

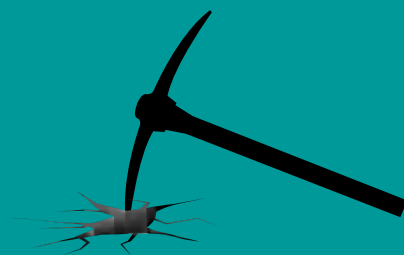
# 2024 ANNUAL REPORT



Practical  
Education  
Network



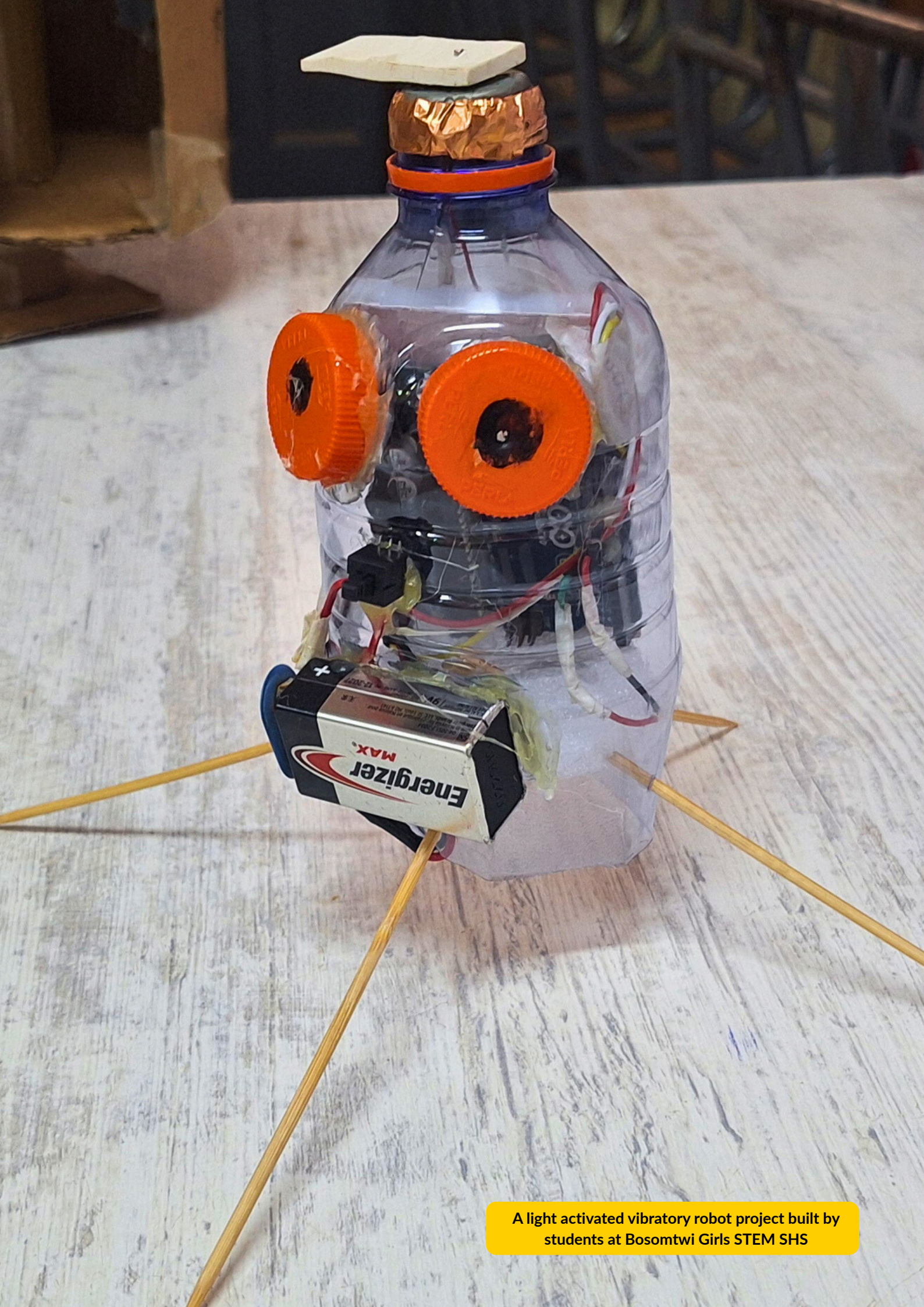
## Breaking New Grounds



**Advancing Hands-on STEM Through  
Diverse Approaches**







A light activated vibratory robot project built by students at Bosomtwi Girls STEM SHS



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SPECIAL ACKNOWLEDGEMENTS



## ABOUT PEN

Practical Education Network (PEN) is a non-profit organisation that works with educational stakeholders to improve learning outcomes by building teacher capacity. The teacher training program PEN provides is infused with MIT-style, learning-by-doing to enable hands-on Science and Mathematics lessons regardless of resource constraints.



### Our Vision

An Africa sustainably transformed by generations of problem-solvers.



### Our Mission

Enable every African child to learn by doing.



### Our Core Values

- Learning
- Integrity
- Generosity
- Humility
- Transparency

We achieve our vision by letting our LIGHT shine before others, so that they may see good works and be transformed

### Recognitions



2021 Finalist - Top 50 Innovations in Education in Africa



2020 Winner - Science, Technology and Innovation for SDGs



Global South Covid-19 Digital Innovation Challenge



2018 Winner - Teachers & Educators Challenge







# LETTER FROM THE CEO

Dear friends,

For the last few years, PEN has been focused on its core model – a holistic, 6-stage training and coaching program. This has been highly impactful and we’ve continually refined it and rolled it out to more teachers.

In 2024, we challenged ourselves to lean into testing out variations on this core model. The impetuses were to see what lower-cost approaches to dissemination could be viable (what is a “minimum” training that adequately equips teachers with hands-on pedagogies?), respond to changing dynamics in the ecosystem (the Ministry of Education Ghana is piloting a robotics & engineering curriculum in the high schools!), and make the most of our office space (can we “pop up” STEM for our own neighborhood?).

I commend the PEN team! Doing something new is never straightforward and doing it well is not trivial. We’ve now completed 5 iterations of our district-wide hands-on resource manual distribution exercise (reaching >1,000 teachers) and it’s encouraging to see how this method of spreading hands-on STEM is lower-cost but still effective. Developing approaches to teach robotics and engineering with local materials has also been exciting!

I’m eager for you to see some highlights of what we learned from our research on PEN’s online training (pg. 22). The findings challenge standing narratives of what is possible in the African context.

A number of other notable developments transpired within the year. These included seeing our first set of trainees complete the entire PEN Teacher Roadmap, culminating in the establishment of STEM clubs in their schools and showcasing of student innovations (pg. 14), launching our hands-on math manuals for primary schools (pg. 24), hosting our first set of supporters who specifically came to Ghana to visit PEN (pg. 24), and hearing the Ministries of Education Ghana and Liberia highlight hands-on learning with local materials at the Global STEM Symposium held at the World Bank (pg. 24).

As we grew our capabilities internally, we continued to see impact unfold at the grassroots as well as the national level. Enjoy this report!

Sincerely,

Dr. Heather Beem  
CEO & Founder, Practical Education Network

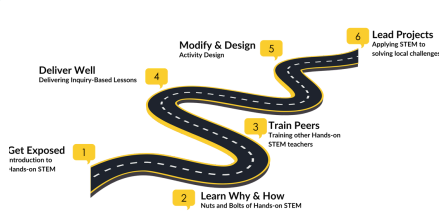








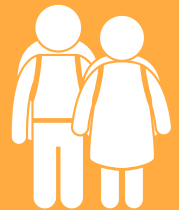
# TRAIL MARKS OF 2024



Successfully piloted all **6** stages of our flagship teacher training programme - PEN Teacher Roadmap - with one cohort.

**44,020**

learners received hands-on lessons from their teachers who received our free hands-on science resource manuals in their districts.



**25**

STEM SHS pioneer teachers received engineering and robotics coaching from PEN as part of the new SHS STEM curriculum pilot by the Ministry of Education, Ghana Education Service, T-TEL and other partners.



**1,315**

STEM SHS learners received hands-on engineering and robotics lessons from their teachers who were coached by PEN with support from T-TEL as part of the official trial of Ghana's new SHS STEM curriculum.



**852**

Hands-on Science Resource Manuals for Teachers (Basic 1-3 and 4-6) were distributed to most public school teachers in Shai Osudoku, Ga East, and Akuapem South districts in 2024.



# Lifetime Milestones



**2,048,440**

learners exposed to hands-on STEM education in Ghana, Liberia & Rwanda since 2017

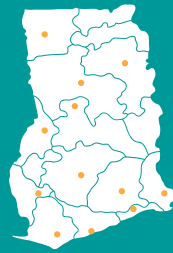


**8,821** teachers trained

to deliver hands-on STEM education to learners mainly in Ghana, Liberia, and Rwanda



**4,486** hands-on resource manuals (science and math) were distributed mostly free of charge to Ghanaian and Liberian teachers



**10** out of **16** regions of Ghana reached with PEN interventions i.e. training & manual donations since 2017



**3** African countries beyond Ghana reached with PEN trainings i.e. Liberia, Gambia, and Rwanda



**5** districts in Ghana benefitted from the district-wide distribution of free hands-on science manuals for teachers, along with a mini training exercise, made possible through various partnerships



**307** workshops organised in Ghana, Liberia, and Rwanda since 2014, providing teachers with the knowledge, skills, and techniques needed to run hands-on STEM lessons, using locally available materials

# PROJECTS IN 2024

## Training of Teachers in Twifo/Atti Morkwa District



In May 2024, the Practical Education Network (PEN), in partnership with the Ghana Education Service and with support from Clasen Quality Chocolate and their local partner, Touton Ghana, trained 15 teachers in the Twifo/Atti-Morkwa District of Ghana's Central Region. The training equipped participants with hands-on, practical approaches to teaching science using locally available materials, alongside movement-based learning techniques designed to boost student engagement, interest, and retention.



This initiative formed part of Clasen Quality Chocolate's Sustainability Lab—an innovation-focused programme aimed at delivering positive impact in cocoa-growing communities. Through this collaboration, five schools in rural parts of Twifo/Atti-Morkwa benefitted from PEN's hands-on science education model, bringing meaningful change to classrooms at the heart of Ghana's cocoa belt.

## Training of Exemplar Teachers and Running of STEM Clubs



PEN, in collaboration with Someone Else's Child Foundation—a US-based foundation and long-time supporter of PEN—re-engaged ten (10) teachers who had previously completed Stages 1 and 2 of the PEN Teacher Roadmap training programme. These educators resumed their journey through the remaining stages (3 to 6), making up PEN's first-ever cohort to successfully complete all six stages of the organisation's flagship hands-on teacher training initiative.



These teachers serve as powerful examples of the impact of hands-on learning. Through their guidance, students were able to design and build physical prototypes that addressed real-world challenges such as transportation, power storage and utility, water purification, and housing. Their achievements underscore the transformative potential of hands-on STEM education in Ghana's classrooms.



# PROJECTS IN 2024

## Coaching of Teachers to Deliver Ghana's New SHS STEM Curriculum



In 2024, PEN deepened its footprint in Ghana's education sector through a strategic partnership with T-TEL, under the Ministry of Education (MoE) and Ghana Education Service (GES)-led pilot of the new Senior High School STEM Curriculum. This collaboration marked a significant milestone in PEN's mission to advance STEM education in Ghana at the SHS level.



As part of the initiative, PEN introduced its distinctive hands-on STEM teaching model to seven STEM-focused senior high schools: Accra High, Abomoso, Bosomtwi Boys, Bosomtwi Girls, Koase, Awaso, and Kpasenkpe. A total of 25 teachers were trained and coached to deliver practical lessons in engineering and robotics using local materials. By equipping educators with inquiry-based, resourceful teaching strategies, PEN played a key role in catalysing a pedagogical shift—from traditional, content-heavy instruction to active, student-centered learning rooted in real-world problem solving.

## Manuals Donation to Primary School Teachers in Shai Osudoku District



With support from the Rotary Club of Colorado Springs and the Rotary Club of Accra West, PEN donated 300 hands-on science resource manuals to public primary school teachers in the Shai Osudoku District of the Greater Accra Region. This initiative ensured that every public primary school teacher in the district received a manual, equipping them to deliver practical science lessons aligned with the national curriculum.



As part of the distribution, the PEN team conducted a mini-training and orientation session for all teachers, highlighting the importance of using locally available materials to teach science in engaging and experiential ways. The goal was to spark greater curiosity and interest in science among young learners by making lessons more interactive and relevant to their everyday environments.



# PROJECTS IN 2024

## Manual Donations in Akuapem South and Ga East Districts



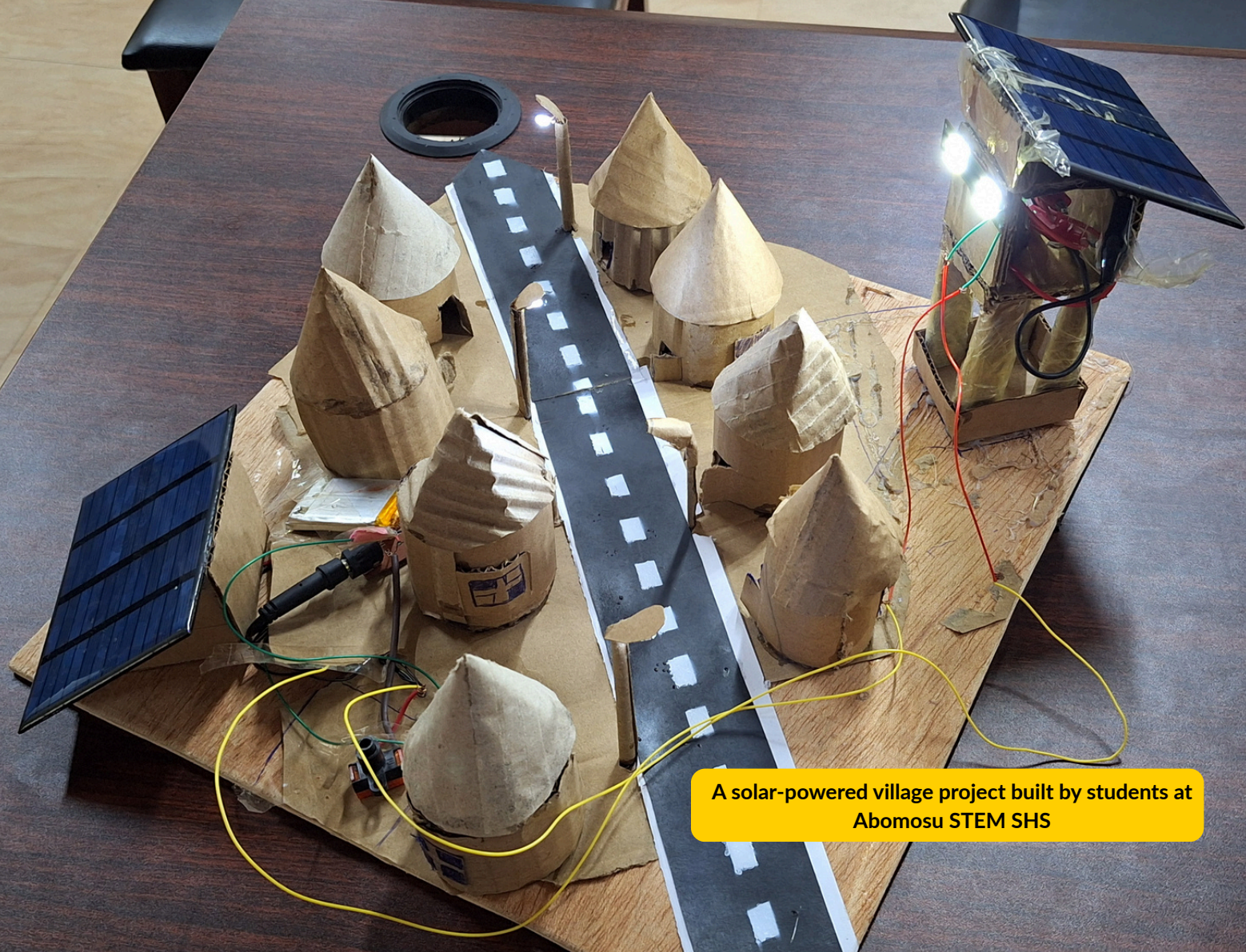
The Ga East and Akuapem South Municipalities received 272 and 280 copies respectively of PEN's hands-on science resource manuals for teachers, made possible through the generous support of Ashesi University. This donation was part of Ashesi's corporate social responsibility, extended to the two districts with which the university shares strong geographic ties.

To complement the distribution, teachers participated in a mini training and orientation session on how to effectively use the manual. They were encouraged to transform their science classrooms using the curated, curriculum-aligned activities—designed to make science more practical, engaging, and relevant by leveraging locally available materials.

**Scan to Watch  
testimonials from  
teachers trained in  
Twifo/Atti-Morkwa  
District in the  
Central Region of  
Ghana**







A solar-powered village project built by students at Abomosu STEM SHS



A solar-powered vehicle built by engineering teachers at Bosomtwe Boys STEM SHS as part of the coaching project by PEN with T-TEL's support





STEM Explorers Day

# Breaking New Grounds



## Advancing Hands-on STEM Through Diverse Approaches

### *Pioneering Contribution of PEN in Robotics and Engineering Education in Ghana's new STEM Senior High School Programme*

In 2019, Ghana embarked on a bold journey: the progressive rollout of a National Standards-Based Curriculum, designed to realign the country's education system with the demands of the 21st century. This ambitious reform reached a new zenith in 2024 with the introduction of dedicated STEM programmes in Senior High Schools. For the first time, students could enroll in specialised disciplines such as Aerospace and Aviation, Biomedical Science, Engineering, Robotics, and Manufacturing Engineering. These were not simply new subjects; they were a clarion call to reimagine the future of education in Ghana.

But launching these pioneering pathways required more than curriculum blueprints. It demanded a new kind of teacher, one who could navigate not only content but also creativity, hands-on experimentation, and technological fluency. Transforming Teaching, Education and Learning (T-TEL), the coordinating body supporting the government rollout of this new curriculum, recognised this need and engaged Practical Education Network (PEN) to help lay the foundation.

PEN was entrusted with a pivotal role to train the first cohort of teachers from seven (7) pioneering STEM schools selected for the national STEM curriculum trial. Our mission was to transform these educators into capable facilitators of translating technical content into immersive, hands-on, inquiry-based learning experiences that spark curiosity and critical thinking in learners.



SHS STEM Coaching



Supporting STEM Projects



Rooted in our deep commitment to hands-on, locally grounded STEM education, PEN partnered with the Ghana Education Service and T-TEL to support this historic rollout. Through tailored coaching, co-created learning materials, and intensive capacity-building workshops, we equipped teachers, particularly in Engineering and Robotics, with the skills, confidence, and pedagogical dexterity needed to bring the STEM curriculum vision to life.

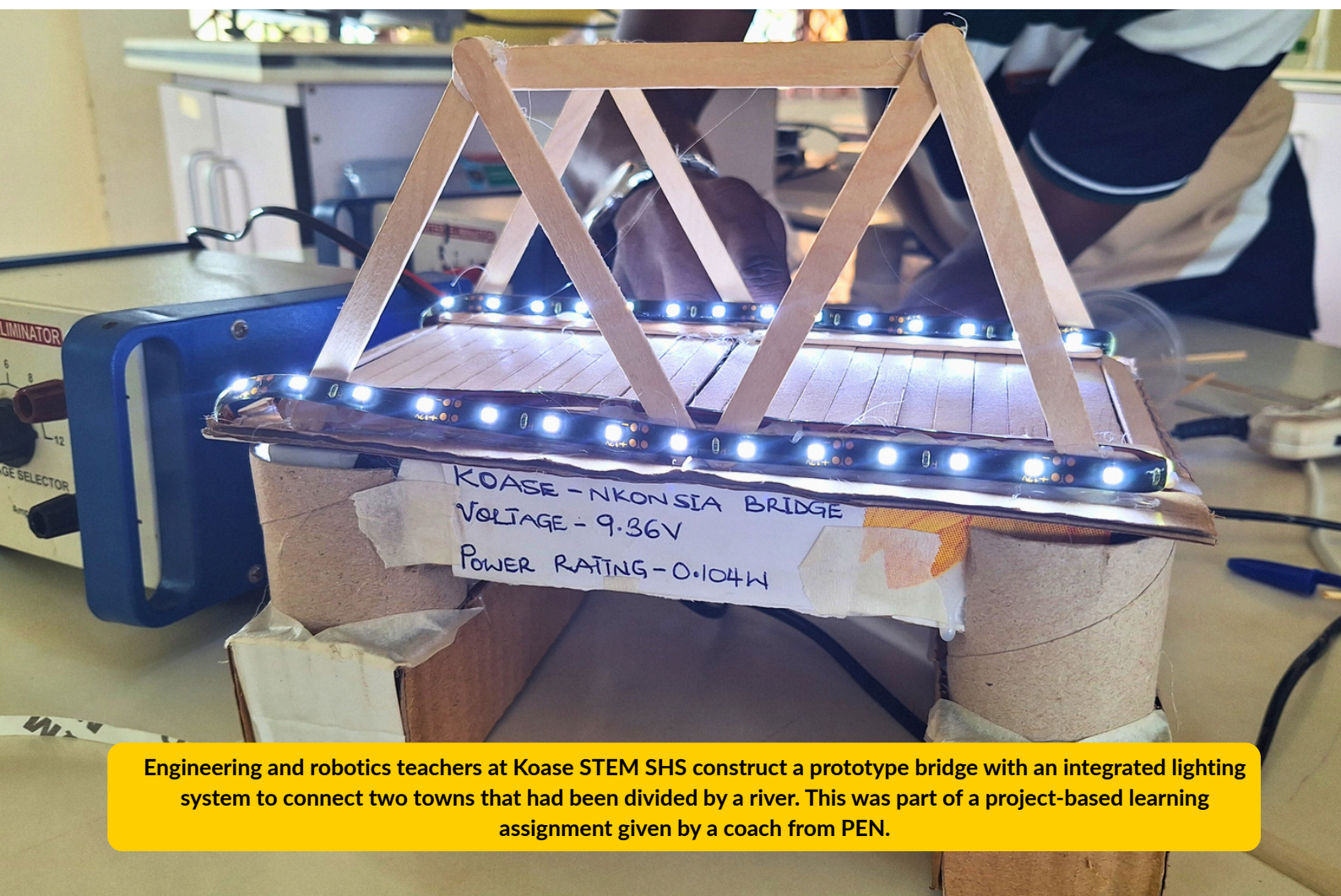
By the end of the third coaching cycle, all participating teachers demonstrated a shift toward student-centred pedagogies. 100% of the teachers reported increased confidence in adapting STEM content using local materials, and each one had incorporated three or more hands-on activities into their regular lessons.

These changes bore fruit not just in classrooms but in the hearts and minds of learners. An initial survey of a sampling of the learners revealed that about 40% of them could link their studies to real-world applications. By the end of the project, this

number had risen to nearly 85%. Interest in STEM soared, with 89% of the sample study reporting heightened enthusiasm for their subjects. Robotics and Engineering clubs blossomed after school hours, often led by students who had once sat quietly at the back of the room. For the first time, many girls took leading roles in practical sessions, forming all-female teams and showcasing their designs with boldness and brilliance.

Beyond the figures, what emerged was a renewed sense of purpose in the schools. Several students, especially those in the Engineering tracks, confessed at the beginning of the project that they saw little difference between their classes and those of their peers in the Arts. They had expected, and yearned, for something more tangible; machines, prototypes, innovation.

Francis Agyei, an engineering Teacher at Awaso STEM SHS reflects on the benefits of the coaching on his confidence as an engineering teacher: *"Personally, I would say*



Engineering and robotics teachers at Koase STEM SHS construct a prototype bridge with an integrated lighting system to connect two towns that had been divided by a river. This was part of a project-based learning assignment given by a coach from PEN.



that if not for PEN, I would have always found it difficult to go to class, especially to implement what is inside the Engineering curriculum for learners to capture everything to their understanding. When it comes to microcontroller programming, 3D modelling and other things that we did with PEN, I would say that the introduction to these topics has helped us.”

By the final coaching cycle, that narrative had changed. Their classrooms were no longer spaces of passive expectation but arenas of experimentation and pride. According to the Head of Department and teachers, many learners from other departments began requesting transfers to join the STEM programmes, inspired by what they had seen unfold.

*I watched a teacher’s face light up when he discovered he could teach Engineering Safety using cardboards, popsicle sticks and hot glue. That moment; simple, yet profound, reminded me that innovation doesn’t require expensive equipment. It requires a shift in perspective.*

Isaac Sogbadzi  
Coach  
(Curriculum and Training Officer)  
PEN



*The training was truly an eye-opener for me. While I was already familiar with PEN’s teaching methodologies in theory, witnessing their practical impact on teachers and students firsthand was transformative. Seeing learners fully engaged, grasping concepts with clarity, and teachers embracing hands-on techniques reaffirmed the power of this approach. The training showcased effective pedagogies for classroom use in Ghana, and demonstrated how project-based learning also immerses both educators and students in meaningful, lasting understanding. This experience has deepened my conviction in PEN’s mission.*

Daniel Ewusi-Essel  
Coach & SHS STEM Curriculum and Training Officer)



Teachers at Bosomtwe Girls' SHS designed, assembled, and programmed a solar-powered traffic light prototype to be installed in a community without electricity or existing traffic lights, addressing a critical need through innovative, sustainable technology



# Sample Quotes

from STEM SHS educators who benefited from the coaching project:



**Eric Ebo Sey**

Headmaster,  
Abomosu STEM SHS

This is by far the best and most impactful STEM training I have witnessed. I strongly hope this training continues beyond this semester so our teachers can further develop their skills. Had I known the coaching would be executed at this level of excellence, I would have ensured more of my teachers participated. What particularly delights me is how the robotics and engineering teaching at Abomosu STEM SHS has been transformed since the very first coaching visit. The changes we're seeing in both our teachers and students are remarkable



**Theophilus Esor**

Engineering & Robotics Teacher,  
Bosomtwe Boys STEM SHS

I think the training has upgraded my teaching in the classroom, particularly different materials I didn't know about, and the power of improvisation. It really enhanced my creativity as well as how I interact with learners in the classroom. I have come to realise that everything is possible in the classroom. There was so much that I didn't know and this training has brought it all to light.



**Deborah Lamptey**

Engineering & Robotics Teacher,  
Bosomtwe Girls STEM SHS

From the very first day, it sparked something in me - a practical way of teaching. Previously, in the classroom, teaching was more talking by the teacher, and with the new approaches, where we engage the students with their hands, it makes the experience lovely. Our girls in this school are also confident that they can also achieve success in the engineering field.



**Kaba Barnabas**

Teacher,  
Kpasenkpe STEM SHS

My learners worked on different types of bridges, dustbins and used local materials to make bags.

The last one they did was sent to Accra for STEMnovation competition. Because of frequent hands on activities students do not miss out my lessons.



**Moses Avorkpo**

Facilitator,  
STEAM Centre, Accra High School

The pedagogies taught have been powerful. It has equipped me to train the students better. More of this is needed!



## First ever cohort to complete all 6 stages of PEN Teacher Roadmap flagship training programme led learners to build projects.

In addition to coaching teachers from the seven (7) newly established STEM Senior High Schools under the support of T-TEL, PEN—through the continued partnership with Someone Else’s Child (US)—re-engaged ten (10) teachers from earlier training cohorts who had progressed through up to three (3) stages of the PEN Teacher Roadmap.

These teachers, drawn from La Dadekotopon, Weija-Gbawe, and Ga North Municipalities, had shown strong commitment and significant growth following their initial training. They were further equipped to deliver inquiry-based science lessons, adapt and design hands-on STEM activities, and facilitate project-based learning in the classroom.

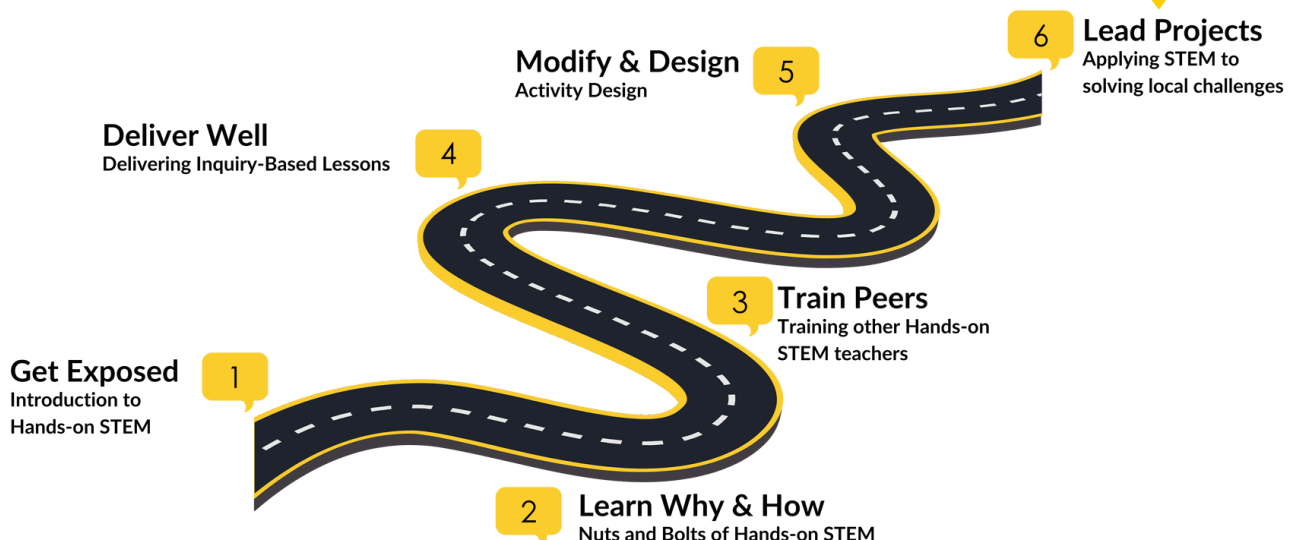
With PEN’s support, these educators established and led STEM clubs in their schools, creating vibrant learning environments where students explored real-life challenges and applied the

engineering design process to develop practical solutions to local problems. Through the STEM clubs, students designed and built functional prototypes addressing real-world challenges in areas such as transportation, housing, cooling systems, water treatment, power storage, and lighting.

To showcase these innovations, PEN organised a mini STEM fair, bringing together the exemplar teachers and their students. These learners confidently presented their prototypes and engaged in peer-led discussions with other young participants who had enrolled in a weekend STEM exploration event.

A photo gallery featuring these exemplar students presenting their projects at the PEN Resource Centre is available on Page 14.

## PEN Teacher Roadmap







# STEM FAIR

## EXHIBITIONS BY EXEMPLAR LEARNERS







### ***Inspiring the Next Generation: PEN Engages Young Minds Through Hands-On STEM Exploration***

In 2024, PEN broke new grounds by organising its first-ever STEM Explorer Day, a hands-on learning event targeted directly at young learners. Traditionally focused on equipping teachers with practical STEM methodologies, PEN made a strategic and impactful shift to engage learners themselves—an exciting step in advancing STEM education from the ground up. Held over a weekend, the event brought together enthusiastic children whose parents had signed them up for a unique science exploration experience.

PEN trainers, known for their dynamic facilitation skills, guided the children through a series of engaging and age-appropriate STEM activities. The highlight of the day included building a mini robot and constructing a model

house, allowing participants to experience basic principles of robotics, circuitry, and engineering design in a tangible, fun-filled environment. Using locally available materials, the children not only built functional models but also gained confidence and curiosity in STEM as a creative, problem-solving field.

This event marked a significant milestone in PEN's programming—extending its hands-on STEM philosophy beyond educators to the very learners whose futures it seeks to shape. STEM Explorer Day demonstrated the powerful impact of direct student engagement and laid the foundation for future youth-centered initiatives that reinforce PEN's commitment to inclusive, locally rooted STEM education.





# STEM EXPLORERS DAY





# Snapshots from STEM SHS Engineering & Robotics Activities



Engineering and robotics teachers at Abomosu STEM SHS with the headteacher (far right) utilising solar energy to power an embedded system project - traffic light



Engineering teacher at Bosomtwe Boys STEM SHS facilitating a lesson in Arduino to programme a blinking LED



Engineering students at Bosomtwe Girls building a remotely controlled vehicle using a mix of local materials and electronics components



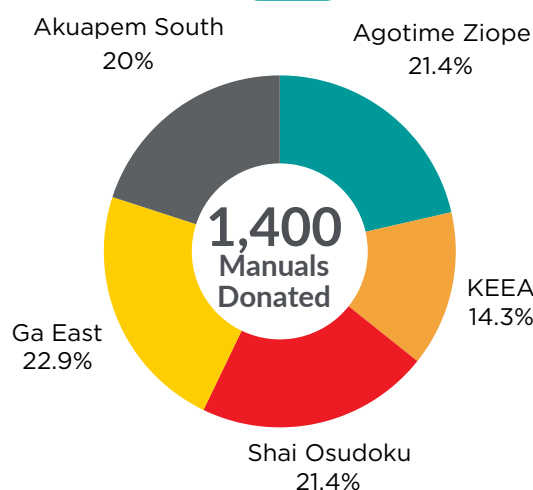
Engineering students at Awaso STEM SHS building a ship as part of a lesson in principles of engineering



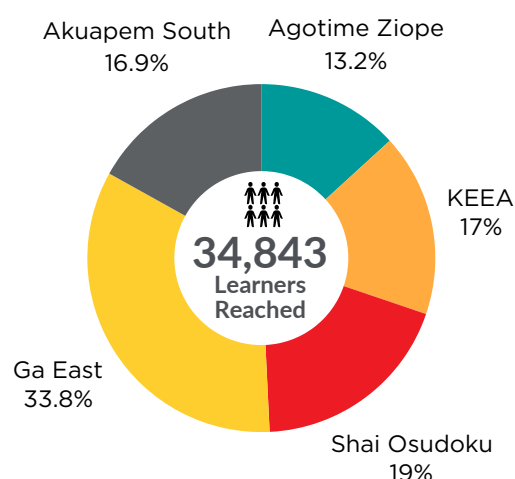


## Manual Donation Overview for 2024

### Number of Hands-on Science Resource Manuals Donated to Districts by end of 2024



### Number of Learners Who had Their Teachers Equipped to Teach Them Science in a Hands-on Way

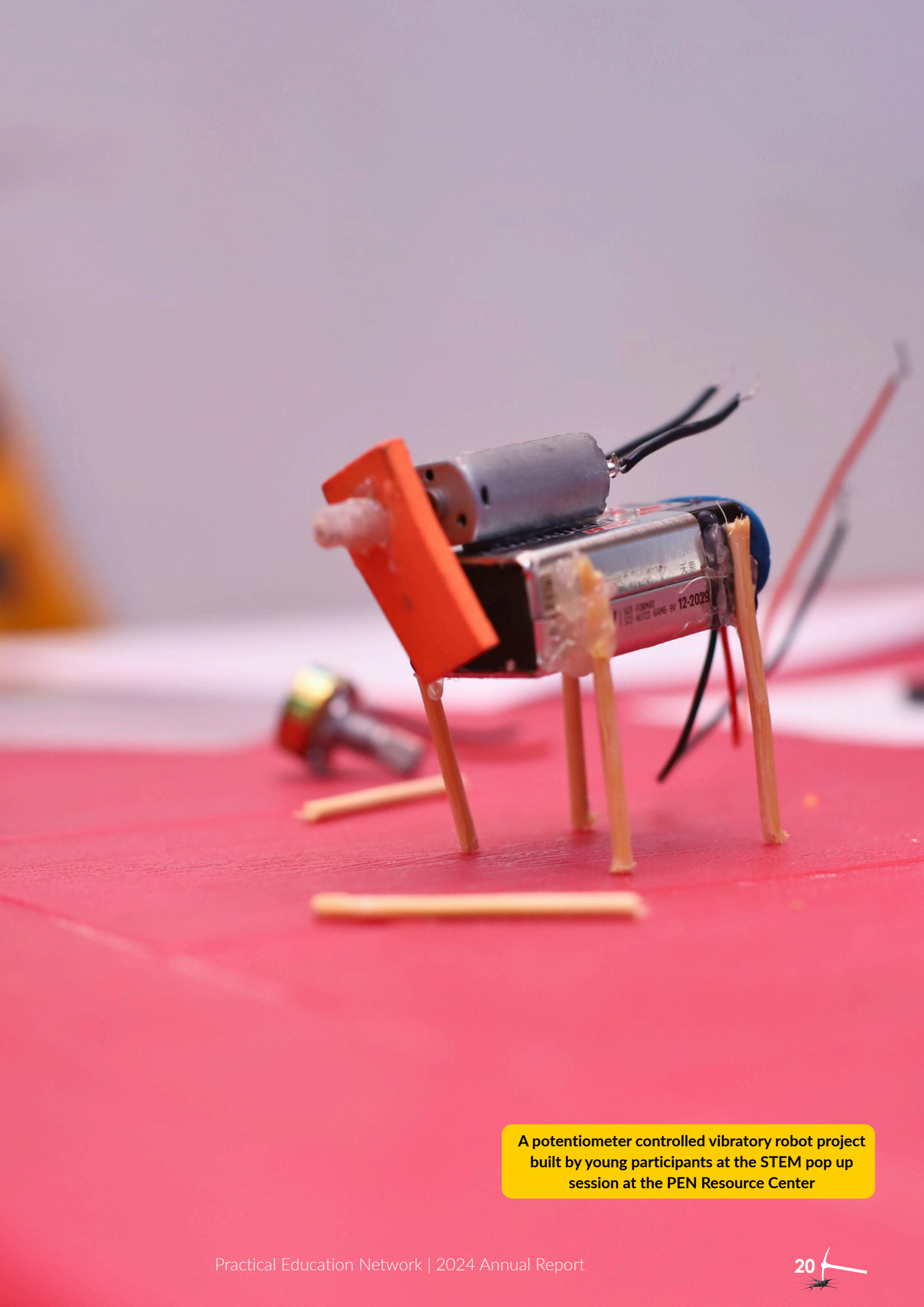


### Key Insights from M&E Visit to Agotime Ziope District - the first ever beneficiary district

In late 2023, PEN donated around 300 of its Hands-on Science Resource Manuals (For Teachers) in Agotime Ziope District in the Volta Region of Ghana. In September 2024, PEN returned to monitor the use and effectiveness of the resource manuals given to the teachers and took the opportunity to address challenges that the teachers raised ranging from pedagogy, logistics and time. Below are some insights gathered from the monitoring visit:

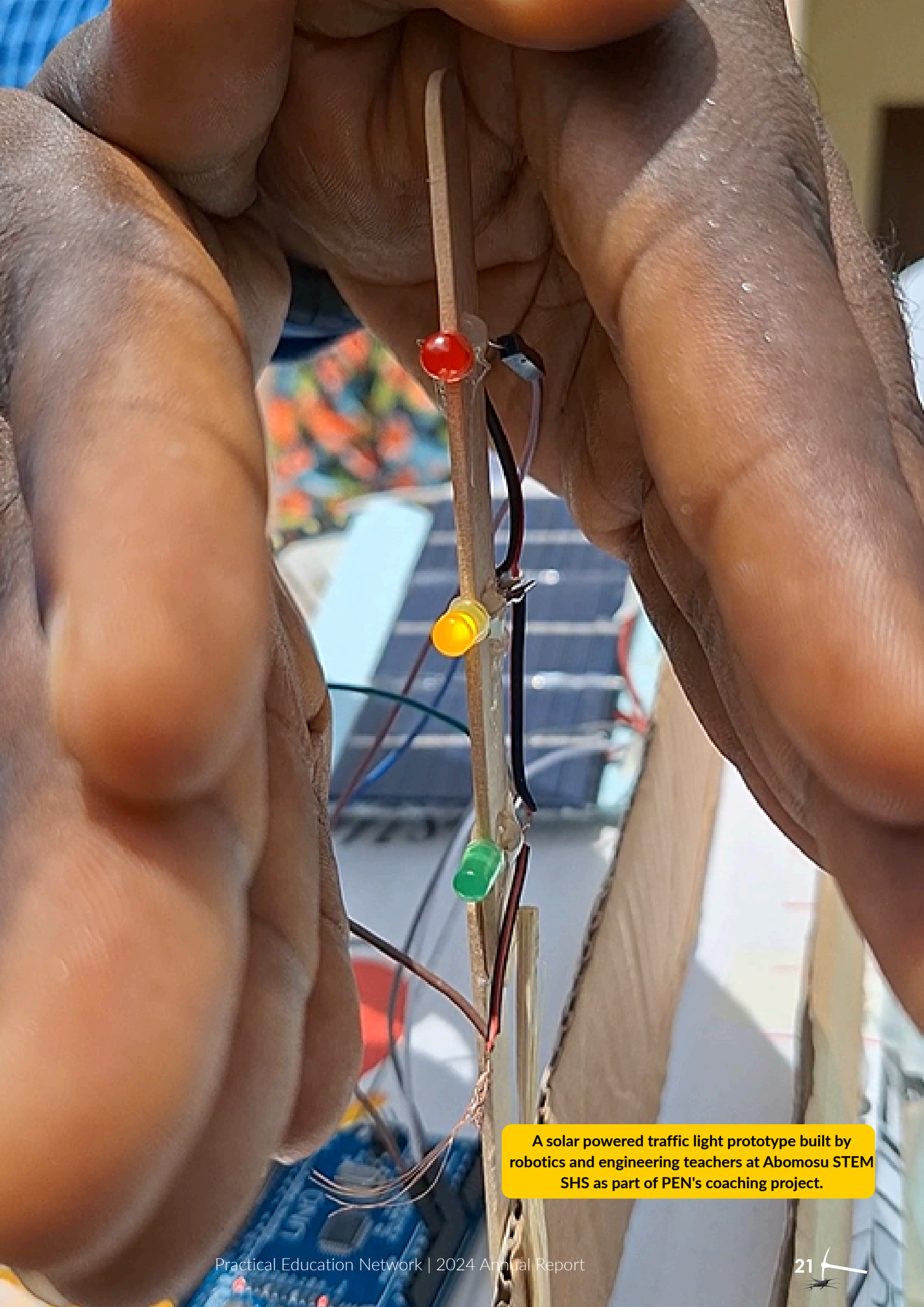
- **Widespread Adoption:** Most schools have started using locally sourced materials as recommended in the PEN Resource Manual.
- **Innovative Approaches:** Teachers creatively modified materials and procedures, using items like plastic bottles, clay, stones, bottle tops, plastic bags and charcoal to demonstrate scientific concepts.
- **Varying Levels of Competence:** While some teachers have mastered hands-on teaching, others, especially in rural areas, need additional support.
- **Manuals:** Teachers largely use the PEN Manuals alongside other textbooks. However, some expressed the need for more manuals, especially in larger schools where teachers combine classes for hands-on activities.
- **Strong Adherence:** Teachers in schools like Yevi D/A Primary, Agotime R/C, and Kpetoe SDA Primary demonstrated strong adherence to PEN's approach, incorporating hands-on activities frequently.
- **Challenges in Rural Areas:** Schools like Honugo D/A Primary and Agbagodo R/C Primary expressed challenges in fully grasping hands-on methodologies, requiring additional training and support. To some extent, they don't use the manuals at all because of their challenges.





**A potentiometer controlled vibratory robot project built by young participants at the STEM pop up session at the PEN Resource Center**





**A solar powered traffic light prototype built by robotics and engineering teachers at Abomosu STEM SHS as part of PEN's coaching project.**



Mawuena who was the principal investigator presented the research findings to the invitees

# RESEARCH PAPER PRESENTATION



## Digital Persistence: Transitioning Hands-On STEM Teacher Training in Ghana from an In-Person to Online Modality

Mawuena A. Hanson  
RMEL Officer, PEN

Dr. Heather R. Beem  
CEO & Founder, PEN  
Senior Lecturer, Ashesi University

COVID challenged PEN to pivot to online training, even though it seemed impossible to teach hands-on online. Indeed, globally, this had hardly been attempted.

Leveraging its reliance on locally available materials, PEN was able to ensure hundreds of teachers across Ghana continued receiving training in hands-on approaches. Rather than shipping kits of materials out, teachers, even in remote areas, accessed short videos that guided them to gather materials in their environment and replicate activities. Aside implementing the online hands-on science

training, PEN devoted resources to measure the efficacy of running hands-on training in an online environment for five cohorts. PEN presented the finding at Mensvic Hotel in Accra to partners from Ghana Education Service, National Teaching Council, Ashesi University, academia and STEM organisations.

Teacher confidence and feasibility to implement hands-on activities increased with statistical significance and large effect size. This is the same result that PEN has seen in the purely in-person training.

Training Mode	Indicator	Period	n	Mean	S.D.	Sig. (2-tailed)	Hedge's g (Effect Size)
Online	Confidence levels	pre	108	3.06	0.95	2.71E-32*	2.80E+00 (large effect size)
		post	108	4.64	0.52		
In-person	Confidence levels	pre	84	4.07	0.72	1.07E-07*	7.70E-01 (large effect size)
		post	84	4.56	0.53		
Online	Feasibility levels	pre	83	2.59	0.92	5.45E-26*	2.27E+00 (large effect size)
		post	83	4.46	0.7		
In-person	Feasibility levels	pre	83	3.02	0.96	6.64E-10*	1.02E+00 (large effect size)
		post	83	3.95	0.86		



R-L: 3 of the teachers from the cohorts researched shared their experience with guests present at the event



Panellists include partners from GES, NTC, University of Ghana and Ashesi University



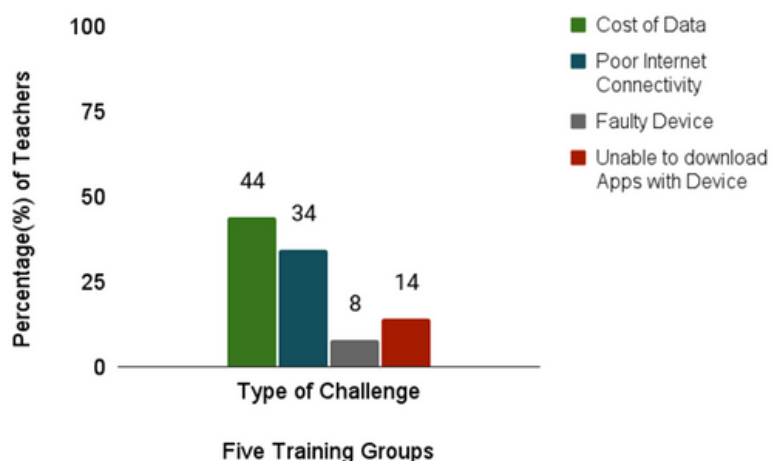
The key challenge faced was in completion of the online training. Some teachers dropped off at a higher rate than they do in person.

Interestingly, the highest drop off occurred at the very first stage (Onboarding), suggesting less issues of network connectivity and more regarding sensitisation to the concept of online training in general.

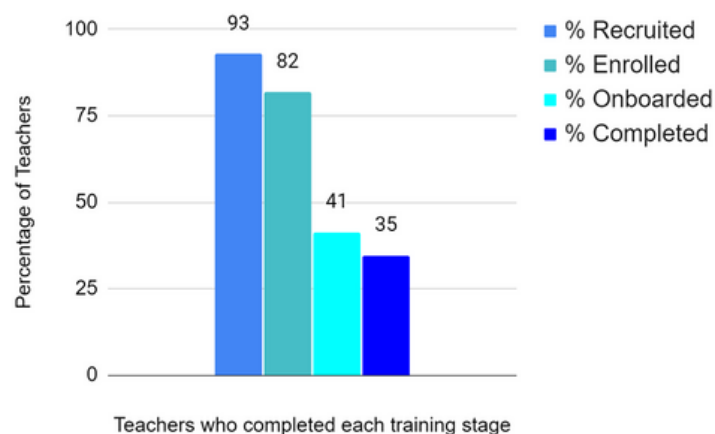
Nearly all teachers who came to the onboarding stage persisted to complete the training, demonstrating incredible resilience and creativity in ensuring they find ways of connecting online to access videos and submit assignments.

This pandemic proof model should provide inspiration to other teacher training providers across the continent to adopt more cost-effective and sustainable ways of offering professional development programmes for teachers.

### Challenges teachers face when using the internet disaggregated by the type of challenge



### Teacher persistence through each of the 4 stages of PEN's online teacher training program

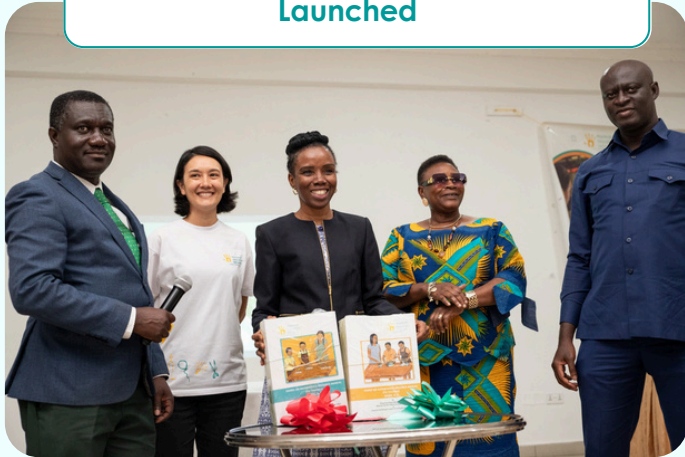


Seated from L - R: Dr. Lawrence Sarpong (NTC) Dr. Heather Beem (PEN), Prof. Elsie Effah Kaufmann (UG), Dr. David Adjepon-Yamoah (Ashesi), Mad. Olivia Opare (GES) in a group picture with PEN staff and invited guests



# Other Highlights

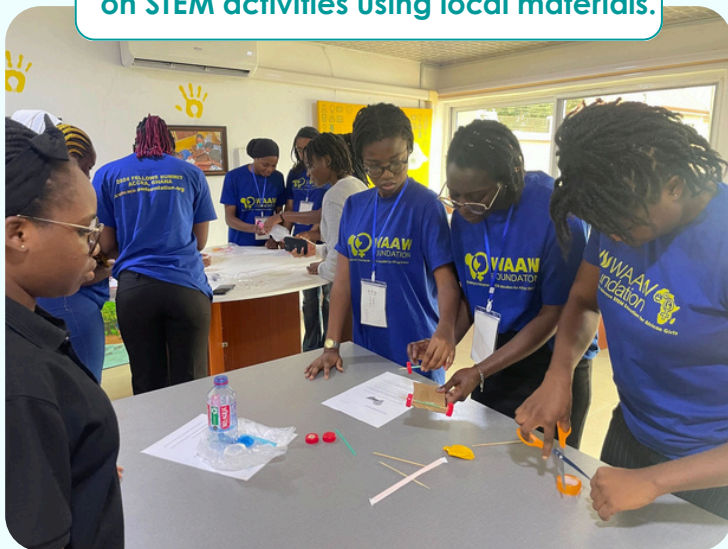
**Hands-on Mathematics Resource  
Manuals for Teachers (Basic 1 - 6)  
Launched**



**PEN Presents on Opportunities for STEM  
Education Among Public School in  
Monrovia - Liberia at the 2024  
Comparative and International  
Education Society (CIES) Conference in  
Miami, US.**



**WAAW Foundation Scholars Visit PEN  
Resource Center to Experience Hands-  
on STEM activities using local materials.**



**PEN Presents on Effects of Hands-on  
STEM Teacher Training Pilot  
Programme among Math and  
Science Teachers in Monrovia -  
Liberia at the CIES in Miami, US.**



**Ministry of Education Liberia and Ghana  
Education Service highlight use of local  
materials in their presentations at the  
Global STEM Symposium in Washington,  
DC, USA**



**PEN Donors Ps & Mrs Zhang  
Purposefully Travelled to Ghana  
and Visited PEN to Experience First  
Hand PEN's Work in Ghanaian  
Schools**





**The Black at MIT (BAMIT) group visited the PEN Resource Center to Learn About PEN's Work in STEM Education in Ghana**



**A cross-section of STEM clubs that PEN Exemplar Teachers ran in their schools as part of the training PEN provided for the teachers with support from Someone Else's Child**





# Testimonials



## **DANIEL EFFAH, TEACHER**

As a professional teacher, I relied heavily on lecture-based methods, until PEN introduced me to more practical, engaging ways of teaching like demonstrations and role play. This shift transformed my classroom. Just recently, thanks to PEN's support, my students created amazing projects like chargeable fans and speed boats using local materials, which they proudly showcased at the 2024 STEM Pop-Up. The impact was incredible, our learners were thrilled, and the whole school deeply appreciates PEN. Special thanks to Heather Beem and her partners. Ayekooo!



## **JACKIE ENTSIE, TEACHER**

The PEN Teacher Roadmap workshops has been a turning point in my teaching journey, transforming how I approach science education. It shifted my focus from theory-heavy lessons to practical, hands-on learning using everyday and discarded materials. With PEN's support, my learners now build scientific projects from what others might call "trash" using bottles, cans, straws, bringing abstract concepts like filtration and solar systems to life. This approach has not only deepened students' understanding but sparked joy and creativity in the classroom. Personally, it opened my eyes to the value hidden in our environment, and inspired me to lead learners in building meaningful projects, some of which we proudly showcased at the 2024 STEM Pop-Up.



## **BEATRICE LOGBAH, TEACHER**

My journey with PEN has been deeply transformative. What began in 2020 as a simple science training turned into years of consistent support, even through the challenges of COVID-19. PEN introduced us to hands-on science, inquiry-based learning, and empowered us to lead and train others. From conducting experiments to organising workshops in neighboring schools, the experience helped me grow as an educator and leader. I'm proud to be able to lead learners in impactful projects in science for the 2024 STEM POPUP exhibition. It's an experience I'll always value.



## **CHARITY AMEGAVI, TEACHER**

PEN has truly been a game changer in my journey as a Science Facilitator. Before joining, I struggled to make lessons practical due to lack of materials. But PEN showed me how to source low-cost resources, making hands-on science both possible and seamless. Today, I confidently lead practical lessons, support other teachers within and beyond my school, and teach with ease and excitement. With PEN's guidance, I formed a science club, led students in building innovative projects, and proudly showcased them at the 2024 STEM Pop-Up. PEN has lit the path forward, Minds Up, Hands On, and will always be in my heart.





# 2024 Partnership and Fundraising Overview

## Introduction

In 2024, Practical Education Network (PEN) continued to forge impactful partnerships and enhance its fundraising efforts to support educational initiatives across Ghana and beyond. Our commitment to improving practical, hands-on STEM education remains unwavering, and we are proud to highlight the partnerships and fundraising achievements that have significantly contributed to our mission.

## Partnerships and Collaborations

This year, PEN established and strengthened collaborations with a wide range of stakeholders, including government, educational institutions, corporate partners, and international organisations. One of our most cherished partnerships was with the Science Education Unit of the Ghana Education Service. Additionally, our collaboration with organisations such as the Ghana Association of Science Teachers (GAST) enabled us to expand into new districts and distribute our Hands-On Resource Manuals free of charge. The National Conference of Principals of Colleges of Education was also a partnership established this year, and we look forward to deepening our engagement with them in the year ahead.

## Growing with Our Partners

We had the opportunity to work with a diverse and inspiring group of partners who share our passion for practical, learner-centered STEM education. Each partnership brought unique strengths—whether through funding, technical expertise, or a shared vision. We were thrilled to continue collaborating with allies such as T-TEL, Ashesi University, and the Someone Else's Child Foundation, whose support have been instrumental in growing our teacher training initiatives. The Ashesi Faculty Research Grant also enabled us to study how our online training influences learning outcomes, helping us anchor our approach in evidence and innovation.

On the corporate front, we received generous support from Clasen Quality Chocolate and Maridav, whose commitment to education and community development has fuelled exciting new opportunities. We also extended our global reach through the generous contributions of the Chinese Bible Church of Greater Boston (CBCGB) Social Concerns Committee and Rotary Clubs which supported our free Hands-On Manual donations. Additionally, our engagement with MIT SOLVE's LEAP program connected us to a broader network of changemakers and innovative ideas.

Significantly, PEN adopted a new approach to practical, hands-on STEM education by joining the Ghana Science and Tech Explorer Prize (GSTEP) consortium alongside DreamOval Foundation, Shulem Lake, and Partnerships Bureau. This collaboration amplified our mission and allowed us to reach more teachers and learners across different regions. These partnerships have not only provided vital resources but also inspired new ways of thinking and working.



## Raising Support, Raising Impact

On the fundraising front, 2024 brought both growth and learning. We secured support from new funders while deepening relationships with existing ones. From grants and corporate sponsorships to individual donations, every contribution helped bring practical STEM education to more classrooms—empowering teachers and sparking creativity in students.

We also invested time in refining how we share our story and connect with supporters—not just communicating what we do, but why it matters. As a result, we experienced increased engagement from individual donors and more opportunities to co-create with partners who are equally invested in sustainable educational transformation.

## Looking Ahead

As we reflect on 2024, we are immensely grateful to every person and organisation that has journeyed with us. Your partnership, trust, and belief in PEN's mission keep us moving forward. In 2025, we look forward to building even deeper collaborations, exploring new fundraising avenues, and continuing to grow practical STEM learning across Ghana. Together, we are not just teaching science—we are equipping a generation to think critically, solve problems, and dream big.

## Conclusion

The partnerships and fundraising initiatives of 2024 have positioned PEN to make significant strides in advancing educational opportunities in Ghana. With continued support from our partners and donors, we are optimistic about the future and remain dedicated to our mission of transforming education for every child in Ghana and in Africa.

Thank you to all who have contributed to this journey.

## 2024 Partners



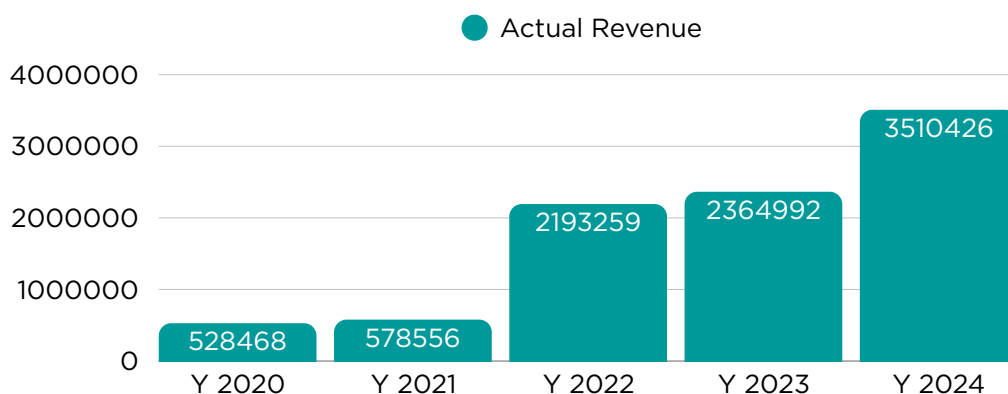


# STATEMENT OF FINANCIAL PERFORMANCE FOR THE YEAR ENDED 31<sup>ST</sup> DECEMBER, 2024

Exchange Rate (USD - GHS)  
**14.29** (2024) | **11.16** (2023)

ITEMS	2024 (GHS)	2024 (USD)	2023 (GHS)	2023 (USD)
REVENUE	3,510,426	245,656.12	2,364,992	211,916.85
DIRECT COSTS	(2,227,788)	(155,898.39)	(1,323,985)	(118,636.65)
<b>Net Revenue</b>	<b>1,282,638</b>	<b>89,757.73</b>	<b>1,041,007</b>	<b>93,280.20</b>
OTHER INCOME	3,308	231.49	235,882	21,136.38
GENERAL AND ADMINISTRATIVE COSTS	(1,366,740)	(95,643.11)	(1,041,187)	(93,296.33)
<b>(Deficit)/Surplus for the year</b>	<b>(80,794)</b>	<b>(5,653.88)</b>	<b>235,702</b>	<b>21,120.25</b>

## REVENUE GROWTH (2020 - 2024)



### Notes on Year on Year Growth

- Increasing demand for PEN's unique solution.
- Strong foundation-building has led to increasing capacity of PEN to engage with a greater quantity and size of partners.



# The Full Time Team that made it work in 2024



**HEATHER BEEM**

CHIEF EXECUTIVE OFFICER



**JOSEPH QUAYE AMOO**

PROGRAMMES MANAGER



**EMELIA BENEDICTA MENSAH**

PARTNERSHIP & RESOURCE  
MOBILISATION MANAGER



**MARGARET DZAKPASU**

FINANCE & ADMINISTRATION  
MANAGER



**MAWUENA ASEM  
HANSON**

RESEARCH, MONITORING,  
EVALUATION AND LEARNING  
OFFICER



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SHS STEM CURRICULUM &  
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**CYRIL ASSEM**

PARTNERSHIPS &  
COMMUNICATIONS OFFICER



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ADMINISTRATION OFFICER -  
LOGISTICS



**CHRISTIANA OBUBAH**

IT SUPPORT ASSISTANT



**ISAAC SOGBADZI**

CURRICULUM & TRAINING  
OFFICER



**KEZIAH CLAD**

PEN GSTEP PROJECT  
COORDINATOR





# NATIONAL SERVICE PERSONNEL



**EPHRAIM  
AMOAKO-OKYERE**

RMEL ASSISTANT



**KEZIAH CLAD**

CURRICULUM & TRAINING  
ASSISTANT



**CHARITY KPORMORNE  
ELEBLU**

COMMUNICATIONS  
ASSISTANT



# Special Acknowledgments

## SPONSORS

- Adeyemo, Adekunle
- Adu-Gyamfi, Siisi & Gwen
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- National Teaching Council (NTC)
- Rotary Club of Accra West
- Rotary Club of Colorado Springs
- Someone Else's Child
- Transforming Teaching Education and Learning (T-TEL)

## VOLUNTEERS/INTERNS

- Baaba Onomaa Amosah
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- Stratosphere
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## OUR MONTHLY DONOR PROGRAMME TO BECOME A PEN PAL



Support PEN with a minimum of \$20 every month to enable every African Child to learn by doing. Every amount goes towards making practical STEM education accessible to learners in Africa.

[www.every.org/penpals](http://www.every.org/penpals)







Empowering Classrooms  
Inspiring Innovators  
Impacting Futures



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