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THE UWI CARAVAN NEWS

FASCINATING EARLY CHILDHOOD NEWS FROM TRINIDAD & TOBAGO

Brought to you by: The Early Childhood Learning Community [ECLC]
Professionals working for young children

Editorial

This issue links Science, Technology, Engineering and Mathematics (STEM) or STEAM which includes the Arts, to the Covid 19 Pandemic. It is intended to encourage STEAM integrated, inquiry learning in early childhood classrooms in Trinidad and Tobago.

STEAM teaching helps children to problem solve, think critically, reflect and build vocabulary and communication skills as they learn. The Project Approach which is already on the Early Childhood Curriculum, facilitates STEAM.

Projects on topics of interest like 'Plants' or 'Trucks' can integrate all the STEAM disciplines as children plan, ask questions, develop prototypes and go on field trips to find answers to real world problems. This newsletter features articles related to STEAM in classroom practice. Do enjoy!

WHAT'S INSIDE THIS ISSUE:

Covid-19 and STEAM for Young Children

S. Abdul-Majied

Since Covid-19 changed the world, the importance of using Science to guide national practices and to find a cure for the deadly disease was highlighted. Doctors
and scientists used data to track the spread of the virus and to guide governments about when to close schools and borders, quarantine citizens and establish social distancing to save lives. These data driven practices, also highlight the need to pay more attention to Science on the Early Childhood curriculum.

COVID 19 should have taught us too, that in this era, 'Techno-knowledge' is critical. We saw those with more expertise 'dragging' unskilled teachers along, to quickly transition into using computer technology to teach children remotely.

The same is true for the importance of teaching sound mathematical principles for kids to develop skills in problem solving, evidence-based reasoning and critical thinking from an early age.

The new health issues generated by the pandemic also need engineering technologies, processes and expert advice to guide practices. Finally, we need the creative forces of the Arts to help us think and transform innovate ideas into solutions which range from designing scientific products to music recitals for calming a nation in lockdown.

Our education system should therefore embrace curriculum, instruction and assessment approaches designed to empower students to adopt scientific ways of thinking, and the arts, from a young age. Covid-19 should have taught us to include STEAM disciplines in all early childhood classrooms.

Let's Explore - Digital games for Social and Emotional Development during Math and Science

Roxanne Craig

Children need to develop social skills to help them to behave appropriately in different settings and with different people. They also need to learn to regulate their emotions to control feelings like joy, sorrow, confidence and frustration as they interact to learn with their classmates. A study was conducted by UWI School of Education researchers to determine the effect of digital game-based learning on the social and emotional development of young children at a preschool in central Trinidad. A group of children 3-5 years old from Happy Ventures Early Childhood Academy took part in this study. Games related to math and science topics under investigation were incorporated as a component of the teaching strategy. Tablets and laptops were the tools used for playing the games.

The starting point for the study was the observation that 21st century children cannot escape being influenced by technology. These digital natives, as children are fondly called, seem to gravitate naturally to any device they encounter. While some might disagree with its use at an early age, others say that if it is managed appropriately it can be useful. The principal investigators for the study were two lecturers from the University of the West Indies St. Augustine. They were investigating the use of digital technology to support Social and Emotional development while learning mathematics and science.

The game theme selected 'Let's Explore' formed the basis from which the lessons were designed. Suitable age-appropriate games related to the topic were utilized for children to learn about the parts of the body, textures, colours, feelings, senses and animal habitats.

Preparing for games

Newspapers with rows and rows of body text can look uninviting to readers. Give their eyes a visual break by using pull quotes. Usually set in bigger font than the body text, it can be used to highlight a key point of the article, or serve as a graphic element. Captions also allow readers to scan through the page. A good caption is short but informative.

For each session the classroom buzzed with excitement in anticipation of which games would be played. Groups of children were assisted by either an adult or a capable classmate. Although there were some moments of frustration when connecting the games or using the trackpad, this also further motivated the students to succeed.

To record and evaluate the outcomes checklists and observation forms were used for each session. The results showed that utilizing Games Based Learning (GBL) did contribute positively to the social and emotional development of the 4+ children working in pairs. Over time Korey who was very unwilling to share as shown by his actions of folding his arms and pouting, began to show willingness to share and interact with his peers. The 3+ group could only manage the games with personalized assistance from the teacher. It was recommended that the 3+ children be each given a device until they are able to work more comfortably in pairs. Generally, there was tremendous improvements in the development of children's social skills and eagerness to study mathematics and science. This practice continues to form an integral part of the curriculum at Happy Ventures.

STEM ➡STEAM ➡STREAM: It's Easier Than You Think!

By Shaffina Ahamad - Hamid

It seems like now- a - days teachers are hearing a lot about STEM, STEAM, STREAM and all with good reason.

The importance of which is to educate and prepare our children in the areas of science, technology, reading, arts and mathematics. First, we heard about STEM- Science, technology, engineering and mathematics. Soon after came STEAM and more recently STREAM. By incorporating art into the mix, it promoted the integration and use of the creative ways that allows children to demonstrate their knowledge and understanding of STEM concepts while the inclusion of the "R" recognizes reading and writing as fundamental to all early childhood education curriculum. Essentially, STEM, STEAM and STREAM are being implemented and integrated within our curriculum to ensure that our children receive a well- rounded education.

STEM, STEAM, STREAM gives a label to what some of us in early education are already doing, that is, helping children to explore, observe, ask questions, predict and integrate learning. It is what we have always advocated in early childhood education since we are aware that it is how young children build their knowledge and understanding of the world. These are the natural tendencies that children have which form the basis for early science, technology, reading, engineering, the arts and math exploration. Children can, and deserve to have chances to think about, talk about, read about and do STREAM explorations as they support critical thinking and reasoning skills, problem solving, literacy development and enhances later interest in STREAM study and careers.

This type of learning can be exciting for children as they explore on their own and when facilitated by a thoughtful teacher. As children engage in STREAM activities they test out their own ideas and have opportunities to develop new ones. Children can really do science and engineering.

Balancing cups to make a tall tower

Inflating a balloon with baking soda and vinegar

When a child builds a tower with blocks, he or she acts as an engineer as he or she tries to make a tall, yet stable structure. The child also takes on the disposition of a scientist when he or she explores how blocks of different materials, shapes and textures affect the strength and stability of the tower. That child might also use mathematics and technology as he or she uses tools to measure the heights of the towers. In order to develop new ideas, children need time and space to think about how their observations and experiences might change their previous ideas. For instance, if children observe that a wooden block floats; does that mean all wood floats? Or that all blocks float? Invite them to help you solve a problem. What can we do if we want to find out if all blocks float? Which ones float and which ones did not? How can we find out? Activities that incorporate explorations like these can build on what children are interested in. Opportunities are provided to think about, and do- sometimes informally or nonverbally- from an early age.

Building a tower with blocks

To foster and further develop our children's natural interest in STEM, STEAM. STREAM, Teachers are critical. Planning is critical. Teaching must be intentional on developing children's skills and love of learning. As teachers we need to honestly reflect to overcome our own relationship with Science, Technology, Mathematics, Reading, The arts and integrated learning. As early educators many of us have to educate ourselves about engineering and its place in 21st century learning. STEM, STEAM, STREAM. If we learnt that science and math for example is hard and no fun, then how can we teach children that those disciplines are doable and enjoyable? To do so, we have to build our own confidence, knowledge and competence in STREAM, so in turn we can support and empower our children to be confident in their knowledge and competencies.

Discovery learning

As teachers, we have to overcome the fear of not knowing all the answers in science and math and focus on re-educating ourselves through lifelong learning. We should reflect on our failures, discuss new strategies, and seek competent guidance to implement more effective teaching approaches. For me, it captures perfectly what our children do when we don't make a big deal when they don't get things right all the time. We should look at "failure" as stumbling blocks on the pathway to success.

As our culture is becoming more technologically focused, we need to support our children to become the next generation of thinkers, builders, scientists, mathematicians and STREAM literate citizens. It is the need of the hour so the earlier our children are introduced, the better for them and the world they live. The young minds of today will be the innovators of tomorrow. Since as teachers we play a critical role in the growth and development of children, it becomes all the more important for us to incorporate STREAM into our teaching. We need to educate ourselves. We need to continue to encourage children to take interest in and help them to incorporate STREAM Thinking into their daily lives. Our country needs STREAM in early childhood education today.

Shaffina is an ECCE Teacher / OAS ITEN Teacher Fellow
She represented Trinidad and Tobago at the OAS ITEN International Fellowship Seminar for STEM Teachers, Lima, Peru August, 2019.

A (foil) river habitat with dam

How to Plan a "Good" STEM Lesson

Taken from- https://lifeovercs.com/river-small-world-habitat-exploration/

Science Technology, Engineering and Mathematics- STEM, is more than a group of subjects. It is a way to intentionally, integrate, different subjects into an existing curriculum. It focuses on developing deeper mathematical and scientific thinking in students and helps them to understand, use, and develop technologies. STEM lessons are therefore not the 'ordinary' math and science lesson. They encourage active learning and allow for more than one right solution to a problem. Students are encouraged to develop and engineer solutions to real-world problems. STEM lessons incorporate the **design, testing, and evaluation of prototypes leading to a redesign to improve the product**. STEM should help young children to develop the social, emotional, cognitive, investigative and creative skills needed for their development, 21st century jobs, and life.

The following are 7 guidelines outlined by Jolly (2016) to help teachers plan successful STEM lessons.

1. Design your STEM lesson around a grade-level science or math topic that students have studied, or are studying. Plan the lesson around one or more objectives. Start by determining where science and math might be used together. An objective from science food groups might lend itself to a challenge involving measurement and portion sizes. One thing to note—it's not necessary that each subject be addressed equally in every STEM challenge. Science might be the driver in one challenge, while math concepts drive a different challenge.

2. Grasp the content and big ideas for the lesson. To successfully integrate science and math in a STEM lesson, be sure you have a good handle on the subject matter in both content areas. Teachers need to understand the language and content of math and science for the lesson. It would be best if teachers strong in the various disciplines e.g. math, science, and technology study and design lessons together. You can also get feedback and information from engineers, subject-matter experts, print materials, and websites with substantive content information.

3. Keep the challenge realistic. STEM lessons need to deal with real-world problems. You can encourage STEM students to use their imaginations and still "keep it real. Note: While most of the solutions students design and construct will not actually be used in real-life situations, they are constructing prototypes and simulating solutions for real problems. Engineers generally build prototypes before constructing an actual device. Prototypes and simulation are bona fide stages in engineering design.

4. Be familiar and comfortable with the Engineering Design Process (EDP). The EDP should be the heart of your STEM lesson—the process by which students will tackle the problem. Please note that the steps are iterative; they do not have to occur in any particular order or frequency. Engineers regularly go back and forth between steps in their work

5. Consider the criteria and constraints needed for your STEM lesson. Your lesson should spell out **Criteria**- the ways students will define success. What will a team's device or prototype need to be able to do to solve the problem, or to simulate a successful solution?
Constraints refer to limitations that students must observe when designing their solution. They may need to limit the size or weight of the device or safety factors. If possible, involve your students in developing criteria and determining constraints.

6. Have a good grasp of inquiry-based teaching and learning. Your STEM lesson needs to be grounded in inquiry-based instructional practices. That means activating students' curiosity, leading them to ask good questions, and transferring the responsibility for learning from you (the teacher) to them. During the STEM lesson, you (the teacher) will not tell students how to solve the problem. They will make decisions and come up with solutions on their own, perhaps with gentle guidance to keep them on track if needed. Failing to find a solution is okay, and students can use what they learn to improve their solution.

7. Know how to successfully engage students in purposeful teamwork. Working in pairs or groups teamwork will not always go smoothly, but your students need to learn know the basics of productive teamwork before they tackle STEM lessons. Before and during your STEM lesson, you will need to provide intentional guidance to help students practice successful team behaviors and personal interaction skills.

The following websites were used as references for this article

1. https://lifeovercs.com/river-small-world-habitat-exploration/

2. Jolly, A. (2016). How to Design a Successful STEM Lesson. Education Week Teacher. https://www.edweek.org/tm/articles/2016/09/23/how-to-design-a-successful-stem-lesson.html?cmp=eml-enl-tu-news1

3. http://www.stem-by-design.com/wp-content/uploads/2016/07/15034-0026f_Design-Tool-7.3.pdf

A Machine designed by a 4-year-old preschooler in Trinidad for a STEM project on Recycling

A Recycling machine with bins for sorting waste

After discussing the waste problem in their class and looking at a video on waste processing, the class decided to build a waste sorting machine. Four-year-old Kanika was so excited that she quickly drew her ideas on a whiteboard. She explained and her teacher labelled the drawing. Her classmates agreed with the plan and prototypes of the machine were constructed by groups before the actual machine was made with parents' and teacher assistance. Though it was manual (they had to turn a handle), the children had fun as they learnt math, science, engineering, language, technology and more. Waste was also drastically reduced in the class.

ANIMAL SCIENCE FACTS

A hummingbird.

DID YOU KNOW THAT:

- Horses and cows sleep while standing up.
- Instead of drinking water, frogs soak it into the body through their skin.
- Hummingbirds can fly backwards.
- Mosquitoes make noise by rapidly moving their wings.
- Sharks lay the biggest eggs in the world.
- Even when a snake has its eyes closed, it can still see through its eyelids.

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To contribute an article or for
further information contact The Early Childhood Caravan
at: 868- 727-1400; 868- 735-6038; 868- 472-0469
or Email- sabeerah @gmail.com