



THE TRINIDAD & TOBAGO STEM PROGRAMME NEWSLETTER

VOL 1 2020

SCIENCE | TECHNOLOGY | ENGINEERING | MATHEMATICS



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The Trinidad and Tobago STEM Programme is sponsored by Shell Trinidad and Tobago



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2020 is here! A new year filled with new dreams and hopes!
In our last issue (Q4 2019), we welcomed new students who started the new academic term; and at the start of the New Year, we welcomed three new facilitators to the programme!

In this issue, we take a look at some programme highlights that engaged the attention of our participants, talk about STEM going online due to the COVID-19 Pandemic and feature a rising STEM Star!

Our first science tidbit takes a look at an age old custom to ring in the New Year - fireworks! We take a brief look at the history and development of fireworks! This age old custom has been part of New Year's Eve celebrations for many cultures worldwide. We know everyone is not a fan of the tradition but one just has to wonder at the science that creates these exploding spectacle!

We round off this edition with our customary Facilitator Feature and What's Next!



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TERM HIGHLIGHTS:

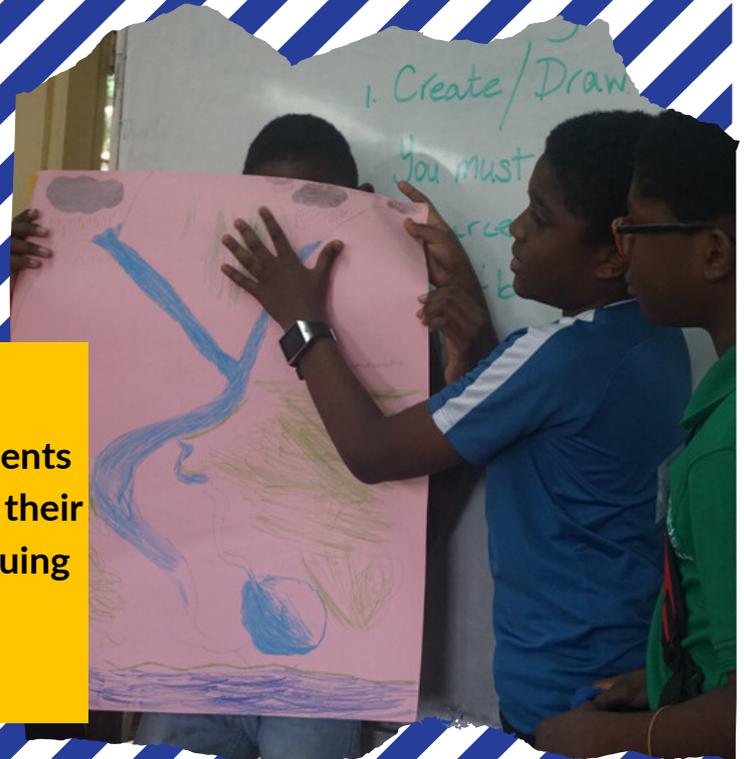
There is always something new to learn during STEM Saturdays. Each session is an opportunity for our participants to be exposed to something different or something new. This quarter, prior to the closure of schools and enforcement of COVID-19 stay at home restrictions, the students learnt about the different types of bridges, algorithms, and the scientific method, acids and bases, the engineering process, coding with the scratch programme, communicable diseases, tourism & its impact on the environment in addition to learning about electricity via snap circuit kits just to name a few!



San Fernando Central students with their bridge model of spaghetti & marshmallows during their Engineering session



Trinity College students display and explain their poster on rivers during Geography



TERM HIGHLIGHTS:



Queen's Royal College students race their cars during the STEM balloon car challenge



Queen's Royal College students use Scratch programme during their STEM Coding Session

TERM HIGHLIGHTS:



Woodbrook Secondary
students test for acids &
bases during Natural
Science STEM Coding
Session



TERM HIGHLIGHTS cont.

This term we were joined by two new Facilitators, Ms. Laura Lewis, a Process Engineer by profession and private educator, who is engaging the students in Engineering; and RSC a non-profit organisation whose goal is to effect change through technology and education which introduced the students to Robotics and will also engage them in eWaste Recycle, and PC Maintenance & Repairs.

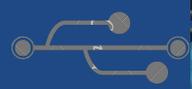
We welcome on board our new facilitators and look forward to the interaction between students and facilitators!



**Cowen Hamilton
Secondary students
during their circuit
building session with
RSC**



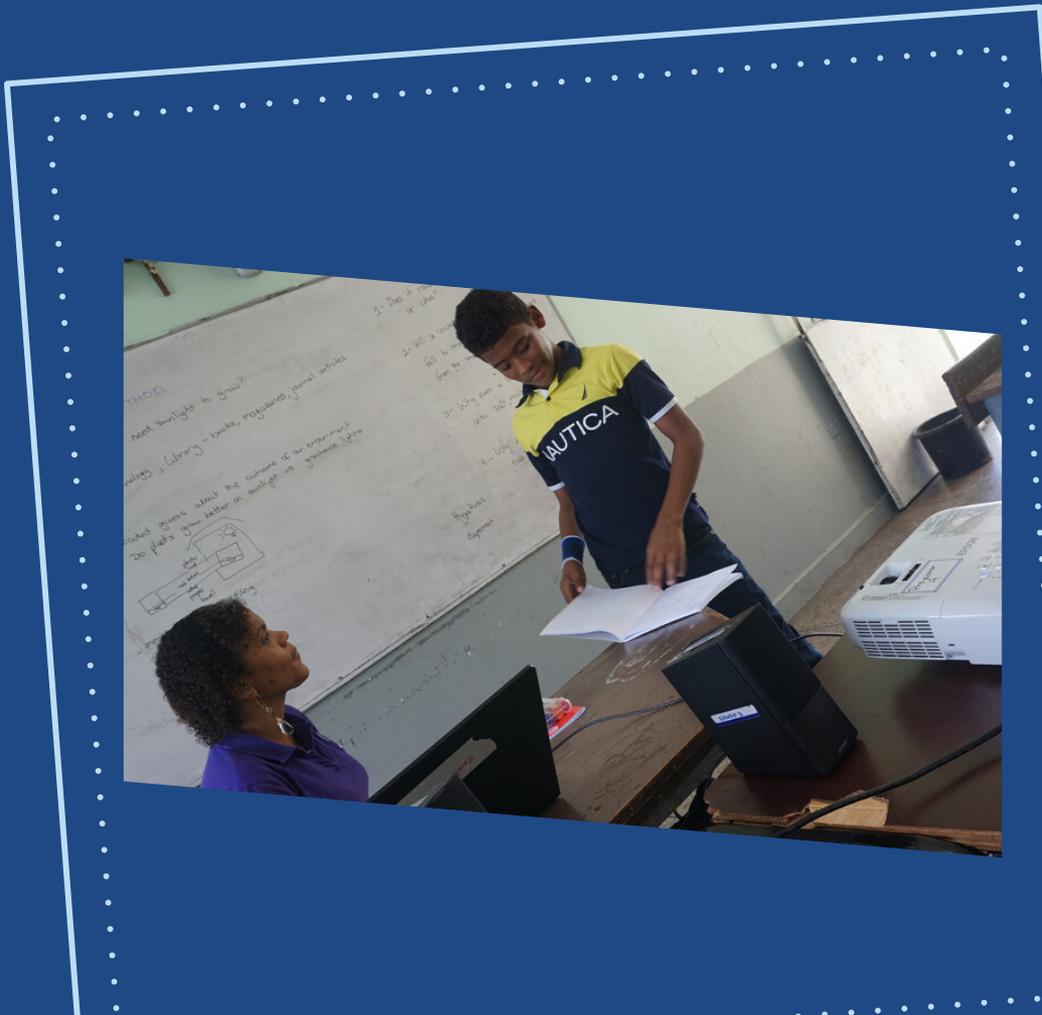
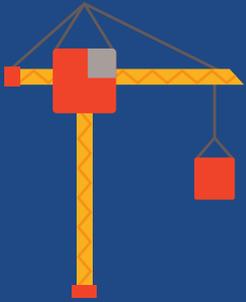
**Mr. Ramdass explains
a point to Cowen
Hamilton Secondary
students during their
session with RSC**



TERM HIGHLIGHTS cont.



**St. Anthony's
College
students
during their
Engineering
session with
Laura Lewis**



STEM STAR: RAPHAEL GAY

We congratulate Raphael Gay, a student at Moruga Secondary who was also part of the STEM Technical Training Programme in 2018. Raphael excelled in the May/June 2019 CSEC examinations in the area of Industrial Building Technology in the May/June 2019 examinations, **placing 26th out of 100 students!** This earned him a place on the National Merit list!

We envisage great things coming out of this STEM Star in the future and hope other students are encouraged by his achievements!

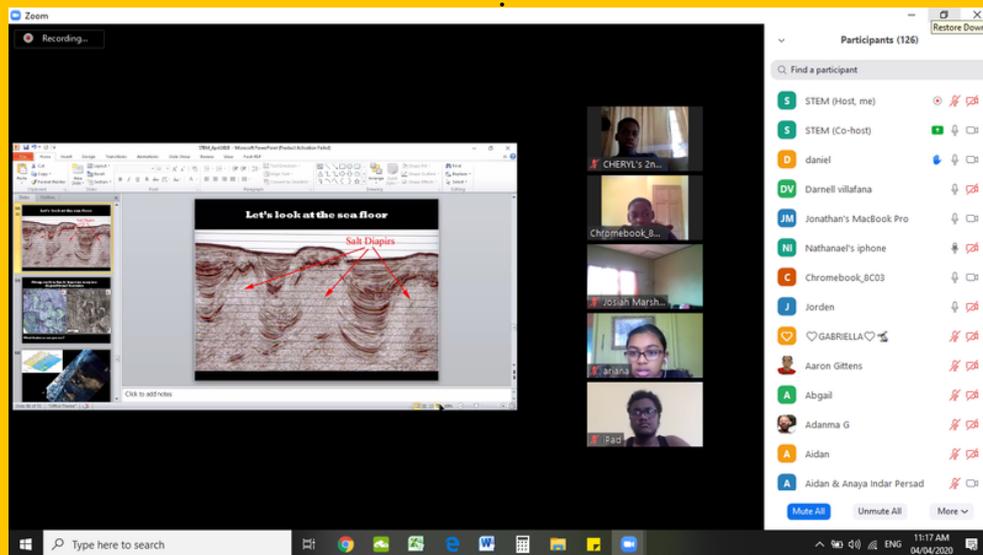


Congratulations

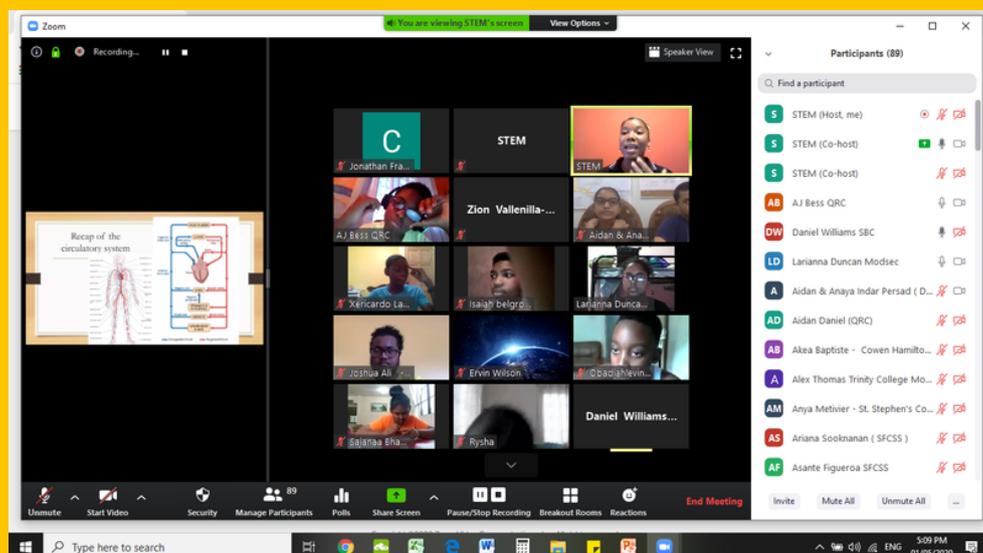


STEM GOES ONLINE!

Who would have thought at the beginning of the New Year that STEM sessions would be transformed into 'virtual learning' just as we got out of the gate for the new term? One Friday afternoon our team was making the final preparations for the following Saturday morning sessions when we received a phone call advising that all schools would be closed officially due to the COVID-19 viruswhich would later be declared a worldwide pandemic!



Despite some initial challenges, we took our programme online using two platforms, one for live sessions and the other for posting content that students would be able to view on their own time.



We hope our participants are enjoying their online sessions while they await the resumption of in-classroom sessions!

STEM - SCIENCE TIDBIT

Most people ring in the new year with fireworks, but have you ever wondered where fireworks came from and the science behind this age old tradition?

LET'S TAKE A BRIEF LOOK AT THE HISTORY OF THIS FORM OF ENTERTAINMENT

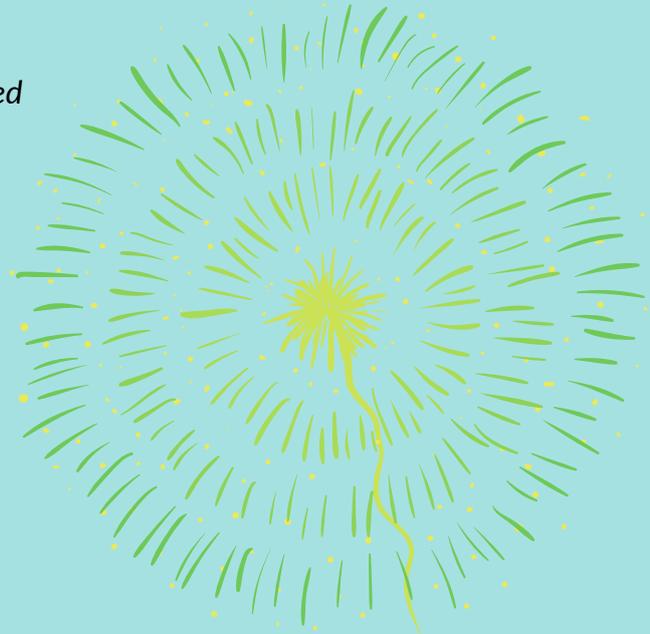
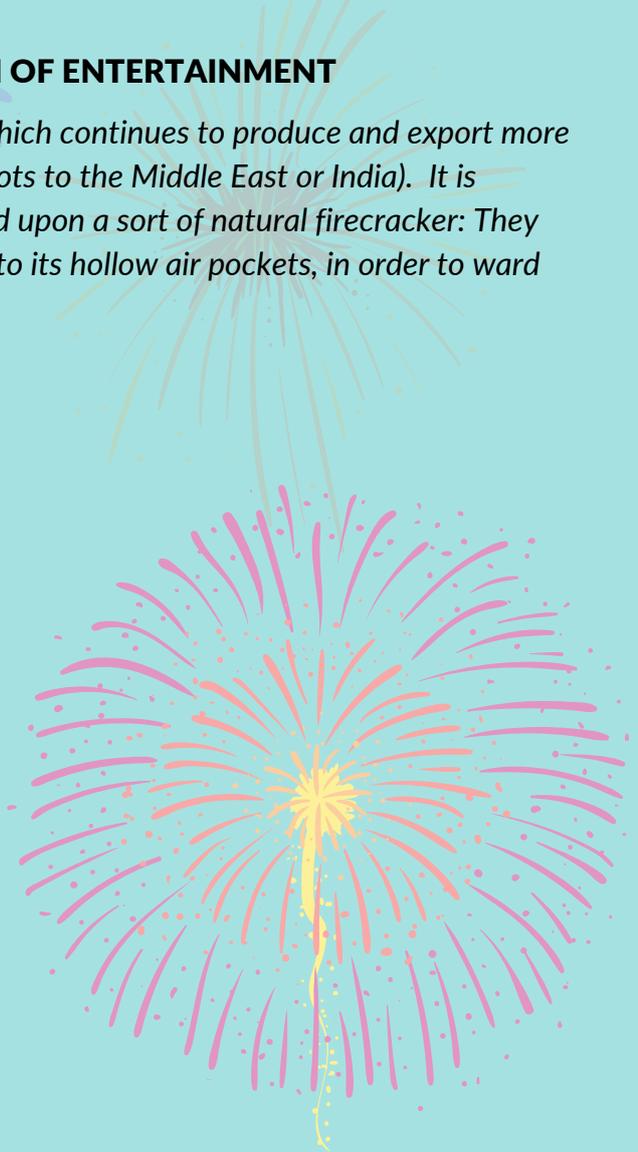
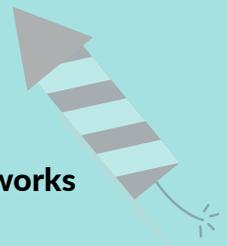
"...(the) most explosive form of entertainment originated in China, which continues to produce and export more fireworks than any other country in the world. (Others trace their roots to the Middle East or India). It is thought that, as early as 200 B.C., the Chinese had already stumbled upon a sort of natural firecracker: They would roast bamboo, which explodes with a bang when heated due to its hollow air pockets, in order to ward off evil spirits."

"At some point between 600 and 900 A.D., Chinese alchemists—perhaps hoping to discover an elixir for immortality—mixed together saltpeter (potassium nitrate, then a common kitchen seasoning), charcoal, sulfur and other ingredients, unwittingly yielding an early form of gunpowder."

"The Chinese began stuffing the volatile substance into bamboo shoots that were then thrown into the fire to produce a loud blast. The first fireworks were born. Soon, paper tubes came to replace the bamboo stalks, and the Chinese discovered that their fiery sticks could be used for more than just scaring away ghosts and celebrating special events."

"By the 10th century, they had developed crude bombs and begun attaching firecrackers to arrows that rained down on their adversaries during military engagements. Two hundred years later, they learned how to fire explosives into the air and guide them toward enemy targets, essentially building the first rockets. Used outside the field of battle, the same technology allowed fireworks masters to put on the first aerial displays."

– history.com

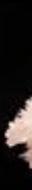


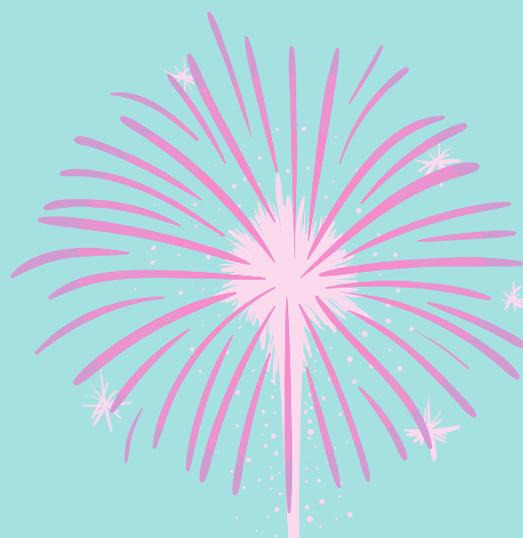
STEM - SCIENCE TIDBIT cont'd.

THE SCIENCE OF FIREWORKS

" Fireworks, explained Michael Pollastri, associate professor and chair of the chemistry department (Northeastern University), get their color from a process in which metal salts are heated, then relax. And some of these salts are more particular than others. An explosion is more or less a very fast and intense burning event. In order to accomplish that, metal salts are mixed with chemicals (oxidizing agents) that cause a very rapid oxidation reaction to occur. This reaction is very fast and exothermic, which means it gives off energy as heat—and anytime you have a very fast and hot reaction, you get an explosion. This launches the fireworks into the sky and the heat from this explosion is what provides the energy to create the colors.

The color is determined by the metal salts that are present in it. The heat that these metal salts experience excites the metal atoms to a higher energy state, and when the atoms relax back to their more stable "ground" state, they emit colors. The wavelength (or color) of light that's emitted when these atoms relax are characteristic of specific atoms: strontium glows red, sodium burns orange, copper burns green, etc. Other colors can be made by mixing these metal salts in the fireworks, which is called "painting" in the fireworks trade. Blue fireworks are particularly difficult to create, because the copper salt needs a very precise temperature to be excited to the energy state that emits blue light. If it burns too hot or too cool, the color gets washed out to a lighter blue hue." - (excerpted from Article by Molly Callahan, Northeastern University for Physics.org)

firework color	atomic # Element	substance, formula	emission spectrum	flame test
	38 Sr Strontium	 SrCO ₃		
	20 Ca Calcium	 CaCl ₂		
	11 Na Sodium	 NaCl		
	56 Ba Barium	 BaCl ₂		
	29 Cu Copper	 CuCl ₂		



Q+A

FACILITATOR FOCUS: Q+A

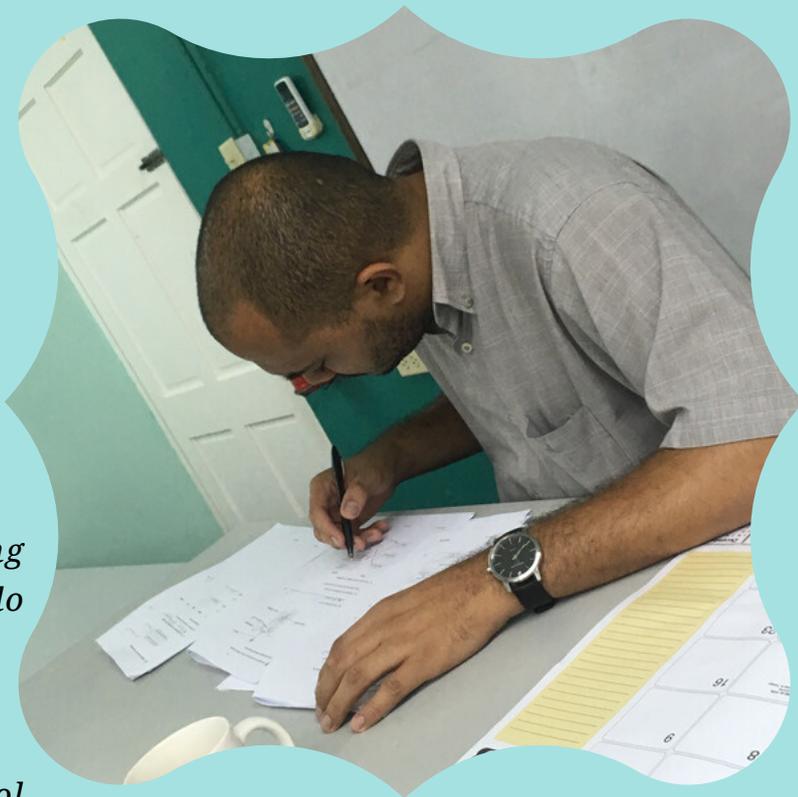
Kendell Assue – Chemistry Facilitator

The facilitators in the programme provide the unique experiences and the 'Aha moments' for students. But who are these facilitators? They are a mixed group that consists of teachers, experts and organizations in the field of STEM. The facilitators are essential partners in the programme. This feature introduces the STEM Programme Facilitators in a brief Q&A session.

Chemistry is one of the most exciting subject in STEM, students get to do experiments galore!

Even if they don't do Chemistry in school our STEM students learn some of the basic principles of this amazing subject which by its very nature is always evolving.

This quarter we feature one of our Chemistry Facilitators Mr. Kendell Assue.





Q+A

FACILITATOR FOCUS: Q+A

Kendell Assue – Chemistry Facilitators

1. When did you start facilitating in the programme?

I started facilitating STEM sessions in September 2017.

2. Why did you decide to join the STEM programme?

I was encouraged by a friend of mine who suggested I should. I made some enquiries and that was the start.

3. What are your hopes for the programme?

To see more kids get involved in all aspects of the different subject areas as they are the future leaders of industry.

4. What was it like when you first started the programme?

The teaching aspects did not pose a challenge. However, every school has its own culture and I was unfamiliar with the culture of the school to which I was assigned. This notwithstanding, the lack of knowledge provided a challenge and I turned the entire familiarization process into an adventure.

5. What changes have you seen since you first started?

More kids have shown interest and participation has grown, although it fluctuates.

6. What subject/s are you teaching?

I facilitate Chemistry sessions in the STEM programme and I am also a Biology teacher.

7. What is unique, different or engaging about your sessions?

Sessions are very interactive and students are allowed to perform the experiments. Also, the students ask very interesting questions.

8. What do your sessions involve?

It is a combination of theory and practical experiments using animated PowerPoint presentations and experiments.

9. How does the subject area you are teaching fit into the development plans of the T&T and the international community?

There is a lack of knowledge regarding the application of Sciences with the exceptions being the traditional areas of medicine and engineering. The aim is to explore many facets of Science and illustrate the role that they play in the national and international economies. Some of the key applications would be in the areas of Agriculture, Earth Sciences and Applied Chemistry.

10. Why do you think your subject area is important for students?

Simply because Science is all around us and we live it daily. Therefore we should know the importance it plays in all living things so that we do not take it for granted.



UP NEXT IN STEM

- STEM Online continued
- STEM Recycle Competition
 - STEM Virtual Camp
- STEM Facilitator Feature



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