

# STEM

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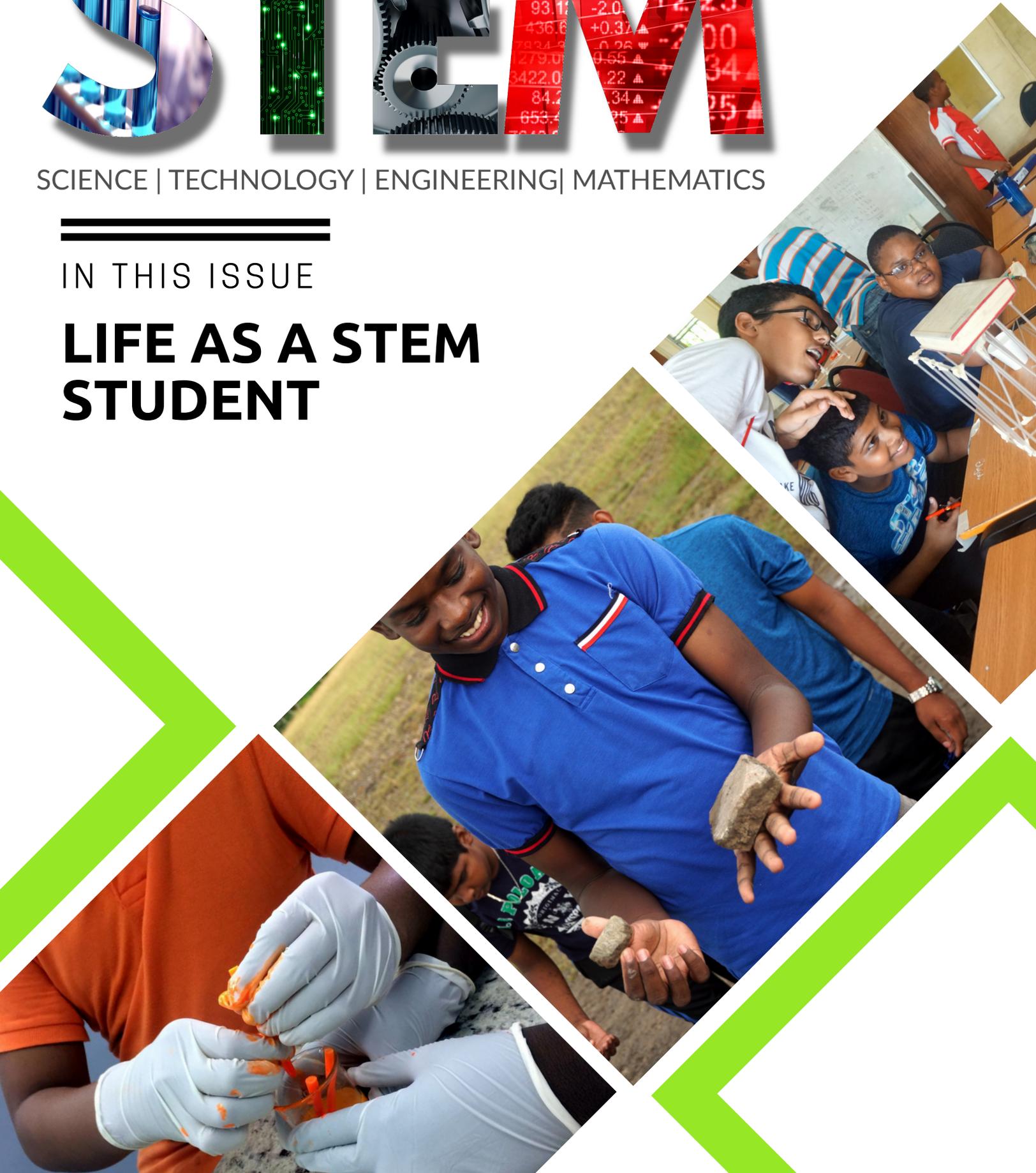
SCIENCE | TECHNOLOGY | ENGINEERING | MATHEMATICS

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## LIFE AS A STEM STUDENT



# A DAY IN THE LIFE OF A STEM STUDENT

# WELCOME NOTE

The Shell STEM programme is under the management of Sacoda Serv Ltd.

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Saturday is a remarkable day in the life of a child, typically filled with freedom, exploration and cartoons. Saturdays are even more remarkable for a STEM student, where freedom, exploration and even cartoons are not separate, but become a part of learning.

Created to introduce and cultivate a passion in the areas of science, technology, engineering and mathematics from an early age, the STEM programme has adopted a range of activities within and beyond the classroom to engage students.

In this issue we explore some of the typical and not-so typical activities of the Saturday STEM programme this term September - December 2017.

We introduce life as a STEM student : A day in the life of STEM aka Saturday.



# A DAY IN THE LIFE OF STEM

Imagine learning about probability in mathematics whilst playing basketball or football; building a bridge out of paper or spaghetti and marshmallows, a stable structure or toothpicks and plasticine; what about using milk, food colouring and liquid soap to demonstrate how polar and non-polar substances work. These are just some of the exciting experiments the students in the STEM Programme experience on Saturdays.

## BUILDING STABLE STRUCTURES

**BUILDING A TABLE OUT OF PAPER OR A BRIDGE OUT OF PAPER OR SPAGHETTI AND MARSHMALLOWS....IS THIS REALLY POSSIBLE?**

Yes it is! You may think a sheet of paper is just for writing or printing, or spaghetti is best served with meatballs. For a STEM participant however paper, spaghetti and/or marshmallows are seen as much more. During their natural science and engineering sessions students learnt about various concepts in science, engineering in structures and how their underlying designs keep them stable.



After learning about the basic concepts and about world famous monuments such as the tower of Pisa in Rome, Italy the students got busy working as future engineers and scientists. Using these 'strange' materials participants designed, built and tested a bridge, tower and a table, illustrating how seemingly weak materials can be used to build stable structures.

## ACTIVE MATHEMATICS

With STEM we go beyond the classroom. Sometimes it can be difficult for students to enjoy and understand the usefulness of mathematics. This introduces, what we at STEM have unofficially termed 'Active Mathematics'. In one Saturday session for example, students learnt how mathematics plays a critical role in sports science. How does probability help coaches in various sport disciplines choose the best players for their team? It's all in the numbers!

Imagine coming to a STEM session and being able to use basketball or football to learn math. The action begins when all the participants get three chances to 'shoot' the basketball or score a goal. Those who are able to score three points or goals successfully are then matched up with each other and round two begins. The data is gathered and used to help the students calculate probability to determine the best players for an 'all-star' team to be created! Maths can be fun!

## CREATIVE THINKING

We start off each new STEM cycle with a Creative Thinking session. This session encourages imagination and free thinking, meant to move students beyond the realm of what could be considered 'normal thinking'. It highlights the importance of perspective and builds on critical thinking to creatively approach situations and craft solutions. It is our hope that from this session and beyond, students will approach life and STEM subjects more as an adventure in creativity and less as an impossible task.





## LAB WORK: DNA EXPERIMENT

***‘All life is an experiment.’***

Experimentation can be great and exciting learning tool. As part of the STEM programme the ‘science’ component usually involves the students conducting a variety of experiments in their school labs. Subsequently, students love testing and observing the effects. This term one of the interesting experiments was during biology facilitated by Ms. Mimi Chu Leung. The session covered deoxyribonucleic acid (DNA); the importance, role and function in the human body. Using videos, students were immersed in a visual representation of the world on DNA structures.

Students then conducted their own experiments to extract DNA from a banana using cold rubbing alcohol. In the end the students observed the DNA structure from the fruit.



***‘Nothing has such power to broaden the mind as the ability to investigate systematically and truly all that comes under thy observation in life.’***

***— Marcus Aurelius***

**“I’m a fan of science. I wanted to join STEM because I wanted to do IT and medicine and I thought it would help me. I was correct. I am not only learning about that but also life skills in the first session that can assist me in becoming a more successful person.**





## FLYING HIGH

Science, Technology, Engineering and Mathematics. The focus on these topics through the Shell Trinidad and Tobago STEM Programme has been exposing students to many alternative forms of learning. The unofficial mandate of the programme is to expose and broaden the imagination of our students, we partnered again with DriveWise Trinidad/ Professional Airline Training Solution (ProATS) for another round of programmes.

Thirty students from the NCMA (North Coast Marine Area) and Trinity College had the privilege of being part of an aviation training at the ProATS facility which was conducted over four Saturdays. This programme exposed students to the functions of, and how to become a pilot. Training was both practical and theoretical. Students were quite intrigued, prompting them to ask an enormous amount of questions. Sessions involved interaction with flight simulators, exposure to aviation weather patterns and information on how pilots approach such challenges.



*“...when we work together, we achieve more. Character is not a concept that is simply spoken about, but actually manifests itself through our actions.” – Jose.A.Aviles*

## **LIFE SKILLS**

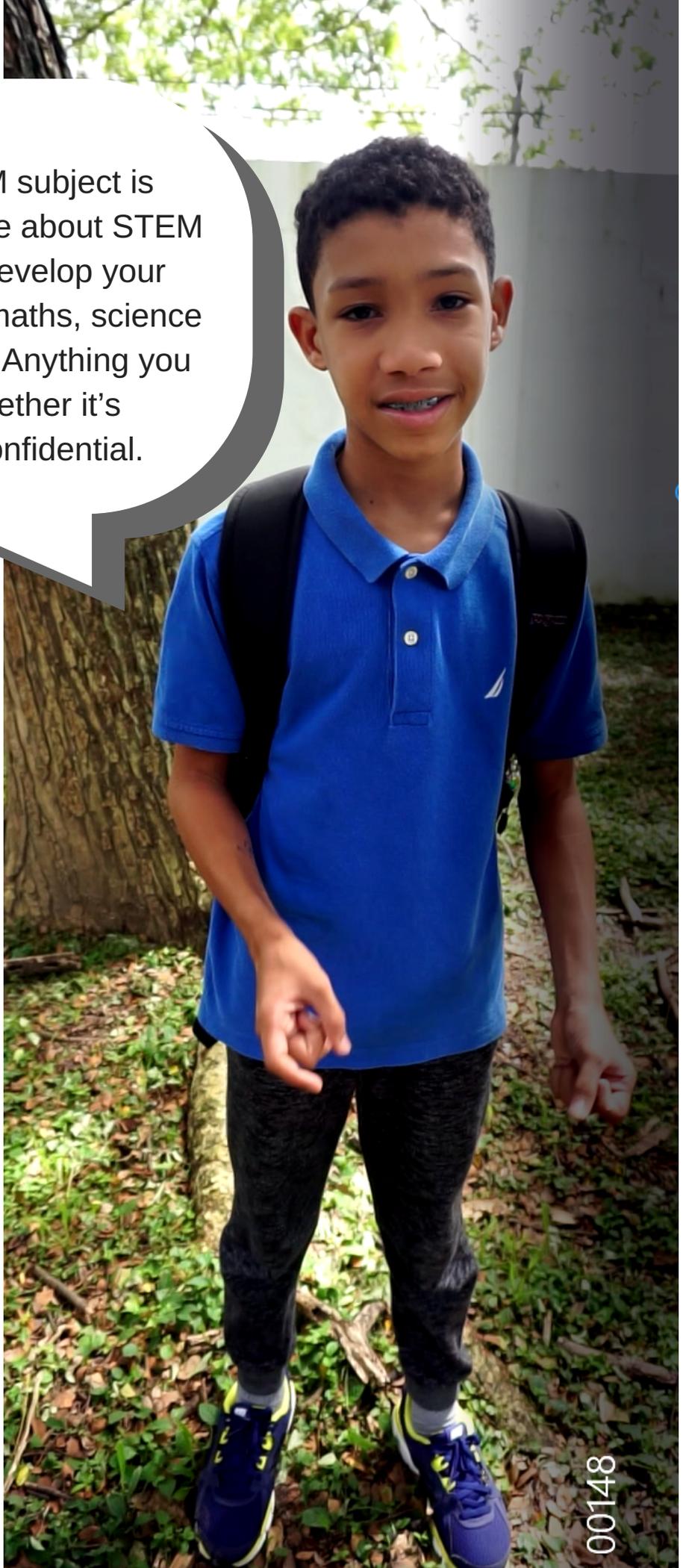
In a fast paced, technologically advancing society, young people struggle daily with social and life skills. Students perform at high levels academically, however struggle with basic interaction and inter-personal skills. The Life Skills element of the programme was introduced to promote and develop abilities for adaptive and positive behaviour that enable students to deal effectively with the demands and challenges of life, particularly those exhibited during interactions in the classroom.

The life skills workshops also covers education globally and team work. Through a range of interactive and personal activities, students participate in the following themes: Getting to Know Myself, My Beliefs and Values and Recognizing and Appreciating Differences in Others.

The students play games, watch movies and have general discussions on each theme, helping them to better understand themselves and relate to their peers, in an effort to produce better team players and well-rounded Scientists, Technologist, Engineers and Mathematicians and general STEM leaders of the future.



“My favourite STEM subject is engineering. What I like about STEM is that it helps you develop your friendship skills, your maths, science and technology skills. Anything you say in STEM, whether it’s embarrassing is confidential.”





## FIELD TRIPS

### always set for a road trip

As expected, field trips are the most anticipated component of the STEM. Trinidad and Tobago is known for a variety of naturally occurring phenomena within our relatively small island, mud volcanoes being no exception. This term, led by a team of geologists from the American Association of Petroleum Geologists Trinidad and Tobago Chapter (AAPG) students of Debe High School, St. Benedict's College, San Fernando Central Secondary, visited the Piparo Mud Volcano; and students of Trinity College and St. Francis Boys' College (formerly Belmont Boys R.C. Secondary School) visited the Devil's Woodyard Mud Volcano on the 14th and 21st October 2017 respectively



On the trip the AAPG team explained the structure of the earth, plate tectonics theory, the formation of the mud volcanoes and their history, how to identify the different types of stone formations commonly found in the area and the importance of mud volcanoes to the oil and gas industry. Students were sent on a scavenger hunt of sorts to find different sandstones and mudstones that were scattered about the grounds and got to interact with the different cones that bubbled with mud. To wrap up the day, the students answered questions eagerly securing sweet prizes which certainly replaced the energy dispensed that day.

# field trips cont'd

In December when other students are busy with the usual Christmas hustle and bustle, students in the STEM Programme were busy exploring areas and getting to know organisations in south, central and east Trinidad in relation to STEM.

Four days of field trips began on 18th December in the south with the students of St. Stephen's College, the Central Block bursary programme and the form two and three students of Cowen Hamilton Secondary. They visited Whyfarm in Siparia –the home of 'Agriman' the agri-science superhero. They started the day with a discussion on the importance of agriculture and how it plays a role in the economy.



A very grape-fruitful trip at Whyfarm

At this location students learnt about the role of the Civil Aviation Authority (TTCAA), the function of an air traffic controller in the tower and the control room – and how to become one, the technology used by the TTCAA and the areas covered by the Piarco facility. If flying isn't your game... becoming an air traffic controller is the next best thing!

The form one students of Cowen Hamilton Secondary as well as the students from the East Coast Marine Area also visited Whyfarm on the 19th December. They also got a chance to tour the farm and plant their own crops, however we heard that 'Agri-man' was off fighting agricultural criminals at a nearby farm that day.

On the 20th December, led by a team of geologists from the American Association of Petroleum Engineers (AAPG); students of St. Anthony's College, Trinity College and St. Francis College visited Biostrat Lab\* in Caroni and then journeyed to the San Fernando Hill.



The second day of field trips on 19th December saw the students of San Fernando Central Secondary and Debe High School visit the Trinidad and Tobago Civil Aviation Authority. After a safety briefing the students were divided into two and took turns visiting the Air Traffic Control Tower and the Control Centre.



# MIC TECHNICAL TRAINING PROGRAMME

## The Final year of the all-boys Three-Year STEM Technical Training Programme

The students of East Mucurapo commenced their final year of training with the MIC Technical Training Institute in November. This programme is intended to increase interest in the technical areas by having extensive practical courses for the students along the Technical/Vocational Trades. The students will cover 200 hours of training in Fluid Power and Controls, Electrical/Power and Controls, Electro-Pneumatic and Hydraulic controls and Air Conditioning.

The courses include practical and theoretical knowledge with focus on the practical element to keep the boys attention.

Upon successful completion of the Three-Year programme, the boys would have gained the knowledge and skills to work under supervision of craftsmen in a number of proficiencies. With further experience, they will have the potential to be gainfully self-employed.

## STEM KICKS OFF IN TOBAGO

The STEM Technical Training Programme - Tobago kicked off to an energetic start with students from eight secondary schools in Tobago. The mainly male programme of 20 boys and (one girl) were from Bishop's High, Goodwood Secondary, Mason Hall Secondary, Pentecostal Light and Life Foundation, Roxborough Secondary, Scarborough Secondary, Signal Hill Secondary and Speyside Secondary begins in January at the MIC Training Institute, Bon Accord. Kristel Washington-Thom, Curriculum Planning and Development Unit Division of Education, Innovation and Energy leads the charge from Tobago mobilising parents and students who attended the orientation meeting on the 9th December, 2017.



# WHAT'S NEXT

## TEACHER TRAINING WORKSHOP

On 18th and 19th of January 2018 a Teacher Training workshop will be held at UTT Chaguanas. Teachers will be introduced to new techniques, activities and skills for integrating STEM in the classroom.

## STEM NATIONAL CONSULTATION

In March 2018 all national stakeholders in STEM will be invited for a consultative workshop to further enable the implementation of the current Shell STEM initiative.

## NATIONAL STEM FAIR

Students from all across the country will be invited to the National STEM fair in March 2018.



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