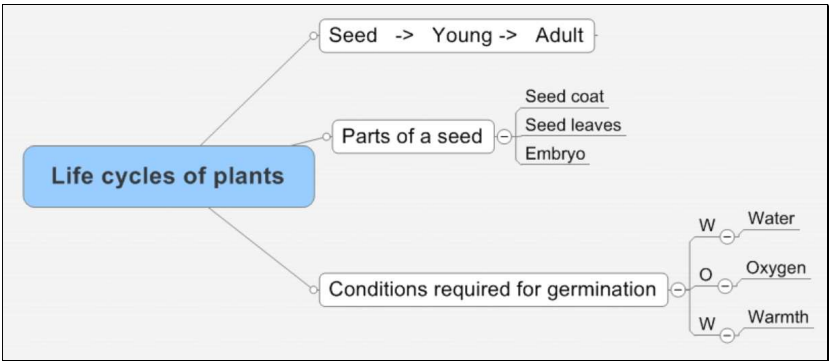

Classification of Plants
What type of fruit does it have?
Edibility
Edible
e.g. Lime
e.g. Cherry
Inedible
e.g. Angsana
e.g. Rubber
Size
Big
e.g. Pineapple
e.g. Jackfruit
Small
e.g. Lime
e.g. Logan
Shape
Round
e.g. Watermelon
Long
e.g. Papaya
Star
e.g. Starfruit
Number of seed(s)
Many seeds
e.g. Papaya
e.g. Watermelon
Few seeds
e.g. Apple
e.g. Lime
One seed
e.g. Mango
e.g. Rambutan
No seed
e.g. Pineapple
e.g. Banana
Texture
Smooth
e.g. Apple
Hairy
e.g. Rambutan
Rough
e.g. Orange
Thorny
e.g. Durian
Colour
Red
e.g. Apple
Orange
e.g. Mango
Brown
e.g. Kiwi
Green
e.g. Lime
Yellow
e.g. Banana
What type of flower does it have?
Colour
White
e.g. Daisy
Red
e.g. Hibiscus
Pink
e.g. Carnation
Yellow
Sunflower
Purple
Orchid
Size
Big
e.g. Water lily
Small
e.g. Mimosa
Smell
Pleasant
Jasmine
No scent
Bougainvillea
Unpleasant
Raffesia
Does it have flowers?
Non-flowering plants
Reproduce by spores
Flowering plants
Reproduce by seeds
Method of seed dispersal
Wind
Light-weighted
Wing-like structure
Water
Fibrous Husk
Animals
Eaten by animals
Juicy
Hang onto animals's body
Hooks
Explosive Action
Pod-like
Dry pod
Where does it grow?
Water
Floating
Partially submerged
Fully submerged
Land
Forest
Garden
Field
Desert
Unusual places
Wall
Drain
Roof
Another plant
Is it poisonous?
Poisonous
e.g. Pong pong
Non-poisonous
e.g. Coconut tree

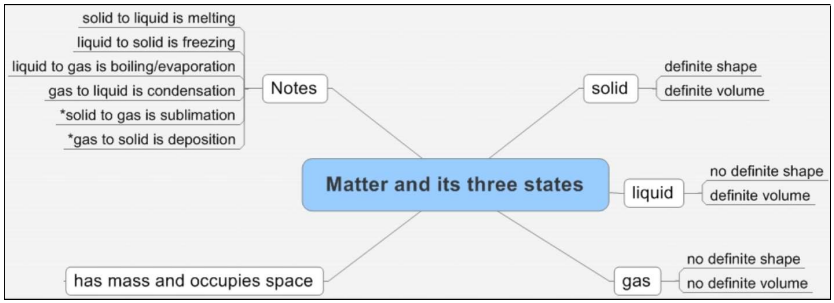

Classification of Plants
What type of flower does it have?
Smell
Bougainvillea
No scent
Raffesia
Unpleasant
Shape
e.g. Chrysanthemum
Round
e.g. Ixora
Cross
e.g. Allamanda
Trumpet
Arrangement
e.g. Tulip
Single
e.g. Rose
Cluster
e.g. Orchid
e.g. Ixora
Petal
e.g. Morning glory
Joint
e.g. Hibiscus
Separate
What type of leaf does it have?
Colour
Green
Non-green
e.g. Croton
e.g. Copper leaf plant
Texture
Smooth
e.g. Dumb cane
Waxy
e.g. Lime
Hairy
e.g. African violet
Rough
e.g. Pine
Edge
Entire
e.g. Periwinkle
e.g. Frangipani
Toothed
e.g. Hibiscus
e.g. Balsam
Lobed
e.g. Maple
e.g. Sweet potato
Size
Big
e.g. Yam
e.g. Lotus
Small
e.g. Mimosa
e.g. Cassia
Vein pattern
Net
e.g. Guava
e.g. Lantana
Parallel
e.g. Grass
e.g. Maize
Leaf arrangement
Simple
e.g. Rose
Compound
e.g. Yellow flame
Shape
Oval
Pong pong
Round
Water lily
Heart
Money plant
Lance
Grass
Palm
Papaya
Butterfly
Bauhinia
Is it poisonous?
Non-poisonous
e.g. Coconut tree
What type of root does it have?
Taproot
e.g. Balsam
e.g. Bean
Fibrous
e.g. Grass
e.g. Rice
Storage
e.g. Carrot
e.g. Potato
e.g. Tapioca
Breathing
e.g. Mangrove
e.g. Orchid
Clasping
e.g. Pepper
e.g. Fig
Prop
e.g. Banyan
e.g. Maize
What type of stem does it have?
Woody
Tree
e.g. Coconut tree
e.g. Rain tree
Shrub
e.g. Hibiscus
e.g. Bougainvillea
Non-woody
Upright
e.g. Balsam
e.g. Tulip
Climber
e.g. Morning glory
e.g. Money plant
Creeper
e.g. Carpet grass
e.g. Sweet potato

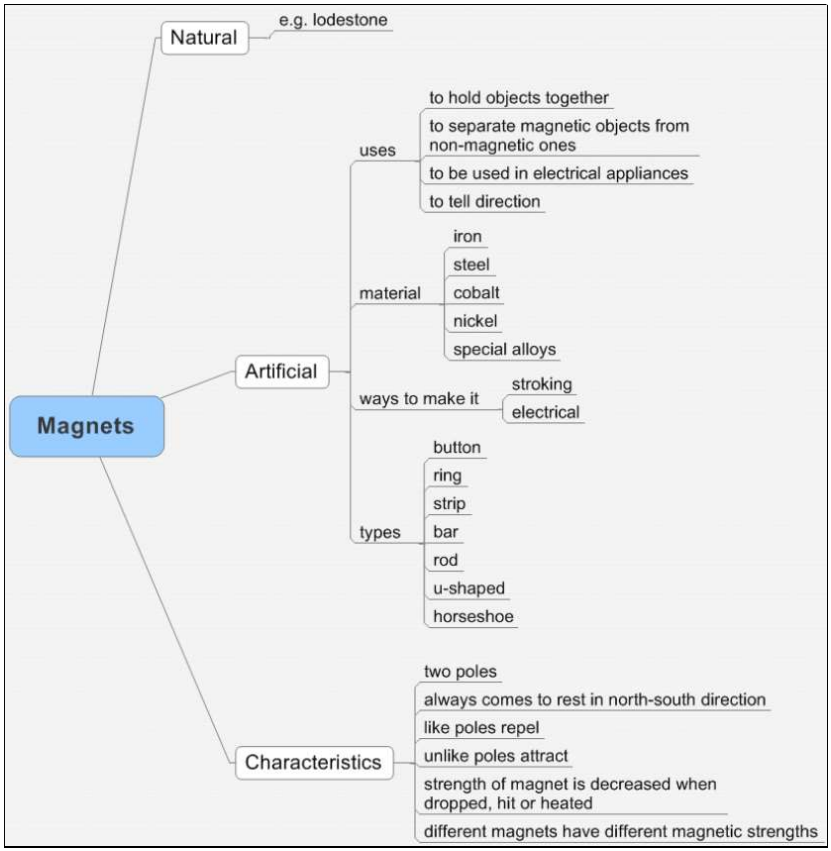

Fungi and Bacteria
Fungi
Are living things that cannot make food and feed on dead or alive plants and animals
Reproduce by spores
Found in
Gills
e.g. Mushroom
Spore cases
e.g. Bread mold
Bacteria
Can only be seen using a microscope
Are tiny living organisms
Can be
Useful to people
Harmful to people
May cause
Sore throat
Diarrhoea


Life cycles of animals
Three stage
egg -> young -> adult
birds
reptiles
most fish
egg -> tadpole -> adult
frog
toad
egg -> nymph -> adult
cockroach
grasshopper
damselfly
dragonfly
Four stage
egg -> larva -> pupa -> adult
butterfly
moth
housefly
mosquito
Note: plural of larva is larvae, plural of pupa is pupae


Materials
Natural materials
Ground
Metal
e.g. aluminium, copper, iron, steel, gold, silver, mercury
Rock
e.g. clay, gravel, sand, limestone
Plant
Wood
from trees
Rubber
from latex
elastics
Cotton
from cotton plant
most widely used
Linen
from stem of flax plant
Animal
Wool
Silk
Leather
Man-made materials
Fibre
made from chemicals
strong; light; soft
Plastics
usually non-biodegradable
strong; light; waterproof
Glass
allows light to pass through
light but hard; brittle
Properties
Magnetic property
Magnetic
e.g. iron
Non-magnetic
e.g. wood
Electrical conductivity
Conductor
e.g. copper
Insulator
e.g. plastics
Thermal conductivity
Good conductor of heat
e.g. aluminium
Poor conductor of heat
e.g. rubber
Transparency
Transparent
e.g. glass
Translucent
e.g. tracing paper
Opaque
e.g. ceramic


Life cycles of plants
Seed -> Young -> Adult
Parts of a seed
Seed coat
Seed leaves
Embryo
Conditions required for germination
W
Water
O
Oxygen
W
Warmth


Matter and its three states
Notes
solid to liquid is melting
liquid to solid is freezing
liquid to gas is boiling/evaporation
gas to liquid is condensation
*solid to gas is sublimation
*gas to solid is deposition
solid
definite shape
definite volume
liquid
no definite shape
definite volume
gas
no definite shape
no definite volume
has mass and occupies space


Magnets
Natural
e.g. lodestone
Artificial
uses
to hold objects together
to separate magnetic objects from non-magnetic ones
to be used in electrical appliances
to tell direction
material
iron
steel
cobalt
nickel
special alloys
ways to make it
stroking
electrical
types
button
ring
strip
bar
rod
u-shaped
horseshoe
Characteristics
two poles
always comes to rest in north-south direction
like poles repel
unlike poles attract
strength of magnet is decreased when dropped, hit or heated
different magnets have different magnetic strengths

Young Engineers Robotics STEM & Coding Programs

Programs	Ages	Topics	Abilities Developed
BRICKS CHALLENGE JUNIOR	3-5	• Developing independence and working with instructions • Developing fine motor skills • Improving coordination during assembly. • Working on spatial-visual orientation • Completing a model independently	• Improving fine motor skills • Exposure to new materials • Understanding instructions • Increasing knowledge for everyday life • Developing social interaction skills through the models
ALGO PLAY with screen-free coding language	5-9	• Introduction to junior coding • Expose to Robotic, Coding, multithreading terms. • Learning about LOOP, LED, WAIT, MOVE commands etc. • Incorporating Distance, Wait and Sound sensors.	• Develop procedural-logical and algorithmic thinking. • Learn the basics of computer programming. • Acquire sense of control through learning and self-empowerment. • Develop high-order skills through metacognitive thinking, problem-solving, creativity, and teamwork.
BRICKS CHALLENGE	6-11	• Basic and complex mathematical operations • Philosophers and scientists • Fundamentals of Physics Mechanics	• Broaden knowledge about physical principles and natural phenomena • Enhance spatial perception • Educate about time management and enhance communications skills
GALILEO TECHNIC	8-12	• Principles of Engineering & Mechanics • Principles of Statistics	• Encourage the ability to solve problems • Enhance analysis, creation and other advanced thinking skills • Develop interpersonal skills
ROBO BRICKS	8-12	• Fundaments of Software & of Mechanical Engineering • Introduction to Enterprise Operation	• Develop computer-oriented programming & algorithmic thinking • Develop speech skills
ROBOTICS	11-15	• Advanced Software and Principles of Mechanical Engineering	• The use of mechanical engineering and programming tools to solve complex engineering problems • Develop creative thinking and teamwork skills

Junior Bricks Challenge

BRICKS CHALLENGE JUNIOR

Average lesson duration: 60 minutes

Suitable for ages: 3 – 5 years (Preschool)

Children start playing with Lego when they are 3 years old. Through Lego, they develop fine motor skills and the ability to work progressively in stages, they acquire planning skills and enjoy an

imaginative and social game. Lego serves as tool that evokes motivation and a desire to develop such skills.

The course will provide a hands-on educational experience – discovering basic engineering solutions. The course exposes children to engineering terminology, as well as terms taken from the animal kingdom, science and their current world. Children will develop self-learning skills, both in terms of building technique and knowledge. In addition, the children will develop communication skills while learning and playing with their friends.

https://www.youngengineers.sg/junior-bricks-challenge-class/

ALGOPLAY

Average lesson duration: 75 minutes

Suitable for ages: 5 – 9 years

Young Engineers believes in teaching through the Spiral Learning Technique. In this method, each enrichment program builds on the previous program's curriculum. In addition, we always encourage newcomers and reteach lessons to make sure all students are up to speed.

With the tangible coding language of Algobrix®, students begin by constructing a building block model, then create various lines of code using function & Parameter blocks. Finally, by pressing the Play block, the robot will perform the coding sequence.

By matching function and parameter blocks together, the child creates a command for the robot. For example, moving it forward or turning on a red light. By putting the blocks together one after the other, it creates a code that the model will execute. In each lesson, the student will perform high level programming tasks such as Algorithm planning, Functions & Parameters, Conditioning, Loops, Multithreading, Debugging, Race Condition, sensor applications and more.

https://www.youngengineers.sg/algoplay-class/

Bricks Challenge

Suitable for Ages: 6 – 11 (Primary School)

Average lesson duration: 75 minutes

Bricks Challenge is our most popular enrichment program. The overall course objective is to impart theoretical and applied knowledge in the fields of Science, Technology, Mechanical Engineering, and Math (STEM) by using LEGO® technic parts and other exciting tools. The main goal of the course is to illustrate content through stories and demonstrations. Our students will learn math and physical principles through intuitive study, develop their independent learning and improve their building skills.

The course will provide mathematical integration between physical laws and the simple calculations to support them. The laws and mathematics are both illustrated through the construction of exciting LEGO® bricks models. Once the concepts have been demonstrated students enjoy hands on building the YE LEGO® models which provides experiential learning and reinforces the lessons topic. To carry out the building process, students receive a tailor made kit developed by Young Engineers.

https://www.youngengineers.sg/bricks-challenge-class/

Galileo Technic

GALILEO TECHNIC

Suitable for: Primary 2 – 6 OR Young Engineers' Bricks Challenge graduates

Average lesson duration: 90 minutes

The Galileo Technic advanced enrichment program offers broad knowledge in Science, Technology, Mechanical Engineering, and Math (STEM). Students explore machines from a professional engineering perspective, focusing on identifying solutions and promoting teamwork to build complex mechanisms.

The program provides an advanced level of thematic study, implementing mechanical engineering principles through building LEGO® parts based models. By analyzing physical, mathematical and technical aspects of a machine's operation, students will implement the most efficient method for building their machine. The Galileo Technic program utilizes the spiral learning method where students study a certain topic, investigate it from different angles and contexts while integrating the core processes frequently applied by engineers.

This is an in-depth program to extend the Young Engineers – Bricks Challenge program; students will use expert level engineering thinking by considering the physical and mathematical aspects of building efficient machines. The program focuses on individual and group projects to prepare students for the dynamic 21st century working environment.

https://www.youngengineers.sg/galileo-technic-class/

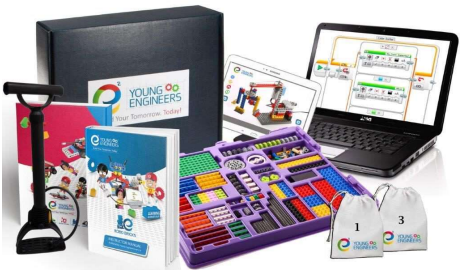
RoboBricks

Suitable for: Primary 3 – 6, or graduates of one of the Young Engineers mechanical engineering programs

Average lesson duration: 90 minutes

The Robo Bricks course objective is to introduce the students to theoretical and practical aspects of the fields of Technology, Software Engineering, Math and Entrepreneurship. The course develops algorithmic thinking and program implementation, using the LEGO® WeDo graphic programming. During each lesson, students will build a robot using LEGO® parts and program it according to the required functionality. Most programming tasks will be performed using English terms.

This enrichment program objective is achieved when the students design a software and mechanical engineering project, study its market and use rhetorical methods to make a successful presentation to investors.



https://www.youngengineers.sg/robobricks-class/

Robotics & Software Engineering

Suitable for: Primary 5 – Secondary 3

Average lesson duration: 90 minutes

R&SE course focuses on exploring the world of Robotics from a professional engineering perspective. Special emphasis on programming solutions will promote the creation of sophisticated and accurate robots to study the fields of Science, Technology, Mechanical and Software Engineering, and Math (STEM) comprehensively.

The R&SE enrichment program offers extensive team work and cooperation to reflect the complex engineering challenges that exist

in the industry. The program aligns with the university engineering curricula in order to prepare students for the industrial world. Students will tackle the same engineering challenges and solve them by using the EV3 graphics programming.

https://www.youngengineers.sg/robotics-class/

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Ready to sign up for a trial class? Here you go!

https://www.youngengineers.sg/trial-class-registration-page/?utm_medium=Book&utm_source=Google&utm_campaign=Traffic&utm_content=STEMQuiz

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5 Locations in Singapore

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Below are options for further enquiries

WhatsApp to 94405079

Or

Email to admin@youngengineers.sg

Answers to Quiz:

1) c
2) a
3) d
4) b
5) a
6) a
7) b
8) b
9) b
10) c
11) a
12) c
13) c
14) The faster you swing, the ____higher____ tension on the net rope.
The slower you swing, the ball will ___stop___.
What will happen if you shorter the net rope?

It will rotate slower

What will happen if you lengthen the net rope?

It will rotate faster

What will happen if you release the rope end that you are holding?

It will fly off in the direction in a straight line

Learn about Technology

Quiz1 : One of the BT applications is for cable replacement?

True

Quiz 2: You can create ad-hoc personal area network with your BT devices at home?

True

Quiz 3: You can connect up to 3 BT devices concurrently?

False . Connect up to 7 devices concurrently

Quiz 4: BT devices operate in 2.4GHz radio frequency band?

True

Quiz 5: You can also share file between BT devices? For example, sending photo from your phone to your friends phone via BT.

True