

## ***Exchanging Best Practices in Teaching and Learning across Continents: A US – Suriname OAS Partnership***

Suriname recently received its first ever Inter-American Teacher Education Network (ITEN) grant from the Organization of American States (OAS) to partner and exchange best practices with George Mason University (GMU), Fairfax, Virginia, USA. This opportunity allowed two members of the Ministry of Education, Science and Culture (MINOWC) including Ms. Daniela Rosario (CENASU) and Ms. Marushca Wong Fong Sang (Curriculum Development) to visit Dr. Padhu Seshaiyer (Professor) at GMU from July 28 – Aug 6, 2017. Through this opportunity, Daniela and Marushca were able to participate in a weeklong teacher professional development program that was directed by Padhu and was held at a primary school in Virginia.

The focus of the program was on enhancing the pedagogical practices of teachers to be able to integrate STREAM (Science, Technology, Reading, Engineering, Arts and Mathematics) education into their respective curriculums to improve student learning in the primary and secondary classrooms. This training connected well with the concept of BE-STREAMING that was founded by Dr. Seshaiyer in 2016 to stimulate and sustain the interest of Suriname’s youth in STREAM by producing and presenting the most compelling, exciting, and educational event in Suriname. Besides Daniela and Marushca, the program included about 25 teacher participants and 20 students aged (7 – 14) and the weeklong course was taught by Dr. Padhu Seshaiyer assisted by his team of faculty and doctoral students.

The ITEN experience helped both Daniela and Marushca to engage in important pedagogical practices including teaching in *active learning spaces*, engaging in *learning by doing* and improving student understanding through *experiential learning*. The *active learning spaces* give an alternate learning experience from what most classrooms in use today were built for which is more traditional, “stand-and-deliver, sit-and-listen” pedagogies in a passive learning setting. The *learning by doing* experience helped them to understand how to engage students in the concept of motion and energy by building wind-powered cars. They also learnt how to engage students in *experiential learning* by pairing with students and help them use critical thinking outside the classroom to find heights of buildings and trees without any measurement tools. On the final part of the professional development, both Daniela and Marushca had the opportunity to become exhibitors with all other teacher



*Working with US teachers in Collaborative teams*



*Active Learning Spaces to engage student learning*



*Engaged in Learning by doing*



*Engaging students in Experiential Learning*

participants to explaining the concept of potential and kinetic energy to the students through live hands-on demonstrations. This activity connected well with BE-STREAMING summer camps that Dr. Padhu Seshaiyer had coordinated with Daniela in Summer 2016 in the districts of Saramacca, Paramaribo, Wanica and Moengo. The highlight of the trip was a visit to the OAS building in Washington DC where they learnt about the 35 Latin American and Caribbean countries and Suriname’s place in this group. Following the ITEN professional development institute, they plan to work with Dr. Padhu Seshaiyer in integrating STREAM into the Suriname curriculum through a lesson plan that was *project-based, research-based and inquiry-based*.



Dr. Seshaiyer said, *“As the counterpart collaborator to Suriname in the ITEN project, it helped to build stronger partnership with lead members of the teacher professional development department and the curriculum development department of MINOWC. I am excited to continue to work closely with Daniela and Marushca in the coming months to help them build a new curriculum for primary and secondary grades in Suriname that incorporates STREAMING, a concept that I have created that has been proven to help teachers to enhance their pedagogical practices and for students to improve their learning successfully.”*

Daniela Rosario said: *“Suriname is not that far behind from the US educational system. Our education system may still be focused on the teacher doing everything and has a book as the leading tool, but we are getting there. The new educational developments that I learnt from this experience indicate that the teacher must be engaged in creating the curriculum and together with the colleagues and students, not only the theoretical side but also the practical side. Hands on, information is now with one push on a button available. Collaboration between teachers, teacher and students, teachers and parents but also students and parents can take the learning process to a higher level. Long life learning is the key for a better future. Teachers, don’t be afraid to learn “when one teach two are learning (R. Heinlein)” With STREAMING there may be a connection to the concept of learning for life. What I see, hear*



*and do know I can adapt and use of apply it later in life. This collaborative project has been a great experience, and has helped to bring me up to the next level in my life.*

*Marushca said, "This mission was a tremendous learning experience. It was good to compare the US educational system with Suriname's. It helps you to view common challenges facing our education systems from another perspective. These international collaborations help to boost and strengthen Suriname's educational system. I am grateful for this experience and I'm looking forward to working with Mr. Padhu and Daniela to incorporate the knowledge we have gained into Suriname's educational system.*

# Exchanging Best Practices in Teaching and Learning through multiple representations in problem solving



**D. Rosario (Director of Teacher Professional Development)**

**M. Pross-Wong Fong Sang (Acting head Curriculum Development)**

**P. Seshaiyer (Director, COMPLETE Center/STEM Accelerator, George Mason University)**



**OAS** | More rights  
for more people



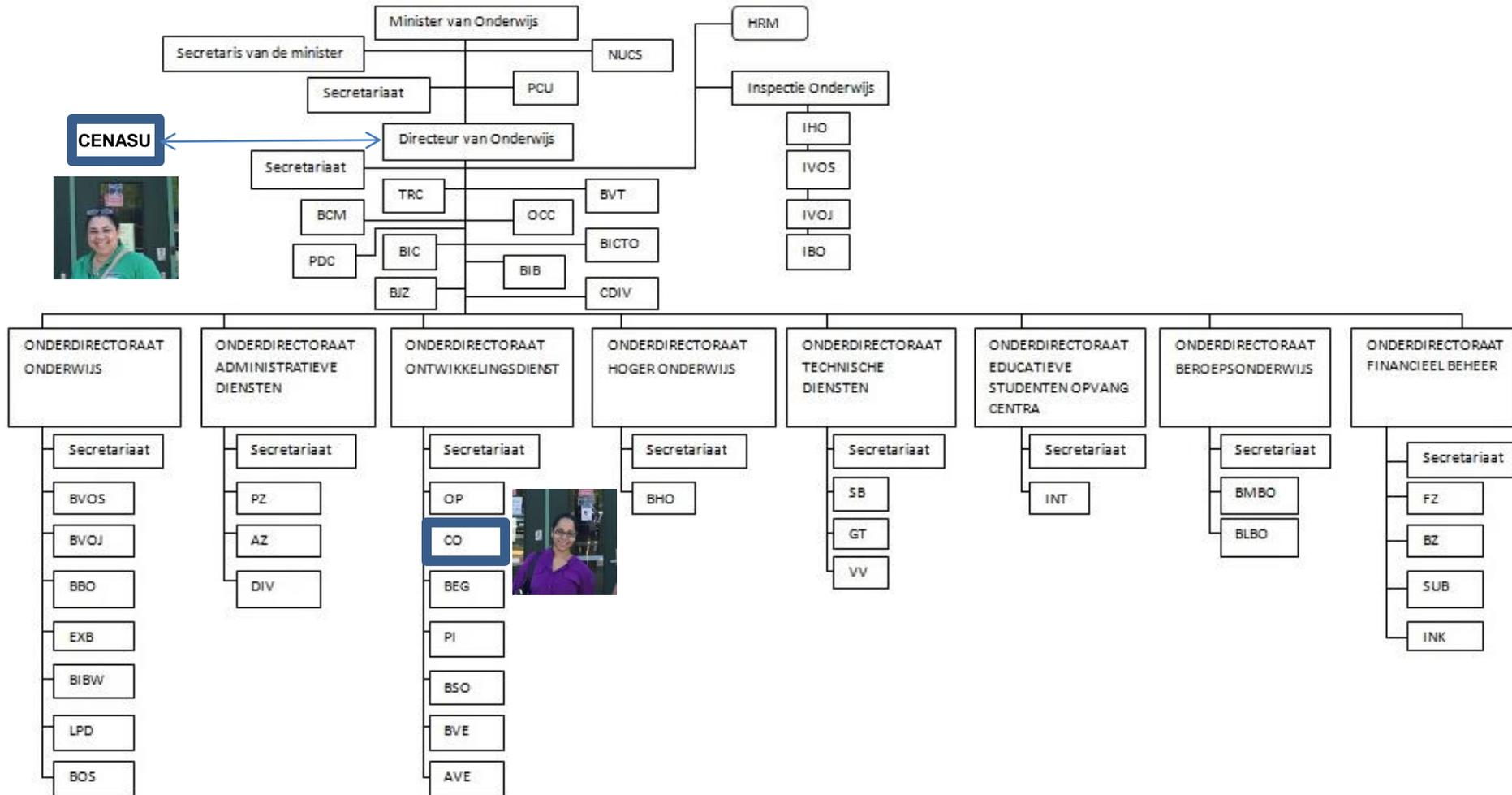
Republic of Suriname  
North-East coast of South America with capital city Paramaribo.  
Population: 558.368 (2016)  
Official language: Dutch  
(26 different languages)

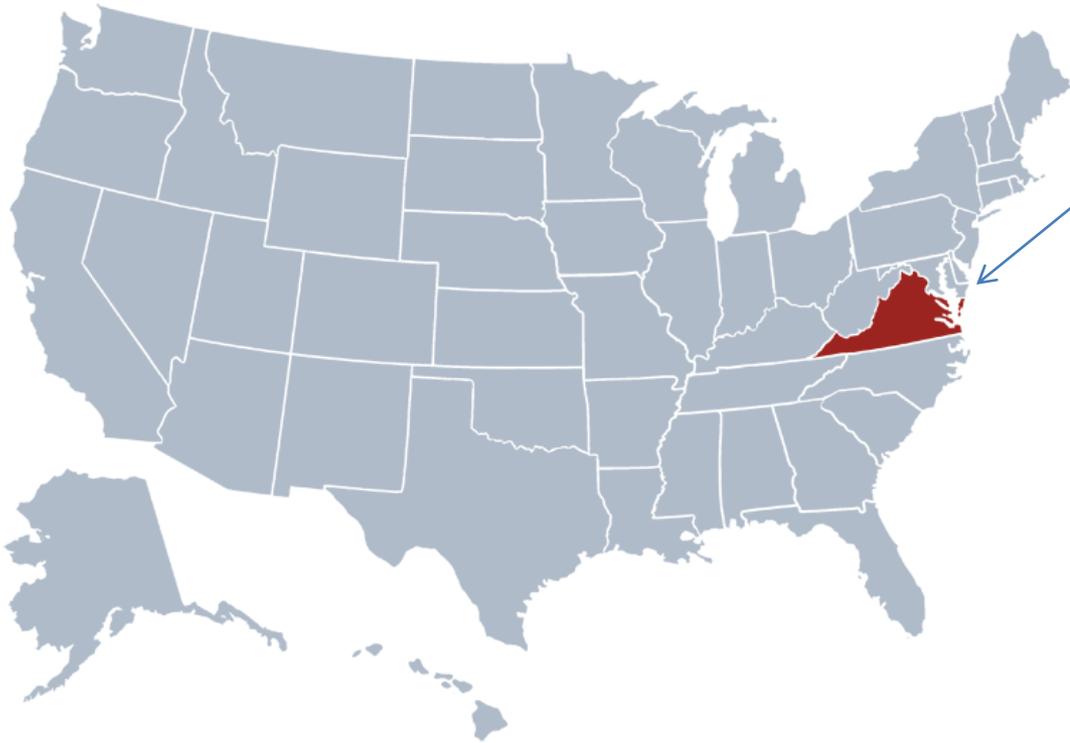
# Multicultural society

- Indians
- Creoles
- Maroons
- Javanese
- Mixed
- Amerindians
- Chinese
- Boeroes (whites, farmers)
- Jews
- Lebanese
- Brazilians



MINISTERIE VAN ONDERWIJS, WETENSCHAP EN CULTUUR  
DIRECTORAAT ONDERWIJS





<b>130 Countries of Origin</b> Our student body represents more than 130 countries.	<b>34,000 Students</b> There are more than 34,000 students on campus, creating an organically diverse environment.
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**1 IN 3** TEACHERS IN NORTHERN VIRGINIA'S WORLD-CLASS PUBLIC SCHOOLS ARE MASON ALUMNI



### Our Mission

*Increase the number of STEM majors  
Improve retention of STEM students  
Reduce students time to graduation  
Build capacity in the STEM workforce*

### STEM RETENTION

*The Learning Assistants Program  
STEM Boot camps  
Oral Reviews/Peer-Peer Mentoring*

### STEM RECRUITMENT

*COS Visits for High School Students  
High School Mentorship Program  
STEM Education Clubs*

### STEM FACULTY DEVELOPMENT

*Discipline Based Education Research  
Undergraduate Research Experiences  
Faculty Research Grants Development*

### STEM JOBS WORKFORCE

*STEM Internships & Fellowships  
STEM Workforce Council*

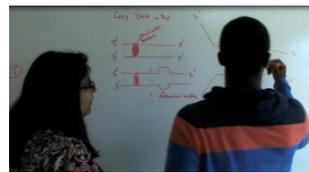
### STEM Boot Camps



### Peer-Peer Mentoring



### Oral Reviews



### STEM Outreach



### STEM CURRICULUM DEVELOPMENT

*High School Dual Enrollment  
Professional Masters in Science  
Governor School @ Innovation Park  
STEAM & STEM-H Programs*

### STEM TEACHER PROGRAMS

*NOYCE Teacher Scholarships  
STEM Professional Development  
STEM K-12 Math Science Partnerships  
STEM High school of the Future*

### STEM K-12 OUTREACH

*STEM Afterschool Programs  
STEM Middle School Academies  
STEM Science and Engineering Fair  
STEM Elementary Summer Camps*

### STEM GLOBAL

*NAS VLP/USAID PEER  
Organization of American States  
Teacher to Teachers International*

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# Center for Outreach in Mathematics Professional Learning & Educational Technology



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## The Mango Problem

One night, the King couldn't sleep, so he went down into the Royal kitchen, where he found a bowl full of mangoes. Being hungry, he took one sixth of the mangoes.

Later that same night, the queen was hungry and couldn't sleep. She, too, found the mangoes and took one fifth of what the King had left.

Still later, the first Prince awoke, went to the kitchen, and ate one fourth of the remaining mangoes.

Even later, his sister, the Princess, ate one third of what was then left.

Finally, the youngest Prince woke up hungry and ate one half of what was left, leaving only 3 mangoes for the kitchen staff.

How many mangoes were originally in the bowl?

**Show your thinking using words, pictures, and numbers.**

**The King's Really Big Bowl , Padmanabhan Seshaiyer and Patricia W. Freeman, *Teaching Children Mathematics*, Vol. 19, No. 2 (September 2012), p. 128**



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# Student Work

$3 \text{ left} + 3 = 6$     $6 + 3 = 9$   
 $9 + 3 = 12$     $12 + 3 = 15$   
 $15 + 3 = 18$  mangoes

$\left(\frac{1}{4}\right)^{\text{of}}$     $\left(\frac{1}{5}\right)^{\text{of}}$     $\left(\frac{1}{6}\right)^{\text{of}}$

Work backward method

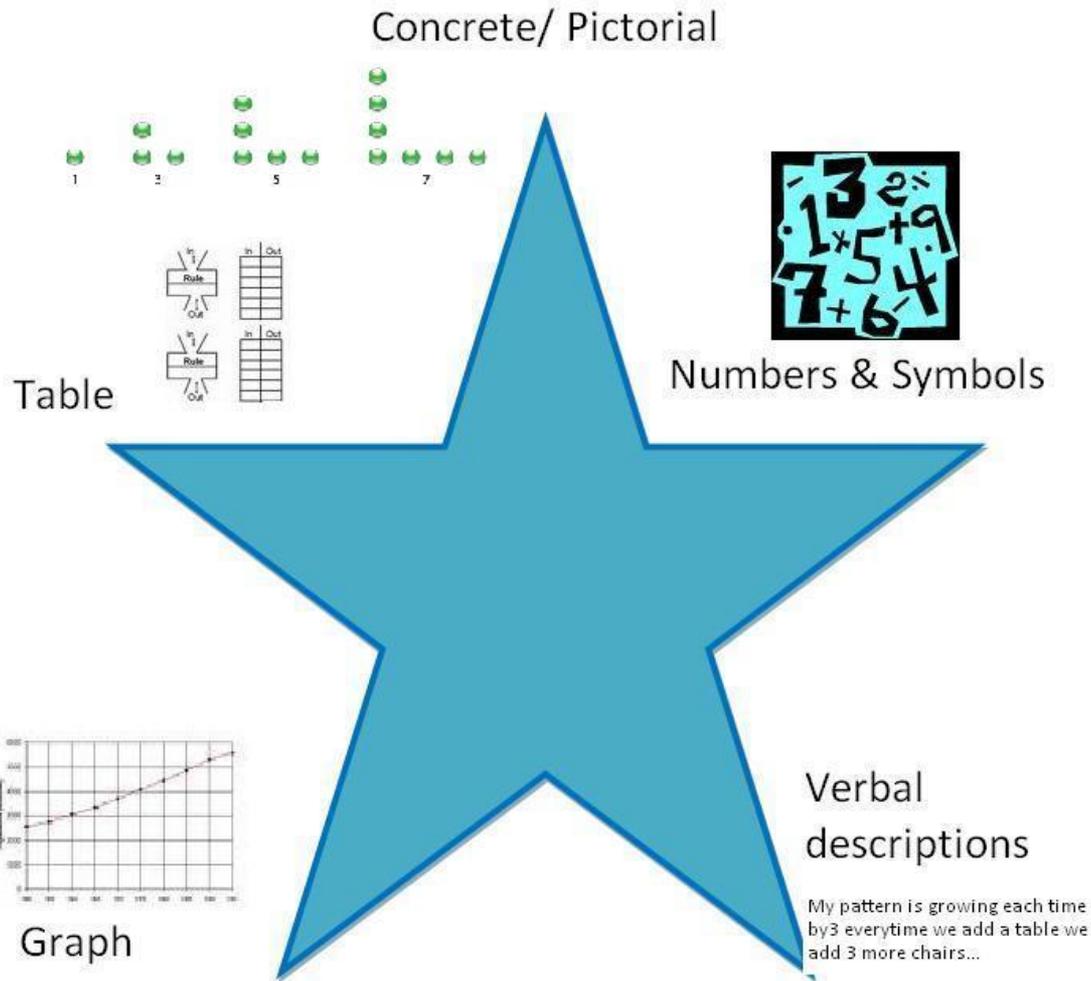
$3 \text{ left}$     $(18)$

$\frac{1}{6}$     $\frac{1}{5}$     $\frac{1}{4}$     $\frac{1}{3}$     $\frac{1}{2}$

$3 \times 6 = 18$   
 mangoes

$= 3 \text{ mangoes}$

# Multiple Representations



# General Challenges

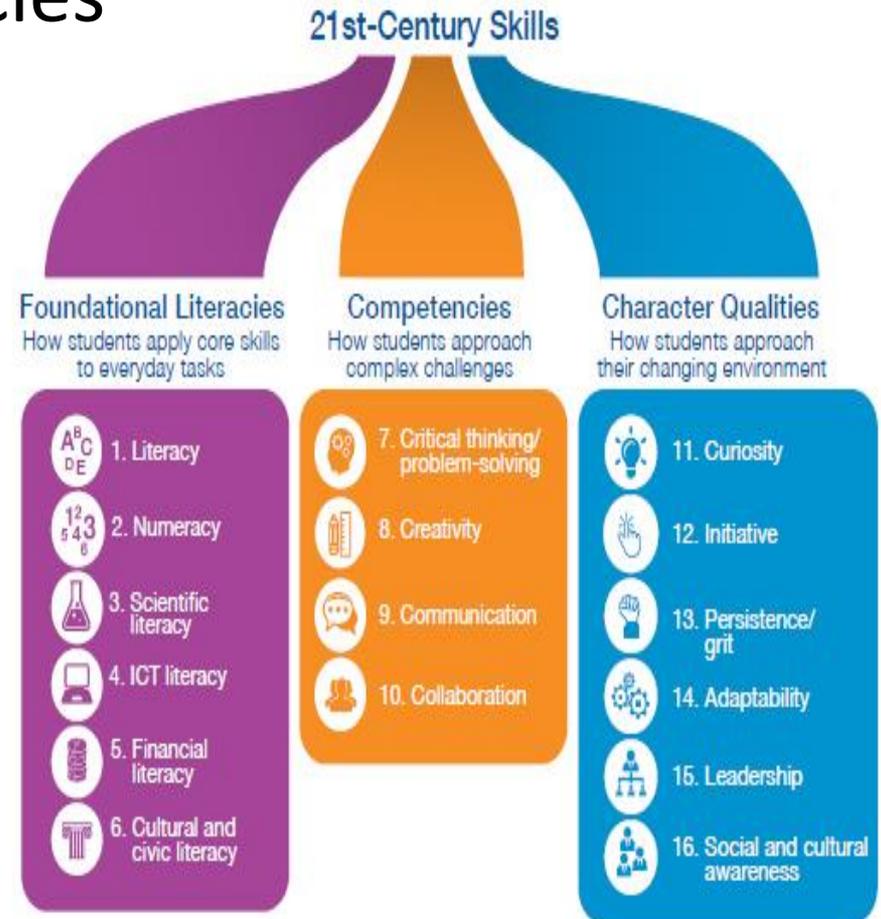
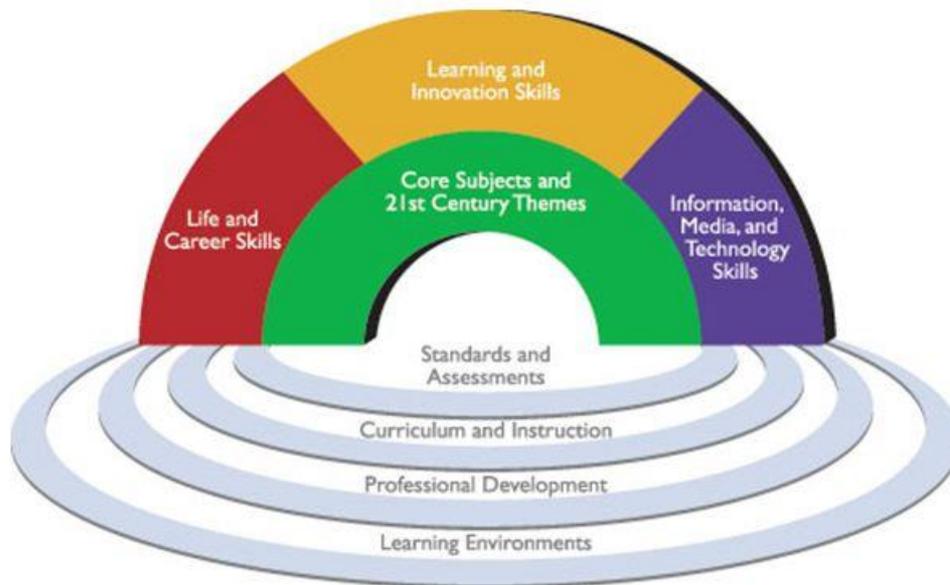
- Not updated curriculum
- Qualification of the teachers
- Training that do not adequately match the needs of the teacher
- Not enough coaching for teachers
- Not enough teaching materials & resources
- Language barrier/ interior
- No smooth transition between grades

# Current goal: Improve student learning

- Major transformation upcoming 4 years
- Development and update of curriculum that provides to the needs of diverse students
- Training of teachers on new teaching methods specifically for math and science

# Important

- 21<sup>st</sup> century competencies
- BE-STREAMING
- Basic Life-long Skills



# BESTREAMING Summer Camps (Summer 2016)



# ***BE- STREAMING (Feb 2016)***



# Thank You

## CONTACTS

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## STEM Lesson plan



**Onderwerp:** ready voor de kabelbaan!!! (Berg en Dal)

**Introduction :** <https://www.youtube.com/watch?v=kKbvEYG80u4>

**Fermi problem:** hoeveel pagaaien, van 1 meter, kun je plaatsen in de kabelbaan?



<b>Doelen</b>	<ul style="list-style-type: none"><li>- De leerlingen kunnen de lengte van de kabelbaan berekenen</li><li>- De leerlingen kunnen de afstand tussen de rivier en de kabelbaan berekenen</li><li>- De leerlingen kunnen de duur van de kabelbaan rit berekenen</li><li>- De leerlingen kunnen de snelheid van de rit berekenen</li></ul>
<b>Integratie</b>	<p><b>Aardrijkskunde:</b></p> <ul style="list-style-type: none"><li>- In welk district ligt het vakantieoord Berg en Dal?</li><li>- Welke bevolkingsgroepen wonen voornamelijk in dat district?</li><li>- Welke bekende plaatsen ken je nog meer in dat district? Brownsberg, .....</li><li>- Aan welke districten grenst het district Brokopondo?</li></ul> <p>Taal: de leerlingen leren het woord kabelbaan Geshiedenis: ontstaan Berg en Dal....</p>

<p><b>Leerinhoud</b></p>	<ul style="list-style-type: none"> <li>- Introductie van de kabelbaan met video</li> <li>- De leerlingen krijgen de gelegenheid verschillende vragen over de kabelbaan in hun schrift op te schrijven (stimuleren kritisch nadenken)</li> <li>- De leerkracht doet in groepsverband de Fermi problem. Hierna doet de leerkracht de opdracht samen met de klas. Elke groep krijgt de gelegenheid zijn hun oplossing uit te leggen. Vervolgens behandelt de leerkracht de 'fermi problem'. De groepen krijgen de gelegenheid te reflecteren op hun oplossing. (multiple problem solutions)</li> <li>- De leerlingen bouwen de kabelbaan (learning by doing)</li> <li>- De leerlingen maken de berekeningen (lengte, afstand, tijd en snelheid) om hun rekenkundige vaardigheden te versterken (learning by doing).</li> <li>- De leerkracht besteedt aandacht aan de vakintegratie.</li> <li>- En de kabelbanen worden uitgeprobeerd.</li> </ul>
<p><b>Materialen</b></p> 	<ul style="list-style-type: none"> <li>- Touw</li> <li>- Zelfgemaakte poppetjes (klei?? Deze kunnen ook tijdens de KCE-les worden gemaakt). Of van huis meegenomen poppen van ongeveer 10 cm</li> <li>- Tape</li> <li>- Een cylinder (deze moet over de kabelbaan rollen)</li> </ul> 
<p><b>Wat doet de leerkracht?</b></p>	<p>Zij geeft aan wat het onderwerp is. Ze vraagt aan de leerlingen wie bekend is met de kabelbaan.</p> <p>Zij laat eventueel de video met haar mobiel zien.</p> <p>Vervolgens doet zij de Fermi problem.</p> <p>De leerlingen maken in groepen een kabelbaan.</p> <p>Hierna maken ze de verschillende berekeningen.</p> <p>De leerkracht stelt zoveel mogelijk stimulerende vragen.</p> <ul style="list-style-type: none"> <li>- Hoe heb je de hoogte berekend?</li> <li>- Waarom heb je dat zo gedaan?</li> <li>- Hoe heb je de snelheid berekend? En waarom op die manier?</li> </ul>

	<p>- Als,..... dan....</p> <p>Hierna laat zij de leerlingen de kabelbanen uitproberen.</p>
<b>Wat doen de leerlingen?</b>	<p>De leerlingen maken de Fermi probleem.</p> <p>Ze gaan zoveel mogelijk in op elkaars oplossingen.</p> <p>Ze maken de kabelbaan.</p> <p>Ze doen de bijbehorende berekeningen.</p> <p>En ze proberen hun kabelbanen uit.</p>
<b>Evaluatie</b>	<p>Na het uitproberen van de kabelbanen krijgen de leerlingen de gelegenheid deze te reviseren. Ze denken na over hoe zij hun kabelbanen beter kunnen maken en praten klassikaal hierover.</p>