

Issue 008 October – December, 2021



# CEMASTEA INFO

## Newsletter

**Better Days  
Ahead**



# Editorial: Better Days Ahead

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We once again welcome our readers to the eighth issue of our CEMASTEA info Newsletter.

In the last issue, we

focused on the

journey of resilience

and building back better from the effects of COVID 19. While we are not out of the woods yet, lessons learnt and improved vaccination is helping stem the spread of the disease. We, therefore, see better days ahead. At CEMASTEA, we continue to implement all COVID19 related protocols. We have stepped up efforts to innovate around the pandemic and deploy more tools of resilience to offer business continuity. We are proud of the outcomes of our building back better initiatives started in quarter one. We highlight two of these initiatives.



Our training programmes shifted majorly to online platforms, and currently, the ICT department is spearheading efforts in

revamping the CEMASTEA portal. The Portal forms a one-stop interactive platform and repository of education resources in STEM. Teachers will download resources, create content, and share them with peers via the platform. It will be used as a learning management platform to implement Professional Development (PD) courses offered at CEMASTEA. Another exciting development is the revamped school visits programme, which allows learners and teachers to engage in innovative in and out of class STEM activities while promoting creative thinking and collaboration among learners.

Other than the above two novel issues, this Newsletter highlights other activities implemented in quarter two. These include CEMASTEA's flagship programmes on Professional Development (PD) in STEM education, ICT and Education for Sustainable Development (ESD) and other cross-cutting issues.

Enjoy your reading and give us feedback via the link below.

<https://forms.gle/thYvLLUb2PyySMDY6>

PATA CHANJO,  
KAA CHONJO



Thuo Karanja, Editor

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Let's all stay safe on our roads

**Speak Out**

**Call Out**

**Speak Up**

## Message from the Director

Esteemed Readers,

I'm immensely proud to welcome you all to the quarterly issue of CEMASTEA's Newsletter. It has been an intense and fulfilling Q2 with numerous activities successfully implemented.

In October, the Centre implemented an International webinar on *Principles of Slow Education for participants from several African countries*. The focus was on the innovative approach to learning aimed at load and stress reduction, quality over quantity, and the incorporation of entrepreneurial skills. Ten trainers participated in a continuing Collaborative Lesson Research (CLR.) seminar. The Project, being implemented with the support of JICA, aims at enabling teachers to prepare lessons that demonstrate '*Teaching through Problem Solving (ITPS)*'.

The Centre continues to host learners from various parts of the Country. The visits aim to demystify STEM subjects and spark creativity and critical thinking in learners. Visiting learners experience a rich mix of hands-on and innovative science, mathematics, and ICT activities. More than 500 students from primary and secondary schools have benefited from these visits this year. The visits are open to any school upon request.

CEMASTEA participated in various international activities. The activities included the; Conference on Mathematics, Science Technological Education in Africa (COMSTEDA 18) held in November. This virtual conference on the theme "*Teacher Professional Development in Africa: Knowledge, Skills, Values and Attitudes in STEM Learning Environments*" was hosted by the University of Rovuma in Mozambique; ADEA's Inter-Country Quality Node on Mathematics & Science Node (ICQN) webinar on discussions and validation of study findings on the status of STEM education in Africa and the 41<sup>st</sup> General Conference Session of the United Nations Educational, Scientific and Cultural Organization (UNESCO) held in Paris, France in November. In collaboration with the Ministry of Education, State Department for Post Training and Skills Development, the Centre hosted a three-day National Conference on matching curricula to labour market demands in tertiary education. Under the theme *Enhancing, Graduate Employability*, Participants held discussions focusing on skills mismatch that largely contribute to unemployment and underemployment of most youths.

In support of one of Kenya Government Big Four Agenda on food security, CEMASTEA has set up a vertical garden demonstration under Education for Sustainable Development (ESD). The Project aims to show visiting learners and teachers that it is possible to grow their food, guarantee quality, and make savings on food purchases. In the spirit of the provision for Universal Health Care and commemoration of World AIDS Day, 2021, the Centre, in collaboration with Nairobi Women's Hospital, successfully hosted a one-day medical camp focussing on HIV-AIDS, Non-Communicable Diseases (NCD) and healthy living.

Finally, I wish to take this opportunity to wish you a prosperous 2022. Let us remember to stay safe and embrace peace in the coming election year. Thank you.

**Jacinta L. Akatsa, HSC.**

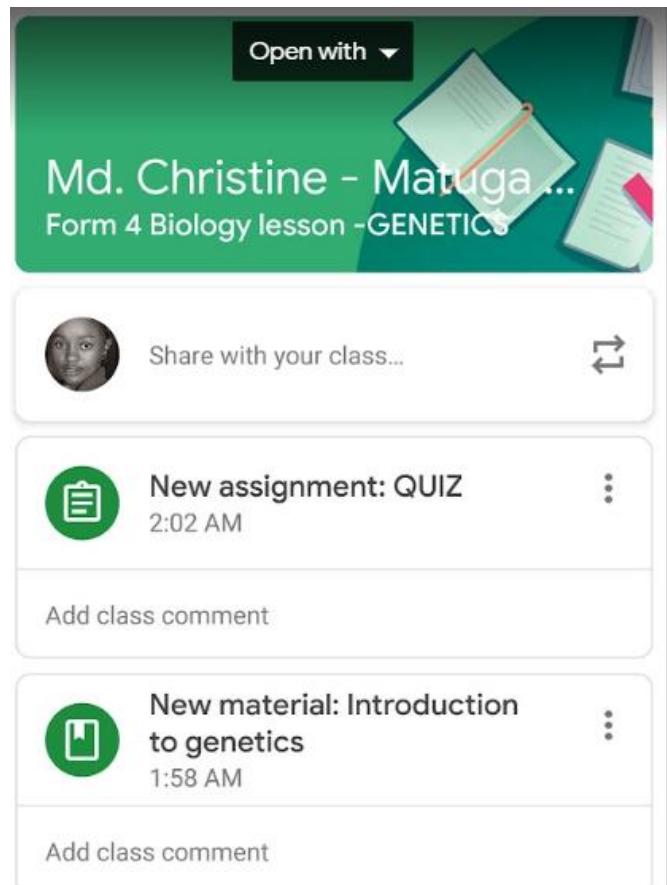


# SMASSE Training for Secondary Schools Mathematics & Science Teachers

The 2021 Strengthening of Mathematics and Science in Secondary Education (SMASSE) course for mathematics and science teachers took place from the 18<sup>th</sup> -29<sup>th</sup> October 2021 in all 47 counties. The training theme was enhancing *teachers' competencies in remote learning techniques for effective teaching and learning mathematics and science*. By the end of the training, participants were expected to demonstrate skills and competencies, plan and implement lessons online using Microsoft Teams, Google Classroom, virtual laboratories and animations. Further, they were to demonstrate an understanding of Competency-Based Curriculum (CBC) and appreciate the need for continuous Professional Development (PD).

The training was officially opened in all 47 counties by officers from the Ministry of Education and Teachers Service Commission. During the opening ceremony in Nandi County, Chief Guest, County Director Mr Zachary Mutwiri, thanked CEMASTEA for being far-sighted to the need of equipping teachers with current pedagogies and, in particular online ICT skills. He noted that virtual interactions are the new norm and called on participants to embrace and apply knowledge and skills learnt. He added that ICT in schools makes learning more interactive and fun, especially the simulation of real-life situations. Mr Mutwiri observed remote learning would help fill the gap experienced through teacher shortage forced closures of schools brought about by events such as Covid-19. These messages were reiterated in all other 47 countries by the Chief Guests.

The training registered success in most counties, with 8,688 STEM teachers participating. Most teachers demonstrated using Microsoft and Google Meet tools to set up, invite participants, conduct synchronous online meetings, and make online presentations. Other vital skills presented included creating and submitting online activities. It is important to note that the teachers will need more practice navigating the online tools for instructional purposes. Some of the challenges observed included low and poor connectivity and the inability to use ICT tools such as mobile phones. Subsequent training will focus on these skills. Officers from the Ministry of Education and Teachers Service Commission monitored and gave valuable input and support throughout the training.



Makanda John & Ann Mumbi, CEMASTEA

## CEMASTEA Revamps its Educational Portal

CEMASTEA has revamped its educational Portal to meet the needs of an ever-changing clientele. The Portal forms an interactive database populated with information and resources, exercises, multimedia resources and related links accessible to teachers, learners and stakeholders. On the Portal, teachers can search for materials and resources on a particular subject, topic or lesson developed by other teachers and content developers. These resources will give teachers and educators the opportunity for collaboration as they post and download educational content and resources and a virtual space where they can meet and discuss classroom and lesson implementation experiences and promote pedagogical dialogue.

Another key highlight of the Portal is its capability as a Learning Management System (LMS).

The LMS will assist in planning and implementing online courses where teachers register and go through INSET and PD modules offered by CEMASTEA.



We are proud of this milestone, as it will help increase the visibility of the Centre to reach more clients and become more efficient and effective in delivering on its mandate. The Portal is at the final testing stages of its functionality and will be live in April 2022.

## ICT Training for Mathematics Tutors

CEMASTEA successfully implemented a short course on Diploma Primary Teachers Training Colleges for (DTTCs) Mathematics tutors on ICT integration in teaching and learning. This was a culmination of discussions by stakeholders at the Ministry of Education. CEMASTEA was tasked with developing an intervention to address some of the emerging challenges identified during Competency-Based Teacher Education (CBTE) implementation. Among these challenges included the low uptake and use of ICT integration in teaching and learning mathematics). In response to this, CEMASTEA, with the support of TSC, held a consultative meeting with the DTTC Principals, Deans of Curriculum, Heads of Mathematics Departments, and Mathematics and Science Tutors in all the Diploma Teacher Training Colleges to establish specific challenges.

The ICT Department took the initiative of developing ICT training materials. The course was implemented from 14th to 23rd December 2021 through online Learning Management Systems, Microsoft Teams, and Google Classroom. The training, conducted after school hours, aimed at equipping the tutors with ICT skills that they could use in curriculum implementation. The training theme was: *'Enhancing teachers' competencies in remote learning techniques for effective teaching and learning of mathematics'*. Areas of learning included introducing virtual platforms in teaching and learning, focusing on Microsoft Teams and Google Classroom and Sourcing digital teaching and learning resources. The tutors were placed in small groups to increase interaction time. Officers from the Ministry of Education and Teachers Service Commission monitored the exercise.

Waibochi Paul, CEMASTEA

# International Webinar on ‘Slow Education’

The International webinar on Principles of ‘Slow Education’ in STEM Education was organized by CEMASTEA from 12<sup>th</sup> to 26<sup>th</sup> October 2021. The webinar was about knowledge management and sharing based on training conducted by A. Ofri International Centre, Israel. The training offered participants an opportunity to share and better understand while practising the knowledge acquired. The concept of ‘Slow Education’ enhances students’ ability to learn and develop values and ethics to live a joyous life.

Speaking during the opening ceremony, the Chief Guest, Director General, Ministry of Education represented by Ms Margaret Muandale, the Director Teacher Education, Ministry of Education, Kenya, applauded CEMASTEA for organising such a timely course. She indicated that the training was in line with Sustainable Development Goal 4, which aims to ‘ensure inclusive and equitable quality education that promotes lifelong learning opportunities for all. Director CEMASTEA, in her welcome remarks, affirmed to the participants that the webinar was to equip Ministry of Education officials in charge of STEM education with the skills to integrate principles of slow education in STEM. She further noted that the webinar would lead to institutionalising school-level policy to support pedagogical leadership of STEM education for school principals.

The webinar covered five sessions: Slow movement and slow

**Deepening**  
A student's progress in class especially in Mathematics is dependent on how critically he or she understands the concept taught. Through deepening, I ensure my students are focused during lessons and could explore on various techniques of solving a particular problem.  
Emmanuel Gyesi

**Minimalism and Deepening**  
I connect with minimalism and deepening. Less is more is very true statement and as an educator, I need to take time teach the concepts and do so deeply not to rush through just to cover the syllabus. This will enhance the learner understanding  
Nancy Nui

**Reflective principle:**  
Being an educator I need to be reflective on programs, activities, training materials and the way I facilitate my training to teachers. I need to analyse these aspects with a view to improving on each one of them. The results of my reflection will lead to better engagement with participants, develop or select suitable materials and facilitation methods. I will innovate better activities for achieving the learning outcomes. I will also train participants to be reflective on what they plan to achieve in a lesson and reflect further on the aspects of less delivered. The same practice

**Minimalism**  
in our group (1) . we chosen minimalism as a principle to connect with as an Educator. Educators teach learners with different characters and

**Deepening**  
DEEPENING  
This concept connects with my work as a headmistress as it enables me to reflect on issues

down narrative, *World of concepts and deepening in principles, from thoughts to deeds, from idea to action and Educational and pedagogical innovation in STEM education*. The webinar was implemented by CEMASTEA staff via Zoom, Google classroom and the Padlet. The participants were actively involved through the Google classroom assignment and presentations to demonstrate understanding of concepts using PowerPoint and in the Padlet links.

The closing ceremony was presided over by the CEO Teachers Service Commission (TSC), who was represented by Dr Reuben Nthamburi, Director Quality and Standards. He informed the participants that the Commission is always geared towards well-maintained teaching standards. He urged them to develop a positive mindset and implement the training outcomes in their respective countries to transform learning. In her remarks, Director of the Aharon Ofri International Training Centre, Isreal Ms Judith Rosenthal, reiterated that ‘Slow education’ is not defined by doing things slowly. It is in practice and an effort to associate quality, culture, sustainability and personalization with quality schooling. She encouraged participants to implement lessons learnt in their respective countries.

Director CEMASTEA congratulated the participants for completing the course and thanked the TSC for continuous support to CEMASTEA in implementing its PD programmes. She encouraged participants to use the ideas and cascade lessons learnt. She promised that CEMASTEA would be cascading the training to STEM teachers in Kenya.

Mary Sichangi & Dan Ororo, CEMASTEA

## Training on Collaborative Lesson Research

In 2020 CEMASTEA, with support from JICA, started a Collaborative Lesson Research (CLR) Project. Collaborative Lesson Research (CLR) is Teacher Professional Development (TPD) that borrows from the Japanese culture of lesson study. It aims to support teachers' professional learning through classroom collaborative action research. To successfully implement the Project, a team of CEMASTEA national trainers has received training and support from two lesson study experts in mathematics education; Dr Akihiko Takahashi and Professor Fuji in Tokyo. The training objectives included building capacity to demonstrate Teaching Through Problem Solving (TTP); Acquiring skills and knowledge to guide pilot school teachers to design teaching activities for TTP and, the Appreciation of TTP as a process of building learner's problem-solving skills.

Dr Takahashi took the trainers through a common practice by Japanese teachers called "Nerriage". In this practice, the teacher engages learners in a whole-class discussion, encouraging them to express their ideas and listen to other learners' ideas. The teachers facilitate learners' conversations to build ideas and correct their misconceptions. During the training, Director, CEMASTEA, stated that the training was timely as knowledge and skills in collaborative research lessons gained would be ploughed into CEMASTEA INSET programmes. She challenged the participating team to cascade the training to the rest of the staff. While the training predominantly focused on CLR in mathematics, a similar programme will be offered for science lessons.

Njeri Mburu & Winnie Magu, CEMASTEA



Mr Kuria of Mathematics Dept. CEMASTEA, exchanging ideas with Professor Akihiko Takahashi during a CLR session

## Science Week: Mt. Kinangop Girls' Secondary

Mt. Kinangop Girls' Secondary held their third Annual Science Week from 1<sup>st</sup> to 6<sup>th</sup> November 2021. The theme of the science week was '*Enhancing Mastery of Content through Practice*'. The week was marked with numerous activities designed to provide active learning experiences for the students. These included peer teaching, group discussions, making teaching & learning aid models, symposiums, quick-fire sessions and STEM-based edutainment. Learners were expected to develop skills in communication & collaboration, critical thinking, creativity, problem-solving, and self-efficacy.

During the closing ceremony, the Chief Guest Director CEMASTEA, Mrs Jacinta L. Akatsa, represented by Deputy Director Mrs Lydia Muriithi, affirmed that the knowledge and skills learnt will be helpful beyond school and will make them more adaptable and competitive in future. She was delighted by the demonstration of skills by the learners. She informed the learners that CEMASTEA functions to assist schools in becoming better in STEM education and promoting innovations that solve real-life problems.



Mrs. Lydia Muriithi (left), Deputy Director, CEMASTEA presenting a science kit to Mrs. Jane N. Njoga, Senior Principal Mt. Kinangop Girls' Secondary during the schools' Science Week closing ceremony.

Dan Ororo, CEMASTEA & Peter Ndiritu, Mt. Kinangop Girls

## UALIMU BORA

### Mentoring Teachers into Practitioner Authorship

The Ministry of Education mandates CEMASTEA to provide continuous professional development of teachers in STEM education. Among recent initiatives put in place by CEMASTEA includes mentoring teachers into practitioner authorship. Guided by transformative praxis, the mentoring initiative intends to attain two outputs.

Dr. Mungai Njoroge presenting a paper on behalf of CEMASTEA at the CLD Conference – University of Toronto

change via reflexive research and practice. Some of the stories were handy towards supporting the continuity of learning during the Covid19 pandemic. CEMASTEA, through the Research & Development Knowledge Management (R&D KM) Department, is in the process of actualizing documentation and sharing of these lived experiences and stories through the establishment of a practitioner journal. The R&D KM department shared this mentorship initiative at The Centre for Leadership & Diversity International Conference, held online from December 10<sup>th</sup> to 11<sup>th</sup>, 2021, by the University of Toronto. Conference participants lauded the initiative by CEMASTEA, which was deemed a timely intervention to mitigate the dearth of literature on quality education from sub-Saharan Africa.

Dr Mungai Njoroge, CEMASTEA

In her remarks, senior Principal Mrs Jane N. Njoga noted that we live in an ever-changing world with emerging challenges that require creativity and innovativeness in home-grown solutions. She emphasized the importance of learners aspiring to be scientists to be curious, attentive, and able to do research. In addition, she reiterated that learners should aspire to apply the knowledge learned to solve societal problems. She thanked the teachers for coming up with the noble idea and promised to make the event part of the school culture. CEMASTEA donated a science kit to the school.

## 41<sup>st</sup> Session of UNESCO General Conference

The 41<sup>st</sup> UNESCO's General Conference (GC) was held in Paris, France, from 9<sup>th</sup> to 24<sup>th</sup> November 2021 at the UNESCO Headquarters. UNESCO's General Conference (GC) is the apex decision-making organ of the organization. It comprises all Member States and is held every two years to determine UNESCO's policies and focus areas. In the 41<sup>st</sup> (GC) attending delegations highlighted the effects of Covid19 and their post-Covid-19 recovery strategies, challenges being experienced in the education sector and the way forward.

The Kenya National Commission for UNESCO, KNATCOM, spearheaded the preparations for the Kenyan delegation. Cabinet Secretary Ministry of Education Prof. George Magoha led the Kenyan delegation. Others included members of the National Assembly, the Senate, Principal Secretaries and Officers in government. Mrs Jacinta Akatsa, Director, accompanied by Mr George Kiruja, and Mr John Odhiambo led the team from CEMASTEA. The CS delivered the Kenyan Policy Statement on 15<sup>th</sup> November. H.E. Santiago Irazabal Mourao, Ambassador, Permanent Delegate of Brazil to UNESCO, was elected as President of the 41<sup>st</sup> session of the General Conference.

In his speech, CS Magoha congratulated Ms Audrey Azoulay upon her re-election as Director-General of UNESCO and noted that Kenya looked forward to working closely with her during her second term in office. He lauded the Secretariat for the solid support for the Member States during the Covid19 pandemic. The CS highlighted some areas of concern in education to the Kenya Government. These included; the need for continued collaboration among member states to mitigate the effects of Covid-19 pandemic on education; innovation and coordination to protect and promote education and accelerate progress towards the achievement of SDG4; Kenya's support to UNESCO's role in strengthening international scientific cooperation, open science and address the climate crisis and; gender equality. The presentation by UNESCO focused on what quality education should do to humanity where every child, youth and adults fully realize their transformational potential of education as a route for sustainable collective futures. It called for the '*new social contract for education to repair injustices while transforming the future*'.

The Global Education Meeting held on 10<sup>th</sup> November and Co-chaired by French President Emmanuel Macron, and UNESCO Director-General Audrey Azoulay led to the adoption of the Paris Declaration. Member countries declared their total support of the education agenda and committed to improving investments in education through public and public-private cooperation. The team from CEMASTEA used the opportunity to network with other delegations to acquire ideas to transform CEMASTEA programmes.



Cabinet Secretary MoE, Prof. George Magoha delivering the Kenya message during the Conference



Dr. Mulambe (centre), Director, Policy, Partnerships & Linkages-MoE, Director, CEMASTEA, Jacinta Akatsa (left) with other Kenyan Delegates

John Odhiambo & George Kiruja, CEMASTEA

# Conference on Mathematics, Science and Technology Education in Africa (COMSTEDA 18)

The Strengthening of Mathematics and Science Education in Africa (SMASE Africa) Association held its 18th Annual Conference on Mathematics, Science and Technology Education in Africa [COMSTEDA 18] from 23<sup>rd</sup> -25<sup>th</sup> November 2021. The virtual conference under the theme: *Teacher Professional Development in Africa: Knowledge, Skills, Values and Attitudes in Science, Technology, Engineering and Mathematics (STEM) Learning Environments* was hosted by the University of Rovuma, Nampula-Mozambique. The conference attracted 58 paper presenters from 11 countries; Botswana, South Africa, Nigeria, Mauritius, Kenya, Namibia, Niger, Mozambique, United Kingdom, Zambia and Uganda.

During the opening ceremony, Chief Guest, Honourable vice Minister of Education & Human Resource Development-Mozambique, Professor Manuel Bazo, lauded the conference and its intended contribution to STEM education in Africa. He noted that STEM educational disciplines play an integral role in the socio-economic development of African nations. He indicated that the conference was the proper forum to share good practices and innovative teaching approaches. He noted that outcomes could be used to explore new methodologies for learning science, developing and cultivating interest, raising performance, and the motivation to choose courses and professions in STEM. The keynote speaker for the conference was Prof. Cyril Julie, a PhD holder in Mathematics education and computer-based education at the University of Illinois, Urbana-Champaign. CEMASTEA presented three papers; two from the biology department and another by Dr Mercy Macharia of the Chemistry department.

The closing ceremony for the conference was presided over by Dr Benson Banda, President and SMASE – Africa. To ensure an effective learning STEM environment and prepare them to meet the continent's demands, President challenged the participants to balance policy, research, and practice. In her remarks, Executive Secretary SMASE-Africa Mrs Jacinta Akatsa, Director, CEMASTEA, reiterated that the conference provided an opportunity for constructive dialogue on STEM education in Africa. She encouraged more participation, especially on ICT Integration in STEM education. Professor Sarifa Fagilde, Vice President, SMASE-Africa, lauded the Organising committee, the hosting Committee in Mozambique and the SMASE Africa Secretariat for organising such a successful conference. She noted that such partnerships would contribute to Africa's aspirations to realize quality STEM education and act as a stepping stone towards more scientific and technological innovations. Uganda's Ministry of Education will host the 2022 COMSTEDA 19 conference.

Mary W. Sichangi, Winfred Magu & Gregory Njogu, CEMASTEA

*"It is not the strongest, nor the most intelligent of the species that survives. It is the one that is most adaptable to change".*  
Charles Darwin

# **Enhancing Graduate Employability: National Conference on Matching Curricula to Labour Market Demands**

The Ministry of Education, State Department for Post Training and Skills Development (SD-PTSD) hosted a three-day national conference on matching curricula to labour market demands in tertiary education. The conference held from 7th to 9th December 2021 at the Centre for Mathematics, Science and Technology Education in Africa built on the momentum of two

previous conferences that the Department organized in 2019 in collaboration with the Linking Industry

with Academia Programme Trust. The conference under the theme: *Enhancing Graduate Employability* provided a platform for government, industry, development partners and the private sector to come together, reflect upon skills mismatch and commit to strengthening the school-to-work transition.

During the conference's opening ceremony, Cabinet Secretary for Education Professor George Magoha, represented by Mr Alfred Cheruiyot, Principal Secretary (SD-PTSD), noted that the conference created a unique opportunity to demonstrate commitment to collaborate towards strengthening the school to work transition. The CS called for smooth routes upon which youth would exit from classrooms to places of work and stressed the elimination of barriers that impedes access to employment by graduates.

The conference attracted 150 face to face participants and more than 200 online participants. There were eight thematic areas with 29 presentations and a panel discussion. All presentations were very informative, linking with the theme of the conference. Keynote presenters at the conference included four Principal Secretaries; Mr Alfred Cheruiyot, PS State Department for Post Training and Skills Development; Amb. Simon Nabukwesi, PS, State Department of University Education and Research; Professor Prof. Fatuma Chege, PS State Dept. for Implementation of Curriculum Reforms and Mr Charles T. Sunkuli, PS State Dept. for Youth Affairs, Ministry of ICT Innovation and Youth Affairs. Each of the Principal Secretaries delivered a keynote speech. PS Alfred Cheruiyot noted that "data on unemployment rate stands at 10.4% while labour underutilization rate is at 17.2%, the labour market thus needs more skilled graduates". He mentioned that the Ministry of Education is developing policies to streamline skills development in training institutions.



Left to Right, Prof Fatuma Chege, Principal Secretary State Dept. for Implementation of Curriculum Reforms, Mr. Alfred Cheruiyot, Principal Secretary State Department for Post Training and Skills Development, Dr Wanjiru Kariuki, Conference Chair and, Jacinta Akatsa, Director CEMASTEA giving a presser about the conference

Professor Fatuma Chege, while acknowledging the existence of skills gaps, said the country is ripe for a shift in the education system. Her presentation detailed the government's efforts to transition to the Competency-Based Curriculum. In his presentation, Ambassador Nabukwesi noted that universities produce more graduates trained in arts subjects than Science, Engineering, Technology and Mathematics (STEM).

Chief Guest at the closing ceremony Principal Secretary Mr Alfred Cheruiyot noted that while progress had been made since the last conference, including policies and interventions, challenges towards matching curriculum to labour market demands still existed. These included limited resources, changing trends of skills and technology required by the industry that do not match the curricula, and industry reluctance in offering work-based learning opportunities. Director CEMASTA presented a paper on the title “Developing employability through Science, Technology and Innovation”

Some of the recommendations from the conference included; the development of a multi-sectoral framework to guide industry and tertiary institutions linkages and collaborative partnerships, the need to incentivize industry and encourage them to take in youth and graduates of tertiary institutions for work-based learning programmes; collaborative research with both industry and tertiary institutions; strengthening the office of career services in tertiary institutions and developing of a graduate tracking and labour management services. In collaboration with other stakeholders, the ministry of education will develop an action plan and a workshop to fast-track the recommendations from the conference.

Philip Rutto, MoE & Thuo Karanja, CEMASTEA



Drivers of Change: Source; Alice Vozza, Skills and Lifelong Learning Specialist ILO DWT CO Pretoria



Group photo of conference participants



## Impactful Professional Development: Robert's Story

Professional development refers to continuing education and career training after entering the workforce. Continuous professional development is significant for teachers and educational leaders as it helps them keep abreast with educational standards of curricula, technology and instructional strategies. PD allows the development of new skills, staying up-to-date on current trends and career advancement.

Teachers who attend PD are expected to plough the lessons learnt into their practice. This way, PD experience becomes impactful as they create school-based opportunities to transfer knowledge and skills learnt.

Mr Robert Muruga is a Physics & Mathematics teacher, STEM champion and Careers Guide at St Teresa Girls High School, Nairobi. The school is located in a slum area with needy and vulnerable students. After attending a course sponsored by Education Development Trust (EDT) and facilitated by CEMASTEA in 2019, Robert decided to implement his action plan back at St Teresa Girls. The course on Gender-Responsive STEM Education focused on strategies for increasing girls' participation in STEM subjects, mentoring and developing an inviting school culture for STEM. His actions included changing how he planned and implemented lessons, becoming a more engaged mentor to the girls, and improving collegial relationships among STEM teachers. Some of the strategies he adopted included; introduction STEM hours in Mathematics and Sciences; encouraging enrolment in mathematics and science; guiding and disseminating information on Kenya Universities and Colleges Central Placement Service (KUCCPS) courses; formation of STEM clubs such as the Coding and Artificial Intelligence Club that has generated interest in computer science; offering guidance and counselling to learners—especially those who hail from humble backgrounds and are vulnerable to exploitation.

Robert's determination is evident in the improving school performance, particularly in mathematics and physics and in the number of girls entering tertiary education, including universities, diploma colleges and other technical institutes. General student achievement has improved with the overall school mean score improving from a low of 3.865 in 2019 to 5.338 in 2020. Performance in physics improved from 3.865 in 2016 to 5.726 in 2019 and 5.338 in 2020. Performance in mathematics improved from a mean of 2.378 in 2016 to 5.023 in 2019. The mean, however, dropped to 3.567 in 2020 as learners were absent from school due to the COVID-19 pandemic. Performance in physics has continually improved from 2.821 in 2016 to 5.058 in 2020.

His activities in mentoring girls have resulted in an increase in the number of girls registering in Kenya Universities and Colleges Central Placement Service (KUCCPS) and succeeding in getting enrolled on tertiary education. The number increased gradually from a total placement of 18 in 2017 to 117 in 2020. There is also a significant increase in learners taking up STEM-related courses from a low of one in 2017 to 13 in 2020.

Robert's hard work has not gone unnoticed. He is now mentoring other STEM teachers in Nairobi County and is a facilitator in STEM and Gender Workshops. He was a facilitator at a seminar for STEM teachers of Our Lady of Mercy Girls Secondary School, Nairobi. Robert believes girls need assistance as they enter school at form one and that this assistance needs to be sustained all through as the needs of the girls keep changing. He is very grateful for the opportunity to attend professional development and urged other teachers to take up such opportunities when they arise. Currently, he is enrolled in the Teacher Professional Development course offered by the Teacher Service Commission.

Beatrice Macharia and Thuo Karanja, CEMASTEA

# Launch of Flagship Projects Progress Reports

The Kenya Vision 2030 Delivery Board launched the Flagship Programmes and Projects Progress Reports and Scorecard at the Kenyatta International Convention Centre, Nairobi, on November 26th, 2021. The Chief Guest at the function was the Cabinet Secretary, ICT, Innovation and Youth Hon. Joe Mucheru. Other dignitaries included the Economic Planning Secretary, Madam Katherine Muoki, the Kenya Vision 2030 Delivery Board Chairperson, Madam Jane Karuku and Director-General Vision 2030 Delivery Secretariat, Mr Ken Mwige. Also present during the launch, CEOs, Directors from Ministries, Departments and Agencies (MDAs), Private sector players and County Governments, all of whom implement The Kenya Vision 2030 Flagship Programmes. Mr Thuo Karanja attended the launch on behalf of Director CEMASTEA.

Kenya Visions 2030, launched in 2008 by former President Mwai Kibaki, is the long-term development blueprint motivated by a collective aspiration for a better society by the year 2030. It aims to create “a globally competitive and prosperous country with a high quality of life to all its citizens in a clean and secure environment by 2030”.

CEMASTE reports on the Social and Economic Pillars of The Kenya Vision 2030 on two Flagship Project areas; Science Innovation and Technology (STI) and on ICT integration in teaching and learning. CEMASTEA report detailed the successes of the STEM Model Schools Programmes.

CEMASTE provided these schools with high-end STEM equipment, and their teachers and school leaders trained on STEM multidisciplinary teaching approach. The Centre also reported on its programmes on ICT integration, where more than 5,000 teachers have participated. In the Fourth



Medium Term Plan (MTP IV), which is in the preparation stage, CEMASTEA will build these successes to on board more flagship programmes.

The Cabinet Secretary praised the collaborations among the MDAs in realizing Vision 2030. “We are serving the same citizens; when you look at where we want to go and the aspirations Vision 2030 holds, it is for all Kenyans and not individuals”. The CS singled out revolutionary technological advancements such as



Cabinet Secretary, ICT, Innovation and Youth Hon. Joe Mucheru and other dignitaries launching the Vison 2030 Reports

the 300 Government services on the E-Citizen, land reforms, MPESA technology, digital migration in media, and modern mapping as examples of how technology has made life easier for ordinary Kenyans. Madam Muoki informed the gathering that the State Department for Planning is currently preparing the fourth Medium Term Plan to guide the country’s development path for the next five years as the country moves towards the Vision 2030 period.

Watch the launch here:

<https://www.youtube.com/watch?v=vQMxxPmkqt8>

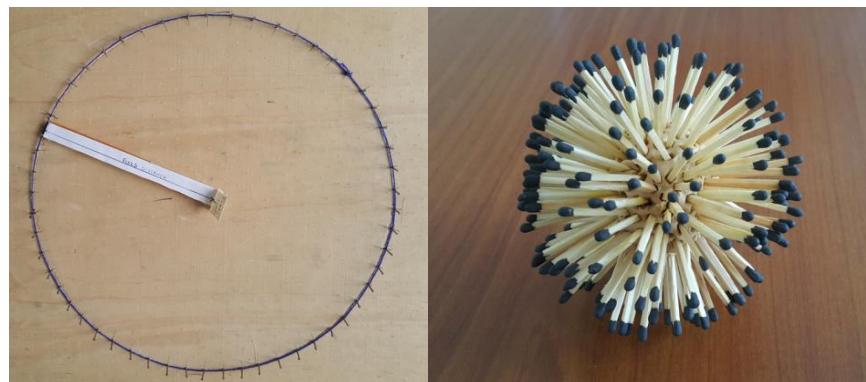
Thuo Karanja, CEMASTEA

# Mathematics Innovations for Teaching Loci

During teaching and learning mathematics, it's vital to let learners know the life application of the concepts they learn; this enhances their interest and motivation. One topic in mathematics that has numerous real-life experiences is the *loci*. As learners carry out their daily activities and interact with the environment, they come across the application of loci in many instances. This may include opening and closing a door, animal tethering, road marking, land subdivision, use of sprinklers, wall clocks. Locus is also used in engineering, sports and air traffic control.

However, understanding the concept of loci does not come easy to most learners. One reason is that teaching loci has mainly been done theoretically with few innovative activities to visualize the idea. KNEC reports

constantly reveal that most



Easy to make innovations for teaching Loci

students cannot, using a ruler and a pair of compasses, accurately construct and locate the locus of points. Further studies by CEMASTEA frequently indicate that *loci* are among the mathematics topics considered challenging to teach and learn.

The mathematics department at CEMASTEA has developed innovative hands-on activities that teachers could use to make loci learning easy. One such innovation is a *practical demonstration of the locus at a given distance from a fixed point in two dimensions*. In making the innovation, a round groove is made on a flat piece of wood and small nails hammered around at constant spacing (see picture above). A clock hand that can go round is the fixed point at the middle. The 'clock' hand represents the '*given distance*' while the hand fixed at the center represents the '*fixed point*'. When the 'hand' is moved around, the '*path traced*' by the tip of the hand is 'marked' by the nails. Learners can also be guided to demonstrate the *locus of a point at a given distance from a fixed point in three dimensions*. In this case, the centre of the sphere made using the match sticks represents the fixed point, while the tip of the match sticks represents possible locations of the moving point.

In summary, using such simple illustrations, a teacher can make it easy for learners to understand that: the locus of a point at a given distance from a fixed point in two-dimension geometry is a circle whose radius is the distance between the two points. The locus of a point at a given distance from a fixed point in three-dimension geometry is a sphere whose radius is the distance between the two points. The department will develop these innovations and vend them to schools at affordable costs.

Francis Kamau, CEMASTEA



## Encouraging Word

Surah Al-Luqman 31:12 "And we had certainly given Luqman wisdom [and said], "Be grateful to Allah." And whoever is grateful is grateful for [the benefit of] himself. And whoever denies [His favor] - then indeed, Allah is Free of need and Praiseworthy.

## School Visits: Sparking Innovations in Learners

Under the Students Learning and Special Programs (SP &SL), CEMASTEA hosts learners and teachers from schools around the country. While visiting, they experience a rich mix of innovative science and mathematics learning experiences: hands-on activities in the innovation laboratories, ICT, Maker Spaces, Education for Sustainable Development (ESD) activities, and motivational talks. The objective of the school visits is to inspire students to learn science and mathematics and share with their teachers' innovative ways of teaching and learning mathematics and science. These activities aim at demystifying STEM subjects and sparking creativity, critical thinking, fostering collaboration and problem-solving skills in learners. More than 500 students have benefited from these visits in this quarter. Schools that visited include Lamu, Ngaru and Munyeki Girls' Secondary schools

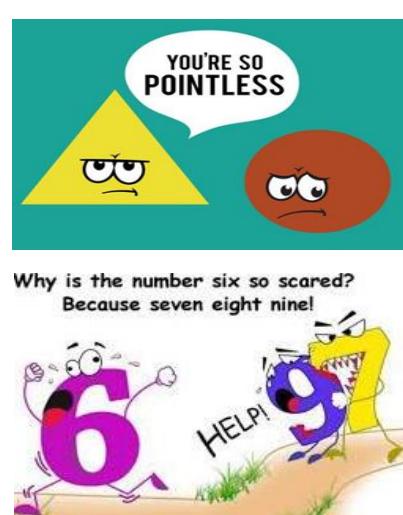
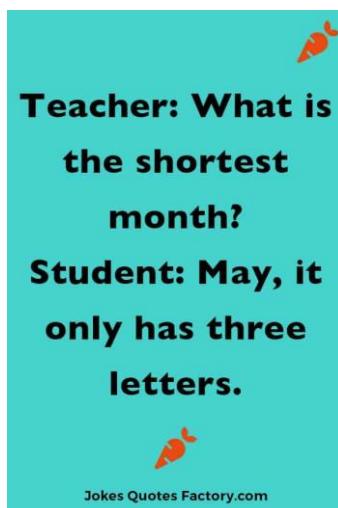
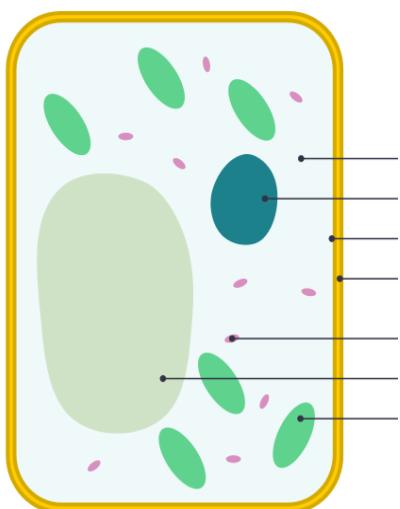


Students of Munyeki Secondary engaged in an out of class biology activity in the topic ecology

Speaking to students of Munyeki secondary school, Director CEMASTEA, Mrs Jacinta Akatsa, encouraged them to take an interest in STEM subjects. She encouraged the students to have a positive attitude towards science, be curious in class, and actively participate during lessons. She advised the teachers to implement well thought out lesson activities using teaching methods that make learning science and mathematics fun and easy. Innovations stem from simple ideas and the imagination to create new things.

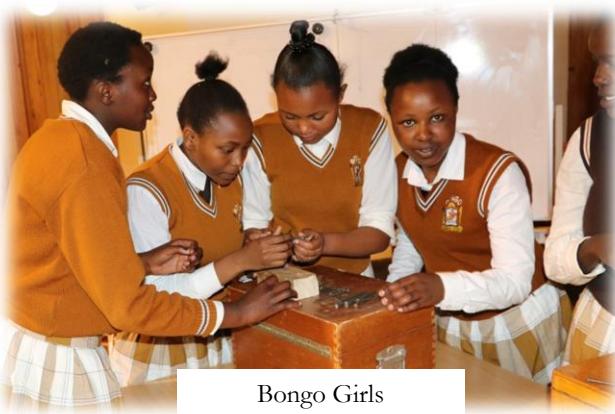
Dan Ororo, CEMASTEA

### Coffee Break



Jokes: Courtesies

## Picture Speak: School Visits



Bongo Girls



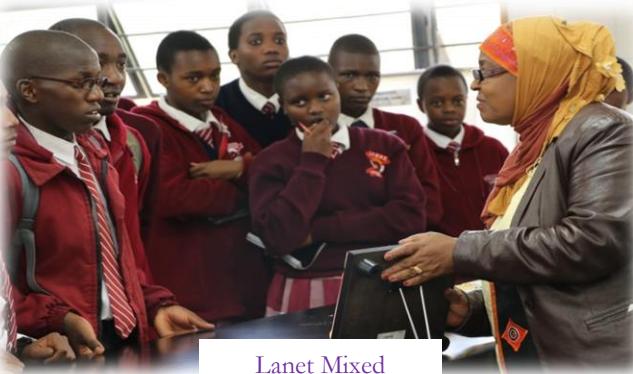
Gaikundo Secondary



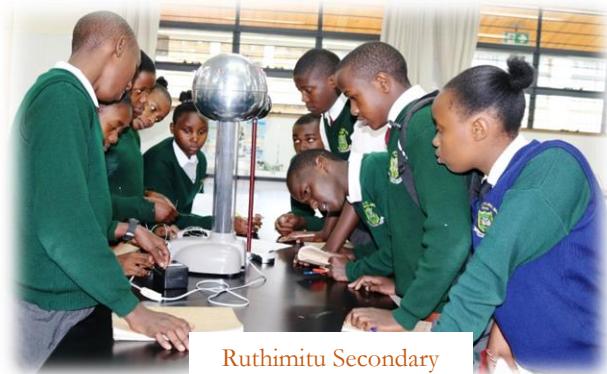
Komaranch Primary



Wanjohi High



Lanet Mixed



Ruthimitu Secondary



Thika High



Jamhuri Primary

## Celebrating Innovative Pedagogy in STEM

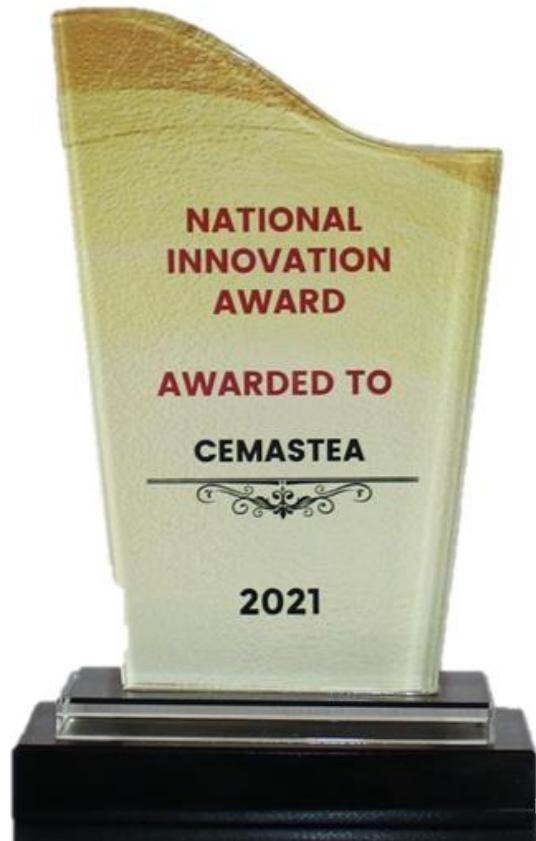
CEMASTEA was among the 14 government institutions and agencies awarded a National Innovation Award at the inaugural Kenya Innovation Week (KIW) 2021. This was in recognition of the role the CEMASTEA plays in building the capacities of STEM teachers in innovative pedagogy and having innovative STEM programmes. Kenya Innovation Week (KIW) is a flagship innovation forum run by the Kenya National Innovation Agency (KENIA). The forum took place at the Kenya School of Government (KSG) from 6<sup>th</sup> to 10<sup>th</sup> December 2021 sought to showcase the innovativeness of Kenyans, champion relevant policy engagements on innovations and strengthen the research and commercialization practices for more significant socio-economic impact. Government agencies, students from schools, colleges and universities, the private sector, development partners, media and civil society attended the event. Key activities and forum tracks included keynote speeches, exhibitions, panel discussions, networking, hackathons and start-up pitches.

The Chief Guest during the forum was Mr Joe Mucheru, Cabinet Secretary, Ministry of ICT, Youth and Innovation. Keynote speakers included Amb. Simon Nabukwesi, Principal Secretary, State Department for University Education and Kadri Humal Ayal, Honorary Consul - The Republic of Estonia in Kenya and Patricia Scotland Secretary-General, Commonwealth.

One innovation at the exhibition was Track and Save a Life (TASAL). It was developed by a Community-Based Organisation (CBO) named in Moyale Sub County, founded by Dahabo Adi Galgallo, an epidemiologist working with the Ministry of Health; Marsabit County. was awarded Kshs. 800,000 for their innovation that helps combat maternal deaths. The CBO works with expectant mothers by fitting them with an electronic GPS and culturally accepted embroidered bead bracelets to track and relay the wearer's position to health workers via a web or android-based application. This enables healthcare workers to pinpoint the wearer within cellular network coverage hence helping provide Antenatal Care (ANC).

Students from St. Thomas Girls, Kilifi, stole the show with a powerful closing ceremony pitch done in the presence of the Chief Guest for the closing ceremony Chief Guest Amb. Nabukwesi. Key sponsors for the event, included Villgro Africa and Konza Technopolis, who were looking for potential scalable and sustainable innovations with business models for commercialization. The best exhibition was awarded USD, 5000 and 1st and 2nd runners up getting USD 3000 and USD 2000 accordingly. Teachers aiming to participate in science and engineering fair projects should not miss this event in future.

Thuo Karanja, CEMASTEA



## Producing More Food with Less Resources

Food security is one of the most critical sectors of any country. Achieving it requires constant change in producing our food amidst a growing population, especially in urban areas. Rural-urban migration has led to a higher population in urban settings and the demand for more quality food. This paves the way for innovation in food production. The underlying principle is producing more food with fewer resources, including space, water and labour. One such innovation is multi-storey gardens that increase the vertical distance, allowing more plants to grow. CEMASTEA has set vertical gardens to demonstrate the possibility of growing food, guarantee the quality, and reduce living costs through savings on food purchases. The garden can accommodate at least 100 vegetable seedlings to sustain a family unit. Some of the benefits of vertical gardening include;

- Increased production from space maximization.
- Reduced water use
- Reduced labour because there is no weeding required and planting and harvesting are physically more accessible than conventional bending.
- Ability to lure young people into agriculture, especially in urban areas

Vertical gardening can take many forms and can use locally available materials, e.g. waste pipes, gunny bags, containers, among others. One only needs a mechanism to stack the planting media vertically. At CEMASTEA, we have constructed a multi-storey garden and vertical pipes gardens. This can be replicated in schools and communities for more people to adopt the innovative practice and contribute to food security at the household level.



(Left) A photo of the multi-storey garden and (right) vertical gardening with waste pipes

Patrick Wanjohi, CEMASTEA



### Encouraging Word

**Psalms 92:1-2:** It is good to praise the LORD and make music to your name, O Most High, proclaiming your love in the morning and your faithfulness at night.

# Training on Tree Nursery Establishment and Management

CEMASTEA, through its Education for Sustainable Development (ESD) Program, is participating in concerted efforts to increase the percentage of tree cover in the Country. These efforts respond to a Presidential Directive seeking to achieve 10% tree cover by 2022 affirmed on 14<sup>th</sup> March 2019. The Centre has a tree nursery and has participated in tree planting initiatives and donations of trees to institutions. According to Kenya Forest Service, the country needs to plant more than 1.8 billion tree seedlings by 2022 to achieve the 10 % forest cover target



Left: A practical session on media preparation and potting during the training and Right: Mr Dominic Karasi being awarded a certificate by KALRO Deputy Director-General, Crops Dr. Felister Makini.

To ensure continuous production of quality seedlings at CEMASTEA's tree nursery, members of the ESD committee attended training on tree nursery establishment and management at the Kenya Agricultural Research Organisation (KALRO) Practical Training Centre in Thika. The training covered setting up a tree nursery,

types of nursery media, seedbed preparation, plant propagation methods, transplanting and stock management, grafting methods, nursery pests, diseases and weed management.

The tree nursery at CEMASTEA can propagate 90,000 seedlings annually. Some of the seedlings available are fruit seedlings (*Avocado* and *Mango*), tree seedlings (*Gravelia*, *Cypress*, *Japonica*, Pine, *Thika palm* and *Acacia*), and flower seedlings. CEMASTEA will have a better capacity to graft quality fruit seedlings using traceable scions from registered farmers through the training. The ESD program is developing skills for micropropagation methods that use tissue culture techniques to propagate quality planting materials. Education for sustainable activities applies knowledge and skills in STEM subjects. We are encouraging schools that visit CEMASTEA to start such projects.

Patrick Wanjohi, CEMASTEA

## Quotable Quotes

*Forests like the oceans are the lungs that keep the planet alive; Investment in sustainable management in the conservation of our forests is one of the most effective interventions to combat climate change in Kenya*

President Uhuru Kenyatta, NAIROBI, 14 March 2019 UNEP, Gigiri One Planet Summit



**The commitments you make here will only have meaning if they are acted on – by putting education once again at the top of the political agenda.**

Quote by  
Audrey Azoulay  
Director-General  
UNESCO during the  
41ST Session of the  
General Conference of  
UNESCO

## Climate Action Summit

On Monday, 13<sup>th</sup> December, CEMASTEA hosted a climate change and environment summit. The event was marked with singing, dancing, recitation of poems and discussion on matters relating to climate change. Five secondary schools, Kenya Inter-University Environmentalists Students Association (KIUESA) members, and four guest speakers participated in the event. Climate Change Action aims to advance the climate change aspects, including resilient, inclusive development approaches with a focus on sustainable poverty eradication and shared prosperity strategies.

The Keynote speaker during the Summit was Ms Ann Angwenyi, Climate Change and Environmental Adviser at the British High Commissioner. She called on the students to be ambassadors of the change they wanted to see in their community. They could model this by personal activities such as planting trees and sensitising public members against cutting down trees by finding alternatives to fuel. She emphasised embracing renewable energy, investing in hydropower for home and industry. Ms Anita Soina, the founder of the Sonia Foundation that aims to empower the Maasai Community, informed that her organisation had put more effort into educating the young and older people on the need to preserve the environment through arts and entertainment. She encouraged the students that it was not too late to be the environmental warriors and to always advocate for a clean and healthy environment.

Mr Isaac Oindo, an environmentalist at the Young Women Christian Association of Kenya, was glad to have had the opportunity to meet enthusiastic young environmentalists who are eager to preserve the environment for the better. He also urged the students to pursue



Ms Cynthia of CYFUND Africa and Md Angwenyi of British High Commission Climate Change and Environmental Advisor, presents tree seedlings to environmental students who attended the Climate Action Summit at Sugiyama Hall, CEMASTEA

Environmental Sciences as this could lead to fruitful careers. Ms Modestalyn, Chairperson, Kenya Inter-University Environmentalists Students Association (KIUESA), advised the students to use environmental clubs in high schools as a gateway to improve the environment. CEMASTEA has been at the forefront of promoting sustainable and inclusive development through the Education Sustainable Development (ESD program). The students and guests attending the summit enjoyed a tour around the ESD projects at the Centre. These included the seedling nursery, organic garden, and sewage treatment site.

Environmental warriors were awarded gift packs of seedlings for planting in their schools. In closing the summit, Ms Cynthia Moses from the Cynthia Foundation Africa (CYFUND) urged the students to uphold and act on what they had learnt during the summit. She looked forward to them influencing other people on the importance of preserving the environment.

Willie Kirui, CEMASTEA

## Healthy Living: Camp on Non-Communicable Diseases

In collaboration with the Nairobi Women Hospital, the HIV/AIDS Committee at CEMASTEA organized a one-day medical camp on HIV-ADIS, Non-Communicable Diseases (NCDs) and mental wellness. The 3rd December event was attended by CEMASTEA staff, Karen Medical Training College (KMTTC) students, and neighbouring communities. Main activities included expert talks on non-communicable diseases such as diabetes, cancers, hypertension and mental wellness. Participants also had their vitals such as blood pressure, Body Mass Index (BMI) and blood glucose levels checked upon which those with concerns got a one on one consultation with a doctor.

While making her opening remarks, Director CEMASTEA urged everyone to live responsibly and adopt healthy body, mind, and soul habits as this reduces the risk of contracting some NCD's diseases and help one live a healthy lifestyle.

Ms Agnes Mwangi, Chair of, HIV Committee at CEMASTEA and event organizer, noted that NCDs are becoming a growing concern, especially with people living with HIV. Research has shown that



A staff at CEMASTEA staff having his vitals checked

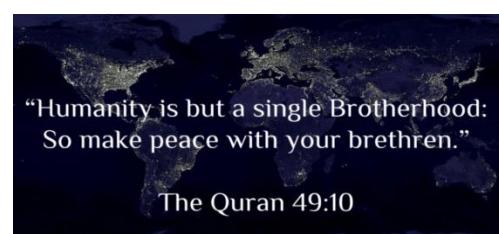
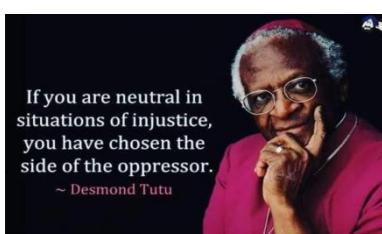
while one may present with NCDs before HIV infection, the NCDs are

made worse by HIV, prompting the need to incorporate management of other chronic conditions into HIV care. A doctor from Nairobi Women Hospital and a group of nurses gave a talk on HIV-AIDS, mental health, and healthy living. A healthy diet and constant exercise were cited as the top priorities for a person willing to live healthily and is particularly important for people who spend most of their time working in offices.

Agnes Mwangi & Dan Oreo, CEMASTEA

### Messages of Peace

The LORD bless you and keep you;  
the LORD make his face shine on you  
and be gracious to you;  
the LORD turn his face toward you  
and give you peace.  
**Numbers 6:24-26**



# COVID-19 Containment: Go Get a Booster Vaccination



In his New Year message to Kenyans, President Uhuru Kenyatta enumerated the government's steps to stem COVID19 infections.

While the country experienced multiple waves of COVID-19 in 2021, the President noted that sustained control measures and a heightened surveillance system has so far borne fruit and

managed to retain positivity rates of less than 5%.

However, the emergence of the more easily transmissible Omicron variant of the COVID -19 viruses has led to a surge in infections. The President, therefore, urged Kenyans not to let their guard down but to continue to follow the health protocols issued by the government.

In particular, Kenyans need to heed the government call to get vaccinated, which was a sure way to prevent severe infections. Leading by example, the President received his booster COVID-19 vaccination on December 31. With 13 million doses of the vaccines available country-wide, the President APPEALLED to all Kenyans who have not been vaccinated to turn out and receive this life-saving

protection and those already vaccinated to bolster their immunity against COVID-19 by getting a booster dose. The Ministry of Health achieved its target of vaccinating at least 10 million Kenyans by December 31 and targets vaccinating 30 million Kenyans by the end of December 2022.

H.E Hon. Uhuru Kenyatta delivering his State of the Nation Address, Year 2022 Message to Kenyans



A person receiving a Covid-19 vaccination jab

Excerpts from New Year's State Address By H.E Hon. Uhuru Kenyatta, C.G.H, President and Commander-In-Chief of the Kenya Defence Forces on Friday, December 31, 2021, State House Nairobi. Read the whole Address here <https://bit.ly/3mOA1wM>

Thuo Karanja, CEMASTEA

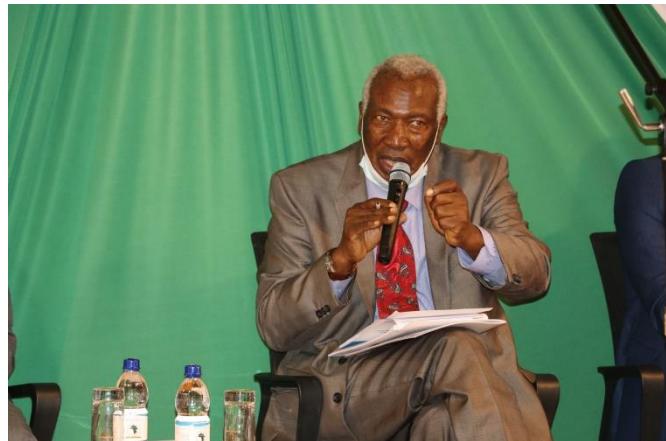
## Picture Speak: Q2 Events



Left: Members of staff together with the medical staff from Nairobi Women Hospital during the HIV-Aids Medical Camp.  
Right: Staff attending the Collaborative Lesson Research together with the trainers and Director, CEMASTEA



Left: Staff enjoying the monthly celebration of birthdays. Right: Students from Maryhill Girls having fun at CEMASTEA innovation laboratory during a school visit.



Left: Students from the Karen Medical Training College doing practical at CEMASTEA Biology labs. Right: Prof. Ratemo Michieka, mModerating a panel discussion during the National Conference on Matching Curricula to Labour Market Demands in Tertiary Education, 2021



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