



Centre for Mathematics,  
Science and Technology  
Education in Africa  
(CEMASTE)

# CEMASTE INFO

## Newsletter

ADVANCING HOLISTIC LEARNING



Pioneering innovative teaching approaches to promote emotional  
resilience, creativity and critical thinking in learning

### Editorial Team

Editor in Chief  
**Jacinta L. Akatsa, HSC.**

#### Editors

Ann Jane Mumbi  
Philip Maate  
Thuo Karanja  
Kizito Makoba  
Njeri Mburu  
Agnes Mwangi  
Richard Jakomanyo  
Winfred Magu  
Benson Mwangi  
Dan Orero  
Dennis Rasto

Feedback: Comments and contributions can be sent to the editor using the email: [ceo@cemastea.ac.ke](mailto:ceo@cemastea.ac.ke)

Contributions may be edited for clarity, space or for legal considerations.

It becomes evident that our journey at CEMASTEA has been marked by remarkable achievements and unwavering commitment to fostering a holistic approach to STEM education.

This edition of our newsletter delves into the trans-formative concept of holistic learning in STEM education. Holistic learning emphasizes the comprehensive development of our learners, educators, and stakeholders. By embracing a comprehensive approach, we aim to cultivate well-rounded individuals who excel in iScience, Technology, Engineering, and Mathematics and possess critical thinking, creativity, and emotional intelligence.

Training teachers from Rwanda is a testament to our belief that education knows no boundaries. By sharing best practices and innovative pedagogical techniques, we aim to create a ripple effect that will empower educators and students transcending geographical confines. Participation in the 2024 International Conference for Principals (ICP) showcased our dedication to global collaboration. Engaging with educational leaders worldwide, we gained invaluable insights that will enrich our teaching methodologies and leadership strategies, propelling our institution to new heights.

Our hosting of the Mathematics Olympiad Competitions underscored our commitment to nurturing young minds in mathematics. The event not only highlighted the intellectual prowess of our students but also

fostered a spirit of healthy competition and camaraderie among participants. In our quest to enhance STEM education and environmental sustainability, we have embarked on several initiatives that integrate environmental consciousness into our curriculum. School visits, empowering learners through hands-on experiences, have ignited our students' passion for environmental stewardship. These visits have been instrumental in bridging the gap between theoretical knowledge and practical application. Furthermore, we have empowered teachers with the knowledge and tools to address climate change, mitigation, and adaptation. By equipping educators with these critical skills, we ensure that our future generations are prepared to tackle the pressing environmental challenges of our time. Our focus on waste management is a significant stride towards creating a sustainable future.

As we move forward, let us embrace holistic learning, where academic rigor, environmental consciousness, and community engagement converge to create a well-rounded educational experience. Together, we can inspire a new generation of leaders, innovators, and change-makers who are equipped to positively impact the world.

Join us as we share best practices in STEM, and as we navigate these exciting topics among others. We invite you to engage, learn, and contribute. Enjoy your reading

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**CEMASTEA Chief Executive Officer Mrs. Jacinta L. Akatsa takes Education Cabinet Secretary Mr. Julius Ogamba (in a blue suit) and officials from the Ministry of Education on a tour of CEMASTEA**

## MESSAGE FROM THE CEO



In today's rapidly evolving world, education is often seen as a means to an end—a pathway to good grades, prestigious universities, and, ultimately, lucrative careers. However, education is more than just a launching pad to professional success. True education shapes us into well-rounded individuals capable of navigating the complexities of life with wisdom, empathy, and creativity.

The concept of holistic learning has just recently received the mainstream attention it deserves. Unlike traditional education approaches that mainly focus on cognitive abilities, holistic education emphasizes understanding the link between

knowledge and experiences rather than pure memorization of facts. It incessantly insists on the development of an all-rounded person, that is, the development of the body, mind, and soul. Its goal is to view learning as an all-encompassing process that ultimately leads to better comprehension and longer information retention. It encourages students to cultivate critical thinking, emotional intelligence, and innovation while promoting a sense of self-awareness and community involvement. This integrative approach is essential for equipping learners with the diverse skills needed to thrive in the modern age.

CEMASTEA plays a crucial role in advancing holistic learning in modern-day education. As a regional hub for teacher training, the Centre promotes pedagogical practices that integrate cognitive, emotional, and practical dimensions of learning. We encourage teachers to go beyond rote memorization by adopting inquiry-based learning, project-based activities, and collaborative approaches that engage students in meaningful exploration. Our experience has been that these methods not only deepen subject comprehension but also nurture critical thinking, curiosity, and teamwork. Here, we fully believe in fostering not only academic success but also social, emotional, and physical well-being. On top of that, CEMASTEAC advocates for STEM education with a holistic lens, recognizing that technical knowledge must be paired with creativity, ethics, and communication skills. It is in this regard that in early September, CEMASTEAC was honoured to host and train teachers from Liquidnet Family High School @ The Agahozo-Shalom Youth Village and Gashora Girls Academy of Science and Technology based in Rwanda on the holistic learning concepts of Social Emotional Learning (SEL), mental health and psychosocial support, and learning through play, and their respective integration into effective pedagogy.

In conclusion, holistic learning should be considered one of the guiding paths to achieving Comprehensive education. It is our responsibility as educators, policymakers, and stakeholders in the education sector to ensure that education remains dynamic, inclusive, and impactful, empowering learners to become competent professionals and responsible global citizens.

Enjoy.

Readers can reach us via email: [ceo@cemastea.ac.ke](mailto:ceo@cemastea.ac.ke)

Jacinta L. Akatsa, HSC,  
Chief Executive Officer



# ENHANCING TEACHERS' COMPETENCES IN IMPLEMENTING HOLISTIC LEARNING: TRAINING FOR RWANDAN TEACHERS

By JMakanda & WMagu

CEMASTEA successfully hosted a week-long training program in September 2024, aimed at enhancing the competencies of teachers from Rwanda's Agahozo-Shalom Youth Village (AGSYV) and Gashora Girls Academy of Science and Technology (GGAST). The training focused on integrating holistic learning practices to develop well-rounded, innovative, and emotionally resilient learners. The training was themed: *Enhancing Teachers' competences in implementing holistic learning*.

During the opening ceremony, Dr. Belio Kipsang, the Principal Secretary in the Ministry of Education's State Department for Basic Education, was represented by Mr. Yusuf Karuyu- Director of Teacher Management at the Ministry and Board Member CEMASTEА. He emphasized the importance of the initiative and commended the long-standing partnership between Kenya and Rwanda, noting that the course reflected a shared



*Front row Seated: Mr. Isaac Gathambiri, Mr. John Livingstone Makanda, Mr. Patrick Kogolla Ag. Director STEM- CEMASTEА, Mrs. Jacinta Akatsa, HSC, CEO Masterpiece Guest, Habiyambere Theophile GGAST-Deputy Principal, Ms. Stella Wayianzuvuko-Admin- Principal, LFHS@ASYV, Samiah Millycent, GGAST-Rwanda, teachers and CEMASTEА staff*



*Participants engaging in various hands-on activities during the week long training*

commitment to building an education system that nurtures knowledge, creativity, and innovation among learners. He reiterated that education plays a pivotal role in shaping the future of society and stressed that holistic learning was essential to preparing young people for the challenges of the 21<sup>st</sup> Century.

The training aligned with international frameworks. Dr. Kipsang explained how the program aimed to enhance teachers' pedagogical skills through learner-centred practices, incorporating components such as Social Emotional Learning (SEL), mental health, psychosocial support, and learning through play. He praised CEMASTEА for its commitment to advancing teacher education across Africa, assuring the participants that

they were in capable hands throughout the course.

Speaking during the closing ceremony, Ms. Stella Wayianzuvuko, Admin Principal at LFHS@ASYV, noted that the workshop sparked creativity among participants, which was evident in the sessions. She encouraged the teachers to introduce activities that integrate play into learning, particularly for demystifying STEM subjects. She also urged them to adopt an inclusive approach and Gender-Responsive Pedagogies. Lastly, she urged the participants to implement what they had learned and promote peer teaching, emphasizing their shared goal of student success.

The closing ceremony, led by CEMASTEА's Chief Executive Officer, Jacinta L. Akatsa, HSC, marked the successful conclusion of the program. Mrs. Akatsa commended the participants for their dedication and active engagement throughout the week. Reflecting on the central theme of holistic learning, she emphasized that it involves nurturing not just the intellect but also the body and spirit. She noted that the training reinforced the strength of cross-border partnerships in education and reaffirmed

CEMASTEA's commitment to supporting the professional development of teachers and enhancing the quality of education across the continent.

# THE 2024 INTERNATIONAL CONFERENCE FOR PRINCIPALS (ICP)

By AMumbi & DRasto

The objective of the 2024 International Conference for Principals (ICP) held in August 2024 was to provide a forum for educators to share ideas and experiences to improve the quality of education in line with SDG No. 4. The conference attracted participants from 23 Countries.

It was officially opened by Kenya's Chief Cabinet Secretary, Musalia Mudavadi who in his address, emphasized the need for African Governments to be proactive against conflicts in the region, as they are negating efforts by governments to ensure equitable access to basic education among African children. The conference keynote speakers included Educationists Indu Khetarpal and Richa Sharma Katyul, Prof. Charles Ong'ondo from the Kenya Institute of Curriculum Development (KICD), Dr. Ian Thompson of the Ed Institute, and Massamba Thioye of the United Nations Global Innovation Hub among others.



*Kenya's Chief Cabinet Secretary Mr. Musalia Mudavadi (seated, in red tie), Education Cabinet Secretary Mr. Julius Ogamba (seated, in gray shirt) and Basic Education Principal Secretary Dr. Belio Kipsang (in white shirt) pose for a photo with key speakers at the World ICP 2024 in Mombasa in August 2024.*



*CEMASTEA Chief Executive Officer, Jacinta Akatsa addressing High School Principals during the International Conference for Principals (ICP) 2024 World Convention in Mombasa.*

CEMASTEA, led by its Chief Executive Officer, Mrs Jacinta Akatsa, conducted a workshop for the delegates during the conference. The workshop was titled *"The Role of Teacher Professional Development and School Leadership in Enhancing Classroom Practices in STEM Education."* During the workshop, conference delegates shared how Teacher Professional Development (TPD) is done in their respective Countries, the challenges and success stories, and how school leadership supports teachers in implementing what they learn during TPD.

In her remarks, Mrs Akatsa urged STEM teachers to innovate and help learners thrive amid crises that beset African schools like overstretched laboratories and classrooms. She emphasized the importance of teaching materials that teachers and students can make at school using locally available materials for practical science and mathematics lesson sessions. She observed that

classroom practices that foster learning by inquiry and investigation will inspire learners to pursue Science, Technology, Engineering, Mathematics and Innovation (STEMi) related disciplines, which are key in helping countries achieve Sustainable Development Goals (SDGs). She further emphasised the need for a paradigm shift in the culture of an average STEMi classroom, from the state of despair to that of inquiry and deeper understanding where learning happens through engagement, exploration, explanation, elaboration, and evaluation.

CEMASTEA also showcased innovations in STEM to the delegates.

# EDUCATION CABINET SECRETARY TOURS CEMASTEА

By WMagu & Dennis Rasto



*Education Cabinet Secretary, Mr. Julius Ogamba (in a blue suit) and officials from the Ministry of Education are taken on a tour of the Ultramodern Information Communication and Technology Complex by the CEO CEMASTEА, Madam Jacinta Akatsa. The Complex is under construction at CEMASTEА in Karen.*

Education Cabinet Secretary Mr Julius Ogamba has rallied CEMASTEА to leverage emerging technologies in Information Mathematics and Communication Technology to inspire innovation and effective teaching and learning of Science, Technology, Engineering, Mathematics, and Innovation (STEMi). He observed that though many teachers today are tech-savvy, most are still learning to use digital devices to source for and develop teaching and learning materials.

Mr Ogamba stated that equipping teachers with skills in effectively using technology in curriculum delivery promises better content delivery methods and the expansion of the teaching and learning material resource base. He was speaking during a familiarization tour to CEMASTEА where he inspected the ongoing construction of

an Ultra-modern ICT complex.

The CS added that expanded innovation programs will revolutionize the teaching and learning of STEM, improve student education outcomes, spur innovation, and boost the country's quest for industrialization. He reiterated the State's commitment to ensuring that CEMASTEА develops into a premium resource Centre for learners and teachers in the STEM pathway.

Mrs. Jacinta Akatsa, CEO of CEMASTEА, and senior officials from the Ministry of Education accompanied the CS during the tour. Mrs Akatsa noted that through continuous training programs, CEMASTEА is committed to building teachers' capacity to mainstream ICT in STEMi teaching and empowering them to effectively source for and develop teaching aids and learning materials for the CBC curriculum.

## OUR RECIPE: Pasta with Bacon and Tomato sauce

### Ingredients

- ✓ 1 red onion
- ✓ 2 red peppers
- ✓ 120g bacon
- ✓ 1 can (450G) tomatoes
- ✓ 1 cup water
- ✓ Olive oil/ Garlic/ Oregano
- ✓ 50g pasta per person

### Method

- ❖ Cut the onion, red peppers and bacon into small pieces
- ❖ Heat some olive oil in a pan and fry the onion, red peppers and bacon
- ❖ Add oregano, garlic, tomatoes and water.
- ❖ Cook for 20 minutes
- ❖ Cook the pasta in a big pot of boiling water
- ❖ Serve the pasta with the sauce and enjoy





# CEMASTEА HOSPITALITY EXPERIENCE

By Dan Orero & Mary Namunyak

Located in the serene lush greenery of Karen - Nairobi, CEMASTEА stands as a beacon of excellence, offering an extensive array of services.

**Accommodation:** Our modern accommodation facilities provide a comfortable retreat. With well-equipped rooms, modern amenities and a dedicated staff, we ensure a restful stay for all our visitors.



**Conference Facilities:** CEMASTEА offers state-of-the-art conference facilities for meetings, workshops and seminars. Our conference rooms have the latest technology to support your event needs, ensuring a seamless and productive experience.

**Grounds for Hire:** The meticulously maintained gardens are perfect for weddings, corporate functions and social gatherings. The lush gardens make every event unique and memorable.

**Bakery and Catering Services:** Our in-house bakery offers a delightful array of freshly baked bread and pastries. Our catering service, which provides delicious and nutritious meals for any occasion, complements this.

**Laundry Services:** We offer professional laundry services. Our team ensures that your garments are cleaned and pressed to perfection, allowing you to focus on your activities without worry.

Whether you are planning a conference, seeking accommodation or looking for specialized services, CEMASTEА has you covered

CEMASTEА is dedicated to providing outstanding hospitality services. Our commitment to excellence and customer satisfaction is unwavering. We invite you to experience the best in hospitality with us



Psalm 32:8:

I will instruct you and teach you in the way you should go; I will counsel you with my loving eye on you.



Qur'an 39:9

“Say, ‘Are those who know equal to those who do not know?’ Only they will remember [who are] people of understanding.”

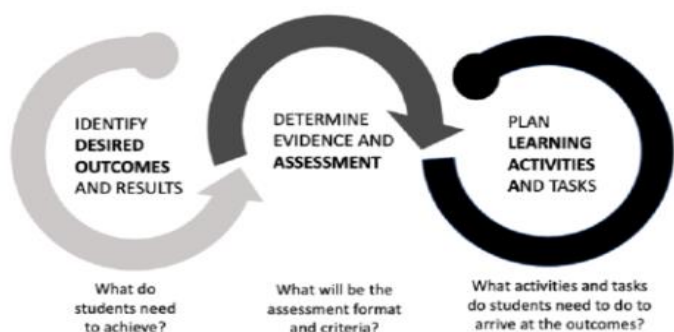


# LESSON PLANNING: THE BACKWARD DESIGN METHOD

By Makoba Kizito

## Introduction to Backward Design

The backward design method, popularized by Grant Wiggins and Jay McTighe in their book 'Understanding by Design', is a powerful framework for planning lessons. Unlike traditional lesson planning, where teachers start with the activities or textbook content, backward design begins with the end goal—what you want students to learn. The method enables teachers to deepen their understanding of what they will teach and how to teach through purposeful planning. This method involves three stages:



1. Identify desired results
2. Determine acceptable evidence
3. Plan learning experiences and instruction

Each stage is critical for ensuring that learning is purposeful and aligned with the intended

outcomes. Using the sub-topic "The Meaning of Osmosis" as an example, let's explore how to apply each stage of the BD during lesson planning.

## Stage 1: Identify Desired Results

This stage focuses on determining what you want your learners to understand, achieve, and be able to do by the end of the lesson. In this stage, teachers establish clear learning outcomes and long-lasting understandings that learners should retain long after the lesson is over.

### Example for the Sub Topic "Meaning of Osmosis":

The long-lasting understanding is that learners should understand that osmosis is a type of passive transport in which water molecules move across a semi-permeable membrane from an area of low solute concentration to an area of high solute concentration.

### Possible Key inquiry Questions (KIQ)

- What is osmosis, and how does it differ from other forms of molecular movement? PITCH IS IGH
- Why is osmosis important in biological systems, such as plant cells? What makes osmosis so special?

**Learning Outcomes:** By the end of the lesson, learners should be able to:

1. Define osmosis in scientific terms.
2. Demonstrate how osmosis takes place in biological contexts such as plant turgidity
3. Compare osmosis and diffusion as forms of cell physiology
4. Appreciate the role of osmosis in living cells

## Stage 2: Determine Acceptable Evidence

In this stage, teachers decide how they will assess whether learners have achieved the desired learning outcomes. The assessment must align with the learning outcomes defined in Stage 1. Both formative and summative assessments can be employed to gather evidence of learners understanding.

### *Example for the Sub Topic "Meaning of Osmosis":*

#### **Formative Assessments:**

- Ask learners to explain osmosis in their own words and use diagrams to describe the process in plant cells.
- Conduct a quick classroom activity where learners predict what happens when a plant cell is placed in a saltwater solution, followed by a class discussion.

#### **Summative Assessment:**

- A written test that includes defining osmosis, explaining how it works in plants, and comparing it to diffusion.
- Lab-based assessment: learners observe the effects of osmosis by placing a potato strip in different solutions (saltwater, distilled water) and measuring changes in size and mass.

## Stage 3: Plan Learning Experiences and Instruction

Once the desired outcomes and assessments are established, the next step is to design the instructional activities that will lead learners toward achieving the learning goals. In this stage, teachers outline the specific lessons, labs, and resources that will support learners in understanding osmosis.

### **Example for the Sub Topic "Meaning of Osmosis":**

#### *Introductory Activity:*

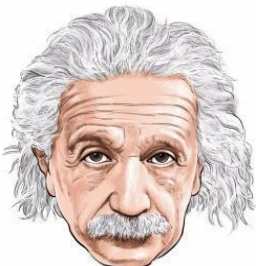
- Begin with a video or animation showing the movement of water molecules across a membrane. Encourage learners to think about what happens at the cellular level.

#### *Interactive Lab:*

- Set up a hands-on experiment where learners observe osmosis in action. For instance, learners can immerse potato cylinders in different solutions (sugar water, distilled water, and saltwater) and record their observations about how the potato's size and texture change.

#### *Guided Discussion:*

- Lead a class discussion for learners to connect the experiment results to the theoretical definition of osmosis. Use guiding questions like, "Why did the potato in saltwater shrink?" and "What does this tell us about osmosis in plant cells?"



*.....Albert Einstein Once Said...*

**"Plans are nothing; planning is everything."**

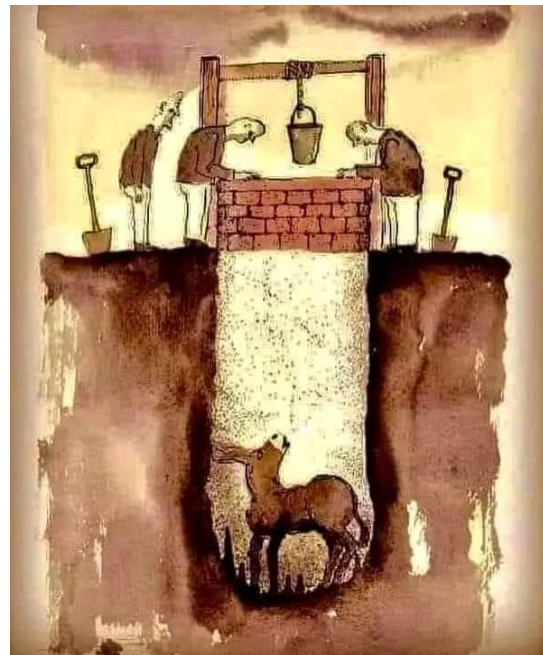
# FABLES

## "THE 5 RULES TO BE HAPPY" - THE TEACHING OF THE DONKEY

One day, a farmer's donkey fell into a well. The animal cried loudly for hours while the farmer tried to find a way to get him out. Finally, the farmer decided that the donkey was old, the well was already dry, and it needed to be covered anyway; it really wasn't worth pulling the donkey out of the well. He invited all his neighbours to come to help him. They each grabbed a shovel and began to throw dirt into the well.

The donkey realized what was happening and cried. Then, to everyone's surprise, he quieted down after a few shovelfuls of dirt. The farmer finally looked down into the well and was amazed at what he saw. With each shovelful of dirt, the donkey was doing something incredible: It was shaking off the dirt and stepping on top of it. Very soon, everyone was surprised to see the donkey reach the mouth of the well, go over the edge, and trot out.

Life is going to throw dirt at you, all kinds of dirt. The trick to getting out of the hole is to shake it off and use it to step up. Each of our problems is a step up. We can get out of the deepest holes if we don't give up. Use the land they throw you to get ahead.



## MENTORSHIP FUTURE LEADERS AT CEMASTE A

*By Philip Maate/Dennis Rasto*

Mentorship has long been a cornerstone in nurturing talent, professional growth and personal development. At CEMASTE A, mentorship plays a key role in shaping the future of interns posted to the Centre by the Public Service Commission (PSC). A mentorship programme has been crafted and a team of experienced professionals and mentors, Ms. Rose Njuki, Mr. Philip Maate, and Mr. John Makanda guide and support them in their professional journey. These mentors dedicate their time to not only teaching professional skills but also fostering personal growth, ensuring that the mentees grow into well-rounded individuals capable of contributing meaningfully to society. Mentorship at the Centre is designed to ensure that interns develop professional skills, that they *grow personally*: Beyond professional skills, mentors instill values such as integrity, accountability and resilience helping interns navigate life's challenges. The structured mentorship programme fosters an environment where interns grow holistically. They leave CEMASTE A not only as better professionals but as better individuals, prepared to contribute beyond Kenya's civil service with purpose and dedication.

*"A true mentor does not just guide a career; they shape a character."  
Mr. Philip Maate, CEMASTE A*



# WASTE MANAGEMENT

By DRasto & R Aura

When the Nairobi Water and Sewerage Company announced a water rationing plan earlier this year, Ndakaini Dam, which supplies most parts of Nairobi, had dropped to 48 cent of its capacity. This enabled them to sustain the city residents for a few more months. This announcement, however, did not worry the over 130 residents and workers at CEMASTEА headquarters in Karen in Nairobi. The Centre has invested in a state-of-the-art water recycling facility, ensuring that most wastewater is recycled, approximately 60,000 litres of water flushed out of toilets, drained from bathrooms or poured down kitchen sinks is recycled at the facility daily.



*Mr. Robert Aura, head of Estates at CEMASTEА examines the waste water recycling plant*

Compared to other water technologies like desalination and atmospheric water generators, this wastewater treatment is economically viable as it uses sequential batch reactor (SBR) wastewater treatment technology. The wastewater is first channeled into the pre-treatment chamber (Sludge chamber). The coarse material sinks to the bottom, and the pre-treated effluent flows into the next chamber with the help of a natural gradient. The second is the feed pump chamber, which serves as storage until effluent is pumped into the bioreactor chambers by the feed pumps. The bioreactors are packed with live anaerobic bacteria media and aeration pumps that ensure oxygen supply. The effluent is given maximum retention time, allowing the bacteria to digest organic contents in the raw water, rendering it germ-free. “Through the SBR technology, the waste is treated in three to eight hours of cycle per day. One cycle consists of filling the reactor, aeration phase, sedimentation phase, and then removal of treated waste,” says Mr. Aura. The system is biological and mimics nature. Faster air is provided by aeration pumps that supply oxygen into the system tank. This means a process that would take nature a couple of days is accomplished in a day, producing clean water for secondary use. “Ninety percent of sewage comes out as clean water, and 10 percent remains as sludge in one compartment, which is removed after three years,” he explains.

Although treated with chlorine, the water recycled from waste is only fit for consumption once it is subjected to ultra-filtration. It can, however, be used for grass watering, cleaning cars, kitchen gardening, and flushing toilets (which consume a lot of water). It can also be safely released into storm drains to flow into rivers. The facility has enabled CEMASTEА to cut water bills, use exhausters to pump out septic tanks and save the environment from pollution. “To make our cities greener, we have to start recycling. The estate manager regrets that millions of litres of sewer water are a pricey resource that most Kenyans allow to go down the drain.

The Centre encourages state agencies, corporations, and individuals to recycle water to ease the ever-growing demand for freshwater.” Water reuse, Mr. Aura states, is becoming highly recommended worldwide for strategic, environmental, technological, and economic reasons. Mr Aura noted that the number of boreholes being drilled in the country is both unsustainable and alarming, adding that the recommended 150-meter span between two boreholes is not being adhered to a situation that is fast depleting aquifers. “Of all our natural resources, water has become the most precious. Due to climate change and other factors, our fallback plan to explore underground water is no longer promising; the aquifers are getting depleted thrice as fast as anticipated. He affirms that the soaring water demand and ever-disappearing freshwater sources are a wake-up call for extraordinary measures and that It’s high time we inject recycled water into our freshwater supply systems to balance the books.

## CHAMPIONING FOR KENYA AND PAN AFRICAN: MATHEMATICS OLYMPIAD COMPETITIONS

By Martin Mungai/Dan Orero



*From top: Chairman Board of Governors at CEMASTEА, Dr. Pius Mutisya, OGW, CEO CEMASTEА, Mrs. Jacinta Akatsa and Chairman Department of Mathematics at the University of Nairobi Prof. Stephen Luketero addressing the contestants*

Kenya Mathematics Olympiad (KMO) and the Pan African Mathematics Olympiad (PAMO) are competitions aimed to drive interest in mathematics and foster excellence among learners. The PAMO competition involves rigorous mathematical challenges undertaken by the students after training at CEMASTEА. The Olympiads are collaborative efforts between CEMASTEА, the University of Nairobi and the Centre for Education in Mathematics & Computing (CEMC) at the University Of Waterloo, Canada. The aim is to increase educational outcomes in mathematics and cultivate a positive attitude towards the subject.

In the KMO boot camp hosted at CEMASTEА in August 2024, 58 boys and 27 girls underwent intensive preparations and took examinations of KMO boot camp. Six Kenyan students participated in PAMO, which was held in Johannesburg, South Africa, with the Kenyan team competing online.

Dr. Pius Mutisya, the Chairman Board of Governors at CEMASTEА, welcomed the participants and encouraged them to participate actively in STEM fetes like the annual STEM boot camps at CEMASTEА. He observed that such educational expositions afford learners the much-needed inspiration and exposure in STEM education.

Mrs. Jacinta L. Akatsa, the CEO, CEMASTEА encouraged participants to champion the love for mathematics in their schools. She reiterated the need for regular practice of concepts to understand mathematics effectively. She encouraged girls to increase their participation in the competitions and be exceptional on the global stage.

Professor Stephen Luketero, the Chairman of the Department of Mathematics at the University of Nairobi pointed out that fun-based method of teaching and learning

mathematics is key in turning learning mathematics into fun.

The students identified resilience and creativity as essential tools for solving problems. They said the learning experience at the Olympiads provided them the exposure that is necessary to pursue their dream careers in STEM.



*Mathematics students participate in a mathematics contest at the Kenya Mathematics Olympiad (KMO). Mathematics trainers say consistent practice of concepts enhances understanding of the subject*

# EMPOWERING LEARNERS IN STEM EDUCATION AND ENVIRONMENTAL SUSTAINABILITY THROUGH SCHOOL VISITS

By WMagu/DRasto/DOrero

School visits coordinated by CEMASTEА, at the request of learning institutions, play a crucial role in enhancing STEM (Science, Technology, Engineering, and Mathematics) Education. These visits offer learners the opportunity to practice and demystify abstract concepts, making learning more interactive and effective. The Special Programmes, Student Learning Committee coordinates these enriching learning experiences at the Centre.

CEMASTEА hosts learners from Secondary, Junior and Primary Schools and are accompanied by their teachers. During the visits, the students are immersed in practical sessions in Biology, Chemistry, Physics, Information Communication Technology (ICT), Education for Sustainable Development (ESD). The highlight of the learning is at the Makerspace and Innovation Laboratory.

In Biology, learners' explore key concepts such as; preparation of temporary slides, specimens, observations and calculations of lens magnifications. Chemistry sessions focus on practical applications through preparation of oxygen, fuel cell and organic models experiments. Activities in Physics highlight miracle mirror on concave and convex lens and their application to daily life, static electricity 1 using the ebonite rod rubbed on cotton cloth, on running tap water or small pieces of paper.

The Makerspace segment introduced learners to the effective use of the Internet for STEM education, helping them integrate technology into learning. In the Innovation Laboratory, students were exposed to a variety of activities designed to sharpen 21<sup>st</sup> Century skills such as critical thinking, problem-solving, creativity, and innovation. These competencies are essential in today's teaching and learning landscape, preparing students to tackle real-world challenges with confident. Learners visited the tree nursery where they learned about environmental conservation. This project aligns with the global call for sustainable practices and highlights CEMASTEА's commitment to supporting environmental conservation efforts.

The aim of these school visits is to bridge the gap between classroom theory and real-life applications, linking academic concepts to practical experiences. Through these hands-on sessions, students gain a deeper understanding of STEM subjects while also learning the importance of sustainable development and innovation.

CEMASTEА remains dedicated to supporting schools in their quest for a holistic and future-oriented education, ensuring that learners are well-equipped with the knowledge and skills necessary to thrive in a rapidly changing world.





# PICTURE SPEAK



Prof. Sarifa Fagilde Vice-President SMASE-AFRICA's visit to the Giraffe Centre and Animal Orphanage in Nairobi on 24th October 2024 during her visit to Kenya



Dr. Sian Proctor, a member of the US Science Envoy 2024 at the CEMASTEAM Innovations lab accompanied by CEMASTEAM Board of Governors, Dr. Pius Mutisya and CEMASTEAM C.E.O Mrs. Jacinta Akatsa during her visit



CEMASTEAM CEO, Mrs. Jacinta Akatsa (in a gray skirt suit), Ag. Director STEM Innovation & Research Mrs. Gladys Masai, Coordinator Partnership & Linkages Dr. Mary Sichangi, Coordinator Secondary Education Mr. Livingstone Makanda and the Quality Management representative Ms. Nancy Nui pose for a photo with members of the Zizi Afrique Foundation.



CEMASTEAM CEO Mrs. Jacinta Akatsa hands a token of appreciation to Ag. Director STEM training at CEMASTEAM Mr. Patrick Kogolla for his outstanding presentation at the International Convention for Principals (ICP) 2024 in Mombasa.

On the Right: Mr. Jackson Areman a Biology intern teacher at CEMASTEAM displays a teaching aid for use in teaching the structure of the human skin. The teaching and learning material has been made from waste rubber and plastic



# EMPOWERING TEACHERS ON CLIMATE CHANGE, MITIGATION AND ADAPTATION

By Kizito Makoba/Denis Rasto/Dan Orero

Climate change, mitigation and adaptation is a complex, global and usually controversial topic that needs an informed populace to formulate mitigation strategies to tackle its devastating effects.

CEMASTEA has acknowledged sharing of information on climate change among teachers for integration into teaching, learning and school programmes. Towards this intervention, CEMASTEAs developed a course and trained teachers from STEM model schools on how to initiate and implement projects on climate change, mitigation and adaptation in their schools. The training emphasized the need for schools to commit



*Participants demonstrate the concept of soil erosion and conservation using a teaching aid made from locally available resources during the training in Nakuru.*

towards fostering a strong STEM culture that integrates climate change issues in schools. The training adopted a Place-Based Learning (PBL) strategy to model how the projects on climate change can be implemented in schools.

The first batch of teachers drawn from the 47 counties had a week-long training from 26<sup>th</sup> 29<sup>th</sup> June, 2024, conducted in four Counties: Kisumu, Uasin Gishu, Nakuru and Machakos. During the training, teachers discussed the various environmental changes they observe in their environment that could be a result of climate change. The topics trained on included: **Flood management**, where

participants conducted audits to identify flood risks at school or community level and developed a flood risk assessment plan to mitigate against the likely occurrence of the floods. On **Energy management**, measures to save and make energy more efficient, as well as to promote renewable energy, promoting energy efficient and low-carbon power were discussed as key to mitigating climate change. In the topic **Waste management in schools**, a demonstration on how to recycle various school-based waste was done as a way of reducing the school's carbon footprint, fostering a culture of sustainability and promoting responsible waste management practices. For the topic **Biodiversity conservation in schools**, the need for learners to be equipped with the knowledge and skills in understanding the interconnection between biodiversity loss and climate change by engaging them in various biodiversity conservation activities was emphasized. At the end of the training teachers prepared school-based action plans to implement at least two of the projects on climate change, mitigation and adaptation in their respective schools. CEMASTEAs will monitor and support schools to implement the projects on climate.

The training in Kisumu, was graced by Madam Caroline Ogutu the Sub-County Quality and Standards Officer, Dr. Samson Arodi County Quality Assurance and Standards Officer, in Nakuru, Dr. Ngina Kairu, Board Member CEMASTEAs, Madam Margaret Mwirigi, CDE Machakos county and Mr. Cheruiyot, Director General TSC, in the Rift valley region.

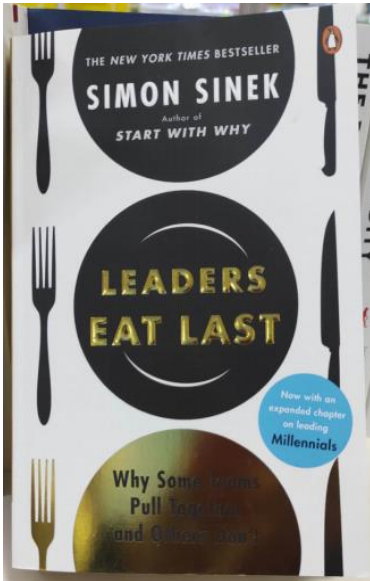


*Mr. Kizito Makoba, Coordinator STEM and Climate Change Program at CEMASTEAs, with the participants in a discussion during the training in Kisumu*



## BOOK REVIEW: LEADERS EAT LAST

By Esther Nyambura



If you're looking for a book that delves into the heart of effective leadership, buckle up because this one's a game-changer!

So, what's this book all about? Well, Simon Sinek, with his knack for storytelling and profound insights, takes us on a journey into the core of what makes a great leader. The title, "Leaders Eat Last," is a nod to the idea that true leaders prioritize the needs of their team over their own, much like how military leaders ensure their soldiers eat first.

Imagine my excitement as I turned the pages, discovering story after story of leaders who exemplify this principle. Sinek's style is engaging and relatable, making complex ideas feel like common sense. He uses real-world examples, from military units to corporate giants, to show how leaders who foster a culture of trust and safety can create environments where people thrive.

One of the standout moments in the book is when Sinek talks about the "Circle of Safety." This concept really hit home for me. It's about creating an environment where team members feel safe, supported, and valued. When people don't have to spend their energy protecting themselves from internal threats, they can focus on the job at hand, leading to remarkable results.

Sinek doesn't just stop at theories. He gives practical advice on how to implement these ideas in real-life situations. It's not all smooth sailing, of course. He acknowledges the challenges and obstacles leaders face, but he does so with a sense of optimism and encouragement. It's like he's saying, "Yes, it's tough, but you can do this!"

*"Great leaders don't blame the tools they are given. They work to sharpen them." - Simon Sinek*

What I love about "Leaders Eat Last" is that it's not just for people in high-level leadership positions. Whether you're a manager, a team leader, or even someone who wants to positively impact your community, there's something in this book for you. The lessons are universal, and the takeaways are profound.

So, why should you read this book? It reminds us that Leadership is not about being in charge. It is about taking care of those in your charge. It's about empathy, trust, and creating a sense of belonging. It's about making people feel valued and understood.

In conclusion, "Leaders Eat Last" by Simon Sinek is a must-read for anyone looking to understand the true essence of leadership. It's a powerful blend of inspiration and practicality, delivered with Sinek's trademark storytelling flair. So, grab a copy, settle in, and get ready to be inspired. Trust me, you won't regret it.





+254-2044406  
+254-70-6722697  
+254-78-0797648



[director@cemastea.ac.ke](mailto:director@cemastea.ac.ke)



[www.cemastea.ac.ke](http://www.cemastea.ac.ke)



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Christmas*

&

**Happy New Year 2025**

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The Board of Governors,  
Management and Staff of **CEMASTEA**  
wishes you love, light  
and laughter this Festive Season.  
— ★ —



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