greenMag

Tech Ideas for Greenovating

LIMITED EDITION

Celebration Pack

☑ Talk
☑ Is
☑ Cheap
☑ Kit

☑ Science
☑ Technology
☑ Engineering
☑ Mathematics

GL

TICK-STEM

Digital Fabrication on the GO!!!

...Celebrating 1 Year of Extreme Impact...

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TICK-STEM
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Would you want to contact, support or partner with us? Kindly contact us using any of this medium. We would be happy to hear from you.

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Editor's Preface

This project first began, when the need to get knowledge on its feet to go where its needed, was discovered. In a bid to extend how far knowledge could go, the TICK STEM Box was developed. TICK STEM is an acronym for 'TALK IS CHEAP KIT for SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS'. The project has then gone to become a project which is giving the knowledge that could have been acquired from a particular location at a time to be acquired at many locations at the same time. When the project began, I (Babasile Daniel) was its first bearer, I bore the TICK STEM Box, going to school to teach kids and set the pace for individuals as an example to others such as Kolawole Oluwasegun, Adebayo Moses, Emmanuel Agamini, Raji Bolaji, and other interns/volunteers to be able to provide knowledge to the nooks and crannies of Nigeria.

The project has grown from a one city project to that which now engages as many cities as possible across Nigeria. And we are with this magazine celebrating such a wonderful time of 365 days' duration, of making impact bearing the responsibility of the TICK STEM box to share knowledge to places where it cannot easily be gotten. This magazine is made in order for us to be able to share the goodness of 365 days of Impact, as a source of inspiration for you as a reader and to get you to becoming acquainted with what we do, who we are, how we do it, and what we intend to do in the foreseeable future.

This book contains picture representation, definitions, (global and local) references, subject terms, location and events that GreenLab Microfactory, the mother body for TICK STEM has and is undertaking the impact level, the vision and goal in view. Words are not being mixed or missed in the magazine, a huge effort has been placed into it to allow as much clarity as possible. The works that have been carried out are so explicit and clear, to the extent that the step by step of the project, beginning from its start up till its present accomplishments have been well explained, in order for a dear reader, such as you can pick up the trail and apply them, where necessary in your life and endeavors.

Moreover, through this magazine, GreenLab Microfactory has shown using the TICK STEM at One, that 'Resourcefulness is the Key to Sustainability of project, product, economy, commerce and people'. The approaches employed in this book will help you to easily understand what TICK STEM has achieved and future plans. Ensure you take enough time to check through the entire glossary of picture, read the complete explanations and do a thorough web surf on its reference, if you do this we are well assured reading this book will provide you with an immeasurable paradigm shift.
Thanks a lot for picking up this magazine, and in addition, our appreciation goes to you the able reader and the entire GreenLab Microfactory team, especially to all those who have provided support, howbeit financial, motivational, and psychological. We truly appreciate you all.

Babasile Daniel
GreenLab Microfactory, Nigeria.
24th November 2019

GreenLab
Micro-Factory

WE DON'T JUST INNOVATE WE GREENOVATE

GreenLab micro-factory is the first Fab Lab in Nigeria, GreenLab Micro-factory is a digital fabrication initiative (Fab Lab), But most importantly, GreenLab is the hybridization of Fab Lab and Open Source Ecology. A digital fabrication laboratory (Fab Lab) with keen focus on fostering social innovation /engineering /entrepreneurship in Nigeria. GreenLab aims to encourage the utilization of dormant, recycled and abundant Eco-friendly materials and resources in rural areas, and to encourage innovation and sustainable development. The aim is to advance and support the grassroots economy of the country, the young generation where change is most likely to be created and implemented if provided with the right stimulus for growth.

Social innovation is a novel solution to a social problem that is more effective, efficient, sustainable, or just than current solutions. The value created accrues primarily to society rather than to private individuals. GreenLab is a social innovation center.

in assisting emerging economies to effectively solve its social challenges, empower her citizens, and have a taste of development became obvious. Thenceforth, the plan to officially launch a Fab Lab in Nigeria was embarked on in May 2015.

CONCEPTION

The rise of the technology era, and the persistent social, economic, and environmental sustainability issues in the developing economies especially in their rural settings indicated the need for a different approach to ensure sustainability and broad empowerment of individuals irrespective of their educational, geographical, and anthropological status.
Based on these identified issues, most of which are very evident in Nigeria, in March 2015 while invited as a guest researcher at the Helmut Schmidt University to conduct a research study the success rate of the Global FabLab ecosystem, the significance of FabLab
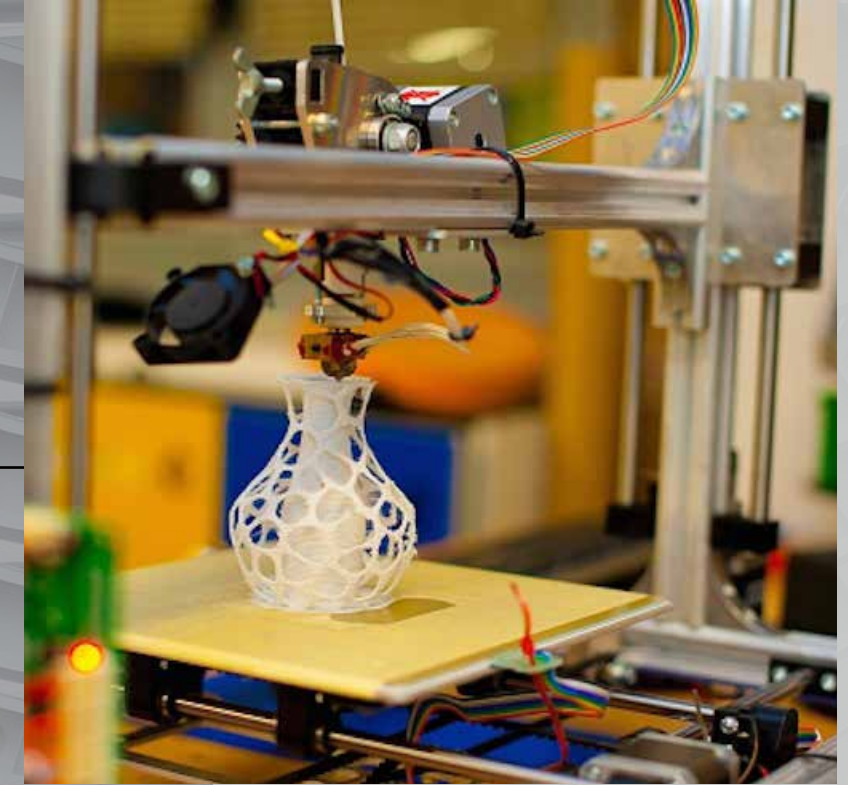
OBJECTIVES

The GreenLab micro-factory was designed to be a space that encourages disruptive innovations in Nigeria. A space where egalitarian activities are practiced, where each and every person has equal amount of access to facts, and libraries of knowledgeable resources to specifically meet their needs. Majorly, GreenLab was conceived to bridge the gap between theoretical knowledge and practical experience. It was designed to be a space where students can gain vital hands-on experience that could make a significant difference in their lives and respective community.

FAB LAB

Fab Lab signifies 'fabrication laboratory', it is an innovative, sustainable and self-organized concept coined by MIT's Centre for Bits and Atoms (CBA). A Fab Lab is a technical prototyping platform for innovation and invention, providing stimulus for local entrepreneurship.

A Fab Lab is also a platform for learning and innovation: a place to play, to create, to learn, to mentor, and to invent. Fab Lab is a high tech laboratory or workshop where ordinary people can design just about anything from machines, to other artefacts which stimulates their livelihood. In order to create self-sustainable environments, there needs to be concrete intervention to facilitate research and development (R&D), product invention, skills transfer, and creation of an entrepreneurial ecosystem irrespective of people's demographic and anthropology status.
FabLabs are more about the people than the machines. GreenLab also attest to the statement given above, that Fab Labs are about knowledge acquisition and dissemination through participatory involvement of individuals which to some extent relies on having adequate access to technologies.

Fab Lab is a small-scale workshop equipped with flexible computer controlled tools and systems for the production of digital fabrications of widely distributed products, which are used to encourage creativity and innovation among individuals irrespective of their geographical and demographical status.

WHAT FABLAB CAN OFFER

Fab Lab as a hands-on laboratory that provides the technology to let people develop a conceptualized idea from inexpensive and readily available materials.
FabLab is an idea incubator and opportunity creator that empowers people from all spheres of life to bring their imaginations to reality.

- Invention
- Job Creation
- Problem Solving
- Education
- Empowerment
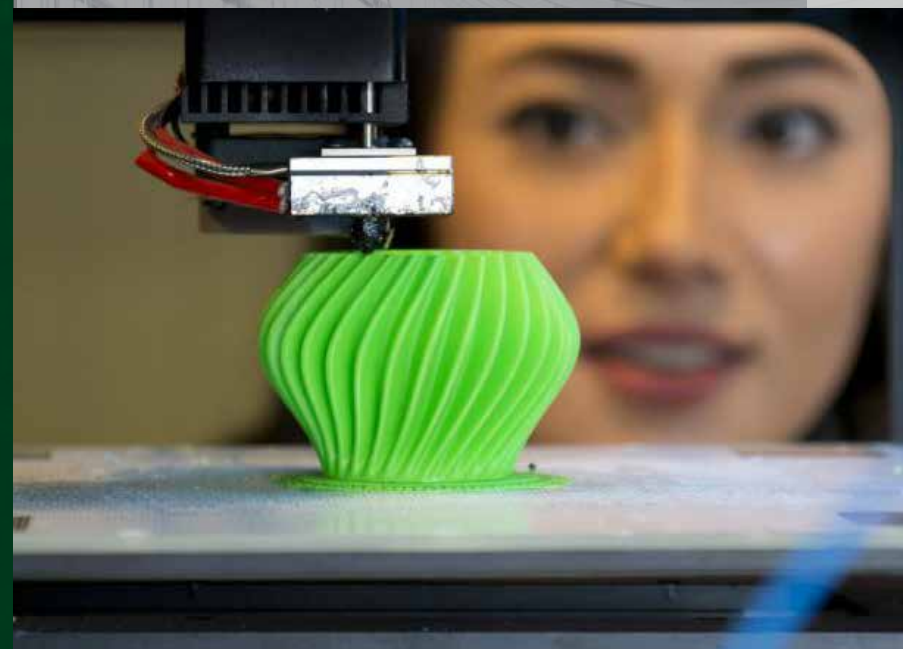
Who is FabLab for?

The FabLab is opened to people looking for practical training, Individuals, tinkerers, inventors, crafters, Children and youth, both school classes and neighborhood groups, Community groups, adults, women, SME's, Innovation teams, researchers, students, and so on. The focus of a basic FabLab is to assist individuals to conceptualize, design, develop, fabricate and test the products, using the equipment provided. FabLabs are open-source movements that practices rigid egalitarianism.

The Fab Lab workshop consists of a collection of tools for design and modeling, prototyping and fabrication, and other electronic tools, with open source software and other dedicated programs to bring advanced manufacturing technologies to ordinary people, by being involved in innovative experimental projects and peer-to-peer learning, and to also provide means to solve local problems creatively. Fab Lab is creating an ecosystem for entrepreneurial empowerments that creates unprecedented domestic opportunities for everyone.

Significance of FabLabs

From the inception of the early industrialization era (export-oriented industrialization and import-substituent industrialization), value creation was deemed to be autocratically for the generation of economic benefits for firms, industries and investors.

However, this approach was based on top-down economics which gives little attention to the actual needs and values of the consumers. The emergence of the technology era facilitated a paradigm shift from the primitive export-oriented industrialization to a more open collaboration-oriented industrialization. The main goal of looking at value creation from the collaboration perspective is to create socially sustainable economic values for all stakeholders.

In order to create self-sustainable environments, there needs to be concrete intervention to facilitate research and development (R&D), product invention, skills transfer, and creation of an entrepreneurial ecosystem irrespective of people's demographic and anthropological status.
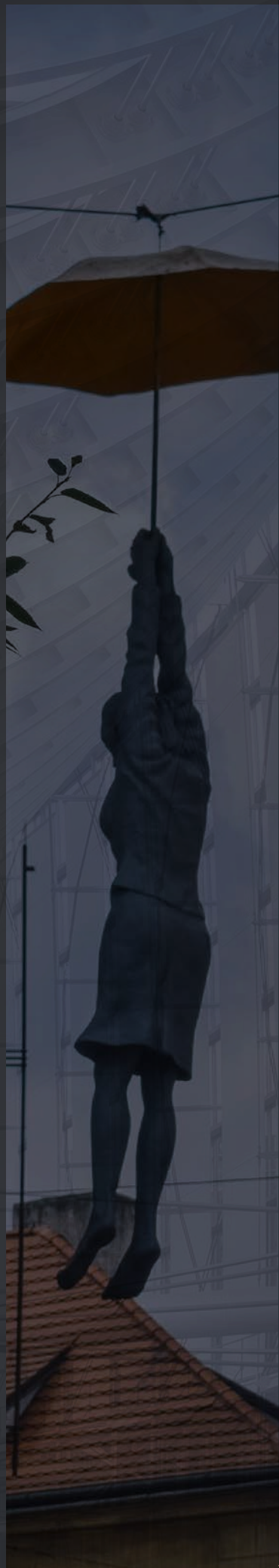
GreenLab's
Innovation strategy

Just like any goal-driven or future-oriented average organization, GreenLab micro-factory has developed its innovation strategy based on the Nigerian social innovation ecosystem it plans to operate and serve. The strategy developed at GreenLab is an iterative strategy called HIDES.

☑ **HEARTEN**   ☑ **IDEATE**   ☑ **DEVELOP**   ☑ **EXPLORE**   ☑ **SHARE**

1 HEARTEN
Drawing from the lack of nfrastructural development, the inadequate access to developmental resources, lack of trust, and gross mismanagement of funds that has marred Nigeria's innovation cycle and growth. This can be seen as a pre-ideation strategy to effectively inform and educate individuals on the importance of innovation, collaboration, sharing, openness, and other methods that will be utilized at GreenLab. It would give them the necessary flair to utilize their limited resources in creating the adequate value. Heartened people produce great ideas and use limited resources to get things done.

2 IDEATE
The ideation phase is where most concepts/ideas are noted and broadly elaborated. The process used during the ideation phase could be based on a series of brainstorming sessions, or individuals pitching ideas. In any innovation strategy, as depicted by the innovation funnel, the idea generation phase is very significant to the innovation process and its output thereof.

3 DEVELOP
The development phase is where selected ideas will be gratified into tangible products. This could include a rapid prototyping phase, or a small scale production of the ideas.

4 EXPLORE
At the exploration phase rigorous tests on the artefact produced would be conducted to know the resilience, usability, adaptability, reliability and maintainability of the artefact.

5 SHARE
Since GreenLab is a member of the global FabLab ecosystem, and imbibes the structure of an open source organization. A distributive economy where ideas, knowledge, information, techniques and technologies are shared will be a key factor in our modus operandi. Inasmuch as commercializing products are encouraged, GreenLab also encourages an open source concept where people can freely interact, collaborate, and share knowledge.

OUR PROJECTS

We believe more of Implementation rather than just talking or saying strategies creating developmental plan, because everyone has a voice and anyone can talk but talk is cheap, implementation is the Key to achieving our aims and objectives. In lieu to this we organize various programs for different categories of people for the purpose of collective growth. Below are the programs we organize and WHY;

1 AJUMOSE

Ajumose is the first program organized by GreenLab, with the aim to start solving the social issues found in Nigeria – exploring how and what people think when it comes to the concept of FabLab. Ajumose in the Yoruba language means Collaboration, teamwork, co-working or cooperation. The event was the first free 3D printer and Solar panel construction workshop coordinated in Ibadan.

The major agenda of Ajumose was to promote collaboration, openness, communal learning environment and development. It also aimed to show people the magnitude of what could be accomplished if they collaboratively focus on providing solutions to social problems by localizing the resources used for production. The set objectives of Ajumose were to build a solar panel from scratch, and assemble 1 RepRap 3D printers.

2 ONE STUDENT ONE ARDUINO

'One student One Arduino' project. The aim of the project is to encourage innovations right from the cradle level, that is, from the primary education level in Nigeria.
The concept was birthed after reviewing the success of the 'One student one laptop' project conducted in the united states in the early 1990's (McMillian & Honey 1993), replicated in Canada in 2004 (Canuel 2006), and some other countries in the world. This produced astonishing results that proved that the program participants (students) were more productive than their peers who are not participating in the program. Moreover, if the laptop, being a ready-made product could aid such developments, how much more an innovative project that gives the pupils the opportunity to create anything electronics which could also include a laptop, as well as the opportunity to learn about the technical orientations of electronics which include software and hardware developments.
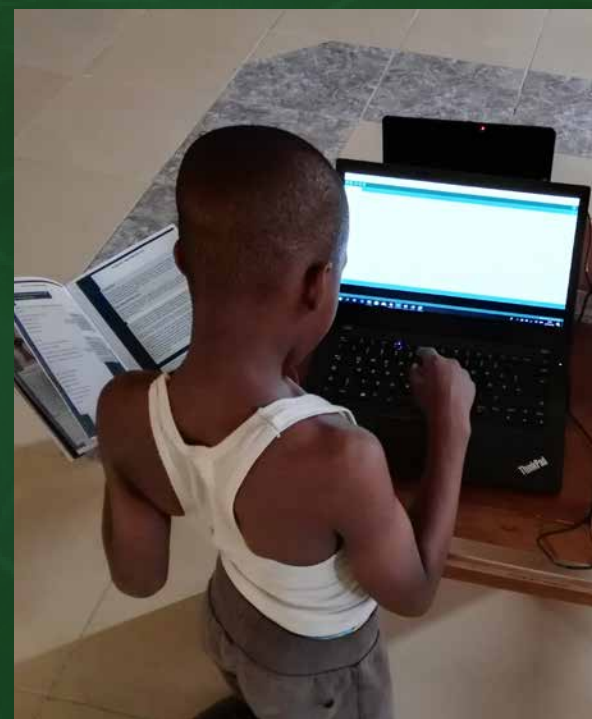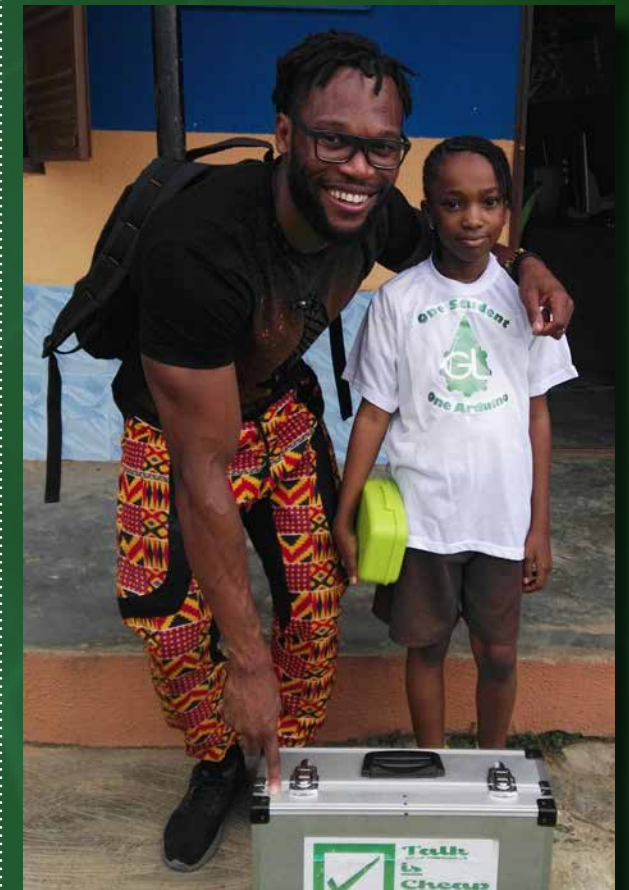
3 TICK-STEM

"Children of today are the leaders of tomorrow"; this is a factual statement we all know and hold dear even though the contribution to its implementation is insufficient.

TICK, which stands for Talk is Cheap Kit, is a STEM (Science Technology Engineering and Mathematics) kit assembled by GreenLab micro-factory to effectively propagate and educate primary and junior secondary school student about science and technology. TICK, equipped with 3D pens, circuit boards, sewing machines and even its own power generation system, is the miniaturized version of FabLab and other digital fabrication laboratories.

The sole purpose of this training is to proliferate their creativity intelligence, sensitize them early about technological approaches and development, as well as instill the will to innovatively decipher how to create a sustainable society. In a nutshell, Our intention is to find and nurture our Change makers from the cradle.... Talk is Cheap - It's time to work.

Achievement

Students were taught emerging technologies through the TICK-STEM BOX (FabLab in a Box) in their classroom setting, without change of environment. The project has recorded huge success ever since the inception in 2018. Over 20,000 students across various Primary and Secondary Schools in five (5) different state in Nigeria has been impacted by the TICK-STEM project.

The major driver or determinant of our projects is the drive to impact knowledge that lead to innovation, in all our program participant are imparted with the following knowledge and skills;

- Provision of new knowledge, information, and technology
- Empoweres participants to think about and be drivers for change in their innovation space therefore enabling the solving of social issues
- Recycling and re-usability of resources otherwise rendered useless.

LEARN TO: DO IT WITH OTHERS(DIWO)

TECHNOLOGY EDUCATION

ED TECH

THE 21ST GENERATION OIL

...Harnessing every Child's Creativity to enhance Learning...

An average kid, irrespective of their geographical location, aspires to become a Doctor, Engineer, Lawyer to name a few. Which is a pointer to the future opulence and wealth of a nation? However, it is well known that reality, due to negative externalities, could change the course of action naturally imprinted in the minds of the kids, nevertheless every child has the right to be whom they dream to be, hence should be afforded the opportunity to fulfill their aspirations.

Every child have different things that interest them and irrespective of what they want to become they deserve to be exposed to the length and breadth to technology, because "until we begin to see other form of technologies the way we see a PC (laptop) we will not fully utilize it" – **Raji Bolaji.**

The fact is, no matter what you want to be in life, you'll need a PC (laptop) to make your work easier, so there's a place for TECH in every area, and it's very important to sharpen these kids ' minds when we're still able to do that. According to the JESUITS, they believe that to mold any child to fully conform to something, you can only do that in the first 7 years of the life of that child, to shape what you have molded for 11 years (from 7-18 years) to do so. It will be harder to change anything when the child clocks 18 years and requires divinity help.

Ed Tech is an acronym of **Technology Education**. Technology education is the study of technology, in which students "learn about the processes and knowledge related to technology". As a field of study, it covers the human ability to shape and change the physical world to meet needs, by manipulating materials and tools with techniques (Fab Lab). It addresses the disconnect between wide usage and the lack of knowledge about technical components of technologies used and how to fix them. This emergent discipline seeks to contribute to the learners' overall scientific and technological literacy. The goal of Tech Ed was to increase students' technological literacy.

Technology education should not be confused with educational technology. Educational technology focuses on a narrower subset of technology use that revolves around the use of technology in and for education as opposed to technology education's focus on technology's use in general.

We currently have thousands of primary and secondary schools in Nigeria, with little or no resources to train their students on emerging technologies, Educational centers could adopt ED TECH to train their students on technology at any level, instead of teaching technology as if it did not exist, which would make it more difficult for the students to understand. Highlighting Sir Ken Robinson's terms, there's no Education when there's no learning, the teacher just participates in teaching activities but doesn't fulfill its purpose when the students don't learn something. Educational centers have a major role to play in promoting education.

"Education should encourage learning not to hinder it, every student has the right at the right time to be exposed to the right technology."

Realizing the Power of Ed Tech

The Brooking Institute described a 100-year gap, the century it will take for the world's poor children to achieve educational parity with the wealthy at today's pace. Neither our world nor those learners can wait that long: We must find ways to close that gap quickly and efficiently, to allow all learners, educators, and educational systems to realize their full potential. In pursuit of this goal, GreenLab's Ed Tech initiative began in 2018 to influence how primary school student learn Technology. The TICK-STEM project which specifically focused on educating primary and junior secondary student in Nigeria on some selected topics in their school curriculum using upcoming technologies in the TICK-STEM BOX.

We have witnessed TICK-STEM bring students from several years behind to on grade level, while also supporting teachers and shifting the norm from teacher-centered instruction to student-centered learning. According to a professor at Lincoln University London, Learning should be done by the Student because the role of the Teacher is to supervise the entire learning process.

We belief that the power of technology, when thoughtfully employed, can serve as a great equalizer in delivering quality education. By enabling ubiquitous access and personalization, Ed Tech can close the gap for students while also empowering teachers to be more effective, especially when there is lack of access to high quality schools, high-quality teacher training, rigorous curriculum, or appropriate interventions.

During the Obama Administration, the US Department of Education's Office of Education Technology identified the following as the main areas where technology can change education;

- ☑ Improving mastery of academic skills.
- ☑ Developing skills to promote lifelong learning.
- ☑ Designing effective assessments.
- ☑ Improving educator productivity.
- ☑ Making learning accessible to all students.

GreenLab's Ed Tech Initiative: TICK-STEM

Ed Tech requires much more than eager learners and motivated educators. Countries around the world are increasingly recognizing the need to improve student learning outcomes as well as the power of technology to support that goal. That recognition has driven education leaders to undertake a range of efforts to integrate Ed Tech into their education systems, schools, and classrooms. While this is an important opportunity for Ed Tech to improve teaching and learning, what is far more complex and critical is to ensure that Ed Tech can advance equitable, high-quality education for all learners regardless of where they live, how much their family earns, or where they study.

GreenLab whose mission is to unlock human potential through learning by catalyzing people, ideas, and systems – so every individual thrives and contributes in a changing and interdependent world. The GreenLab Micro-factory – TICK-STEM Project – contributes to Nigeria's educational prosperity by helping Nigerian education institutions, Educators, governments and professionals as they:

Strengthen Nigeria's Educational system. Provide platforms for student to work together on various project both on a group level DIWO (Do It With Others) and Individually DIY (Do It Yourself). Preach their belief in the importance of education equity for all individuals and societies to thrive.

Acknowledged that Ed Tech can have an impact on learning outcomes.

Make learning technology accessible to all students regardless of where they live, how much their family earns, or where they study.

Improving educator productivity through various technology based trainings.

Kids-Tech

Every child get to know Technology with FUN!

One role of education is to awaken and develop the powers of creativity that lie idle in children, excite the power of imagination and creativity. Educational system has to engage students in three aspects in order to get them to learn anything;

☑ Curiosity
☑ Individuality
☑ Creativity

Once you can act fully on the curiosity, individuality and creativity of a child they will learn with little or no supervision at all. One thing that has proven to help to engage the curiosity in every child is FUN because they are children, according to Sir Ken Robinson all children are suffering from a disease called Childhood and everyone has suffered from this disease that should not cured, this disease is responsible for their playfulness and their inability to understand anything unless that thing is Fun to them and in other to teach them they must find that thing Fun and more importantly the Teacher or tutor must be suffering from the disease too in other to transfer the knowledge to them.

Really, all of these points about how technology benefits children are interconnected: With technology comes freedom of expression, and with such freedom comes the chance for kids to independently set out and achieve something, largely on their own. In doing so, they face roadblocks and challenges that must be cleared if they're to reach their goals, so they learn how to deal with such hurdles.

Tech executive and bestselling author Sheryl Sandburg said this: "What would you do if you weren't afraid?" Even as adults, there are things we often avoid because we haven't had experience with them, and thus, we are afraid to fail. If kids can jump in and do things with technology now, they'll be in better position to keep pushing and achieving as they grow older, because children are not frightened of being wrong, I'm not saying that being wrong is the same thing as being creative, but there is one thing that is certain and that is "If you are not prepared to be wrong you cannot come up with anything original", and when they get to be adult most children have lost the capacity of being wrong they are frightening of being wrong. Picasso once said that every child is born artist, but the problem is to remain an artist as they grow up. We don't grow into creativity, we grow out of it, or we educated out of creativity. Creativity in education is as important as literacy, it should be treated with the same importance.

Benefits of ED TECH for Kids

Over 20,000 were reached in their classroom with the Gospel of Innovation during the Tick-Stem outreach to different states in the southwestern part of Nigeria, unique strengths and innovation were ignited in different sections of the classroom.

1

TECHNOLOGY ENHANCES LEARNING
What items do you typically associate with the terms learning? Years ago, it was primarily books, schools, and libraries. Then, the computer introduced a new way to learn. While that use of technology really opened the learning floodgates, consider now what virtual and augmented realities could accomplish.

Instead of reading about how the pyramids were built, kids could step into a virtual reality and experience what it like to be present when the structures were erected. They could stand below and observe the massive stones being dragged into place, leaving them with vivid memories instead of words on pages.

2

TECHNOLOGY ALLOWS FOR CREATIVITY & FREEDOM OF EXPRESSION
Kids have big imaginations; too big to be contained. Where in the past they only had art supplies like crayons and colored markers at their disposal to get those ideas out and into a conveyable form, they now have computers, tablets, and so much more to help them turn such thoughts into reality. Sure, they still have pens and paper, but now, instead of - or in addition to - drawing a picture, they can create a 3D dimensional object using 3D pen, and then even send their drawing to a 3D printer to allow it to take on a physical form. The skills learned from interacting with technology each have an attached creative form of expression

3

TECHNOLOGY ALLOWS FOR INDEPENDENCE AND EMPOWERMENT
Think about the journey from idea to conceptualization. First, you think of something cool, unique, fun, etc. Then, you lay the groundwork and research that thing or idea a bit more. And finally, you do it, or start to actually put wheels in motion to bring the idea to reality. With technology, kids can carry out that process on their own! Without technology, who knows how far they would get? It's not only the act of creating and doing - which is cool enough - but that feeling of independence and empowerment. It can be incredibly powerful; beyond what words can convey.

PARENT-TECH

There is a gross misconception in African, especially Nigeria that technology is evil, and mostly attributed to Bad Events and people, especially the Internet fraudsters and all African Parent wouldn't want their children to be in such category of people or relate with anyone that have something to do with technology.

Parent Tech should be organized to lighten the burden of evil about technology in the minds of Parents, and their eyes should be open to the advantages that they and the children could derive from technology and most importantly how technology could be a developmental tool that could be used to advance the course of our country Nigeria, because for the success of Kids-Tech there has to be a direct permission and support from the Parent or Guardian before the child could learn freely and explore deep into the Technological World.

Before every workshop when the same quiz was conducted on all the different technologies in the TICK-STEM BOX, a majority weren't able to explain specifically what they know about, some haven't heard about it at all and did not know how the technology works. This was a huge relief because it confirmed the obvious speculations, lack of infrastructural development in Nigeria was mostly responsible for our laggard innovative cycle. The program hosted by Greenlab micro-factory has recorded more than successful training of over 5,000 students in five different states. The average attendees of the program were about 50 people. About 30 Kids were present at the event, Staff and the other adult trainees of Greenlab micro-factory made up the remaining figure.

A student from Benin, named Isaac said he wanted to become a mechatronics engineer because he wanted to design the first flying cars in Africa, to stop people from spending hours in traffic.

He was taught mechatronics using technology packed into the TICK-STEM. e took his concept through the process of sketching and developing a prototype for testing and simulation using 3D technologies.

The student was able to visualize the dream to make it appear more tangible and easy to achieve.
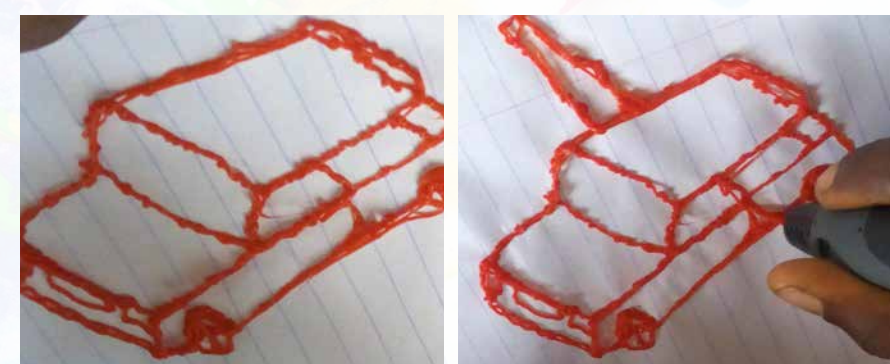
NATIONWIDE TOURNAMENT

ITESIWAJU ARDUINO SOCIAL CHALLENGE

ELECTRONICS IDEA HACK CHALLENGE.

PARTICIPATION AND IDEAS SUBMISSIONS START JANUARY 2020.

PROJECT DAY: March 21st 2020.

ORGANIZED BY:

GreenLab Microfactory

PARTNERS:

ARDUINO

Lab Hamburg
Think it! Make it!

76
DAYS
Countdown

GreenLab Microfactory

TICK STEM

Project Description:

An average Nigerian child knows the nursery rhyme which says 'We (children) are the leaders of tomorrow', the nursery rhyme ended with a plea to their parents for a sound education. Itesiwaju Arduino Social Challenge (IASC 1.0) is a step towards fulfilling this plea. IASC 1.0 is an idea challenge designed for the progressive orientation of children between the ages of 8 and 16 about technology development mostly with Arduino electronics.

Participation Requirement:

There are no specific requirements to participate in this challenge. Participants will be selected based on the uniqueness and significance of their ideas. Therefore, will be required to submit an idea about a low-cost technology solution they would like to develop, then build the prototype with the help of the team at GreenLab Micro-factory.

Number of Participants:

A total of 5 finalists will be invited to our node in Akure. This invitation includes logistics to and from Akure.

Prize and Deadline:

Arduino Starter Kit as well as other prizes.

Submission closure: 28-02-2020
Event Date: 21-03-2020
Submission link:
https://tinyurl.com/IASC2020

Event Address:

Green Garage, House 5, Stateline road, Futa South-gate, FUTA, Akure, Ondo State, Nigeria.

Would you like to support us by providing more gifts to the finalists or to support GreenLab in general.

Please contact us:
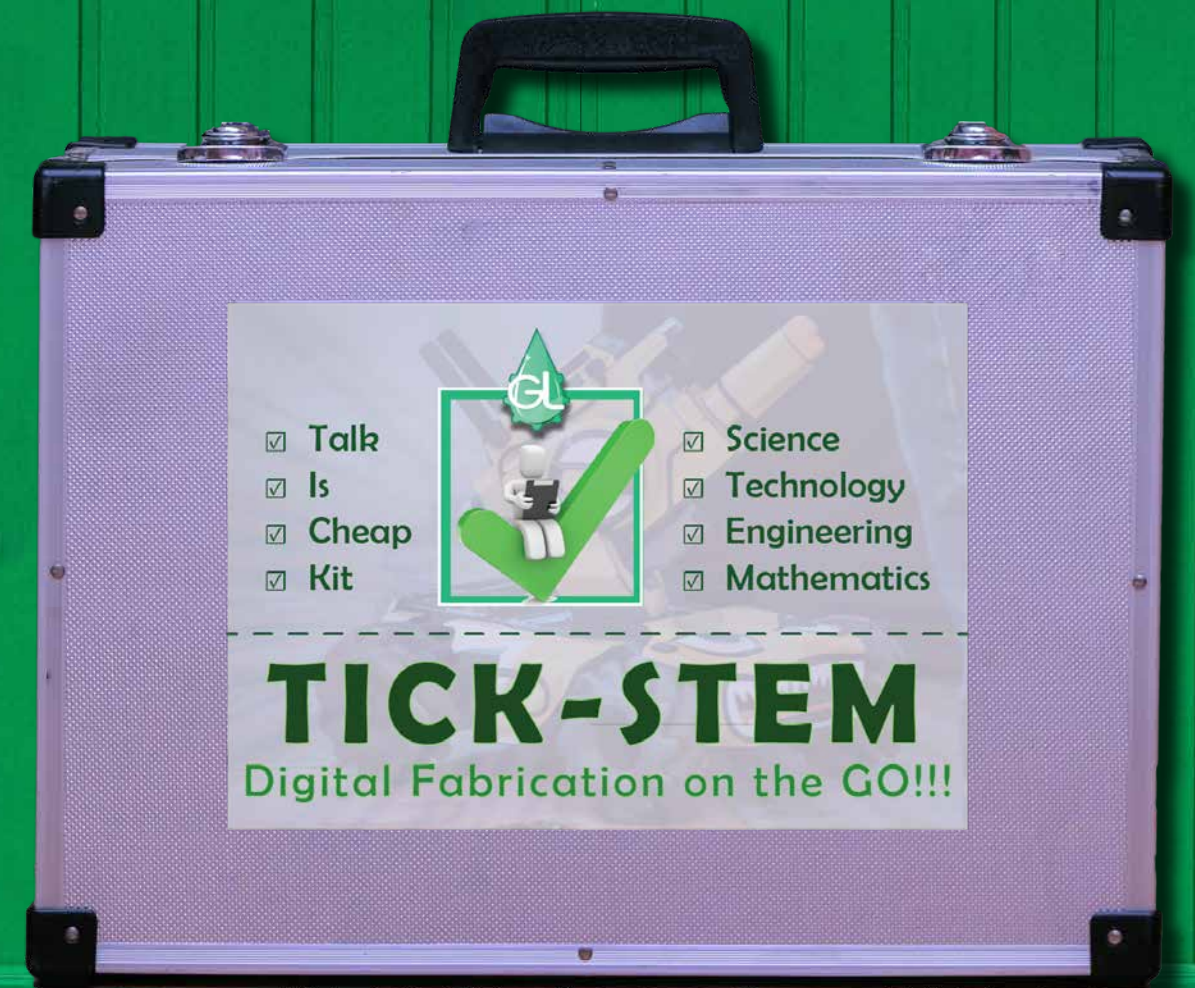+2348092205588 or info@greenlab-microfactory.org

...GreenLab - We don't just innovate, we greenovate...

Talk is Cheap, Let's get our hands dirty learning something new!!!

GL

1 Year > 20,000 Students = 6 States = 10 Cities

- ☑ 3d Pen
- ☑ Arduino
- ☑ Battery
- ☑ Hand Drill tool
- ☑ Hand-Held Sewing machine
- ☑ Inverter
- ☑ Makey–Makey
- ☑ Solar panel

☑ Talk ☑ Science
☑ Is ☑ Technology
☑ Cheap ☑ Engineering
☑ Kit ☑ Mathematics

TICK-STEM
Digital Fabrication on the GO!!!

TICK–STEM

TALK IS CHEAP KIT — SCIENCE TECHNOLOGY ENGINNERING AND MATHEMATICS

The Gospel of ED TECH
for Kids

Concept

We've always believed that accessible and understandable technology for every age is the future.

TICK, which stands for Talk is Cheap Kit, is a STEM (Science Technology Engineering and Mathematics) kit developed by GreenLab micro-factory to effectively propagate and educate primary and junior secondary school students about science and technology.

We strive to empower and increase the awareness of Technology by targeting the right generation and grooming them very early. We train kids between the ages of 7-14 the skills to become innovators in the fields of engineering, science, technology, and mathematics, using full equipped Tick-STEM BOX.

TICK, equipped with 3D pens, circuit boards, sewing machines, and even its power generation system, is the miniaturized version of FabLab and other digital fabrication laboratories. We intend to find and nurture our Change-makers from the cradle... Talk is Cheap - It's time to work.

Our Vision

The TICK-STEM project is a powerful vision of Greenlab micro-factory to inspire young minds (especially children) about being a developer in this current century.

Our Mission

We strive to build confidence in each child to engage in the fast-growing world of technology. We believe that exposure to and mastery of techniques and skills used in science, technology, engineering and mathematics at an early age will ensure a bright future in these fields and others.

Our Teaching Philosophy

Teaching is a creative process, it's not just a delivery system where teachers just there to pass on received information, great teachers do that but what great teacher also do is to provoke, mentor stimulate engage, the students because at the core education is about learning, if there is no learning there is no education going on. The only point of education is to get people to learn learning. We encourage the use of trial and error to find a way to solve the problem themselves. Our philosophy is that by experimenting, troubleshooting and collaborating, students can better understand and retain important ideas and concepts.

> *There are three sorts of people in the world those who are immovable, there are people who are movable people who see the need for change and are prepared to move and there are people who move people who make things happen and if we can encourage more people to move that will be a movement and if the movement is strong that is in the best sense of the world a revolution and that is what we need. — Benjamin Franklin.*

Talk is Cheap, Let's get our hands dirty learning something new!!!

Agenda of every workshop held

The goal of the workshop, to encourage a 'Do it yourself' (DIY) and 'Do it with others' (DIWO) growth mind-set within the youth today who would essentially progress to being the future of Nigeria pushing and supporting the "Made in Nigeria" industry. The idea of today through the workshop would enable noticeable developments over 5-year interims spanning well into the future and thus enriching the lives of many rather than private individuals.

Nevertheless, this was the reason for every workshop organized by GreenLab micro-factory was there to inject seeds of knowledge which if watered correctly could essentially promote infrastructural development and provide sustainable solutions to the lurking social problems in Nigeria.

TICK-STEM BOX (TALK IS CHEAP KIT SCIENCE TECHNOLOGY ENGINEERING AND MATHEMATICS).
  » 3D Printing using a 3D Pen.
  » Learning about conductors using the Makey-Makey Board.
  » Hand Drilling tool.
  » Hand-Held Sewing Machine.
  » Energy Conversion.
  » Solar Panel, Inverters, and Batteries.
  » Green Nigeria, making Nigeria Green Again.

Hands-On with TICK-STEM

Skills

Students were taught how to artistically use a 3d pen for creative purposes, and how to use a hand-held sewing machine. The hand drill tool was used to explain the concept of Computer Numerical Control (CNC) milling machine to the students trained.

Knowledge

All the students were taught;
  ☑ How to Greenovate.
  ☑ Dimension, and its types.
  ☑ Conductors and its types.
  ☑ How current flow through a conductor.
  ☑ Energy conversion and inverters.
  ☑ Importance of a Greener environment and how to make their environment GREEN.

TICK-STEM – Exploring every equipment in the Box

The TICK-STEM BOX makes it easy to introduce STEM (Science Technology Engineering and Mathematics) to elementary school kids. The TICK-STEM is comprised of modules that fit together, thus providing endless hours of creativity, because we know that kids like having fun while learning.

STEM skills go hand in hand, combined with fun activities like drawing and crafting, with coding, electronics, designed around themes like conductor and gaming with Makey-Makey Board & craft using 3d pen to create 3d craft, TICK-STEM combine digital learning with hands-on technology. So much more than what's in the box and the student are engaged for a minimum of 3 hours' classroom section.
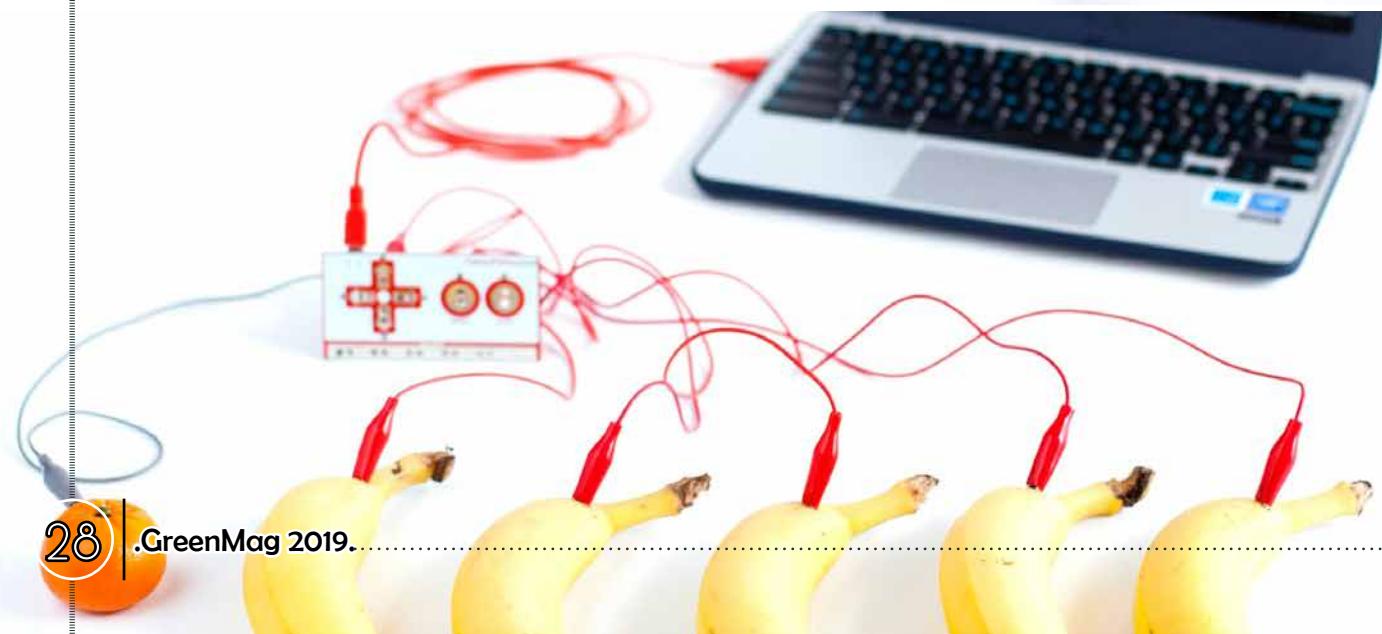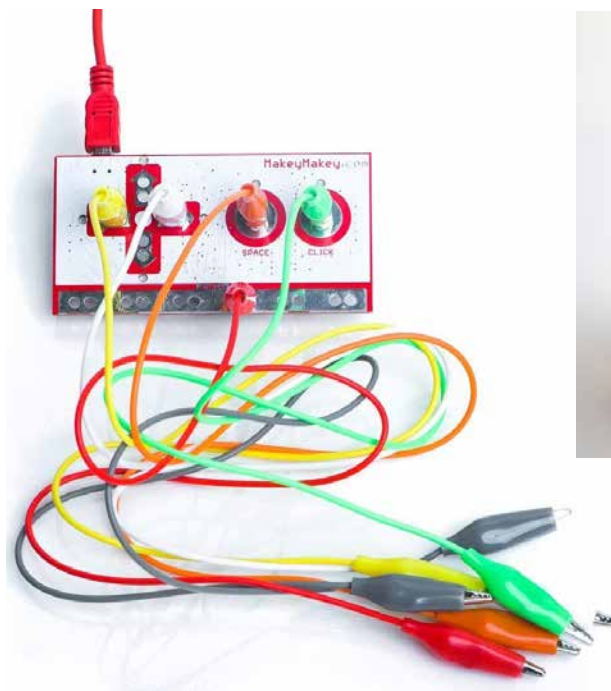*Serious Fun, Serious Learning.*

COMPONENTS IN THE TICK-STEM

Solar panel:

Solar cells are devices that use the sun's light or heat to produce electricity. The job of each cell is to turn sunlight into moving electrons. Each cell contains two different layers that are stuck together. Solar cells can be used to generate electricity from sunlight. It is a device that converts light energy into electrical energy. Sometimes the term solar cell is reserved for devices intended specifically to capture energy from sunlight, while the term photovoltaic cell is used when the light source is unspecified.

Arduino:

Arduino refers to an open-source electronics platform or board and the software used to program it. Arduino is designed to make electronics more accessible to artists, designers, hobbyists, and anyone interested in creating interactive objects or environments. Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards can read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED.

Battery and Inverter:

An Inverter is an electronic device capable of transforming a Direct Current(DC) into alternating current (AC) at a given voltage and frequency. It is therefore indispensable to use it to power by DC, electrical devices that work in AC.

A Battery converts stored chemical energy into electrical energy. Due to chemical reactions within the battery, the anode builds up an excess of electrons. This causes an electrical difference between the anode and the cathode. The electrons want to rearrange themselves and displace the extra electrons in the cathode.

Makey–Makey:

Makey Makey is a PCB board that allows you to send a keyboard message through an everyday object to a computer. So when you touch a banana or play dough which is connected to the Makey Makey with Alligator clips, the computer or device thinks you are pressing a button on the keyboard or mouse. In essence, you can turn anything conductive into a keyboard. It allows kids to have exciting moments with creativity, they play the game with what they drew and not a game-pad that they are used to, and also play musical instruments and more importantly have fun while learning.

Hand-Held Sewing machine:

A hand-held sewing machine is a cute little gadget which can be used for small repairs, instead of dragging out a large sewing machine. They can be used on any fabrics including cotton, polyester, silk and even nylon.

Hand Drill tool:

The key grouting tool is the grout float. This is a large, flat, rectangular blade with a handle you will use to spread the grout around to fill in all of the spaces between tiles, It can be used engrave on wood, aluminum, and other soft materials

Over 20,000 were reached in their classroom with the Gospel of Innovation during the Tick-Stem outreach to different states in the southwestern part of Nigeria, unique strengths and innovation were ignited in different sections of the classroom.

A student from Lagos, named Praise during a TICK-STEM class said he wants to become an Aeronautical Engineer because he wants to design the first Nigeria Made Airplane, Using the TICK-STEM box, he was taught the process birthing Innovations from Ideas. He was taught the rudiment of designing an aircraft using the TICK-STEM, he was walked through the method of sketching his concept and refining his designs.

He was taught Prototyping; making a prototype for testing and simulation using 3D Printing technology, which was demonstrated using a 3D Pen.

TICK-STEM took this Praise closer to his dream of becoming an aeronautical engineer, Ed Tech made his dream look real as if he was in Virtual Reality Box. Most importantly thousands of students who took part in the initiative were changed in one way or the other.

3d Pen:

A 3D pen is a pen that prints in 3 dimensions. ... But instead of gluing things together, the colored plastic that oozes out of the pen's nozzle is used to draw figures and artwork. It's sort of like drawing stick figures. You can work the plastic into just about any shape and apply it to most surfaces. You can use it to add raised decorative designs to everyday objects. With practice, you can even make 3D drawings in space. These pens can also be used to modify and repair other 3D printed objects.

Designed without hot components completely safe for children aged 8+. Pen plastic and nozzle can safely be touched with no burn risks. 3D ART MADE EASY FOR KIDS: Vinyl hardens rapidly allowing children to draw in the air with only one speed and one temperature.
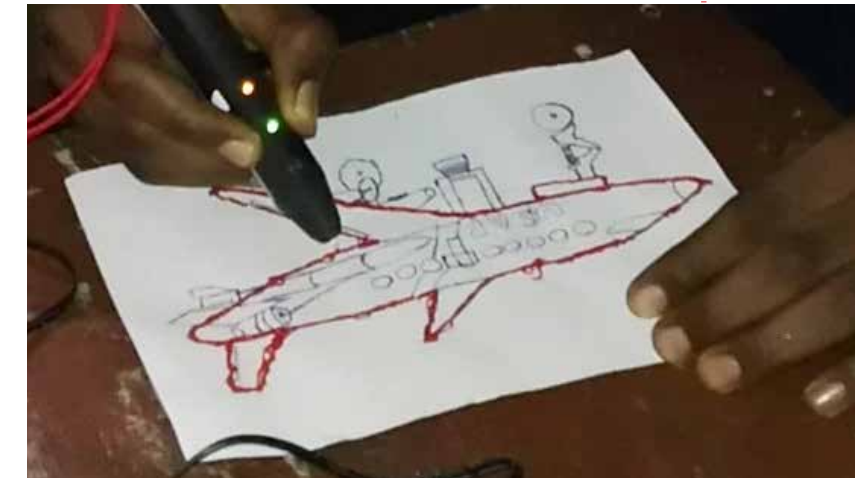
TICK - STEM EXPLORATION MAP

TICK-STEM reach

🌲 Tick stem in Lagos
🌲 Tick stem in akure
🌲 Tick stem in ondo
🌲 Tick stem in ekiti
🌲 Tick stem in Benin
🌲 Tick stem in Oyo
🌲 Tick stem in Ibadan
🌲 Tick stem in Osun
🌲 Tick stem in ado
🌲 Tick stem in Ife

The Locations marked with the GreenLab logo are the places and states that the TICK-STEM was used to train and impact student with innovation in Nigeria .
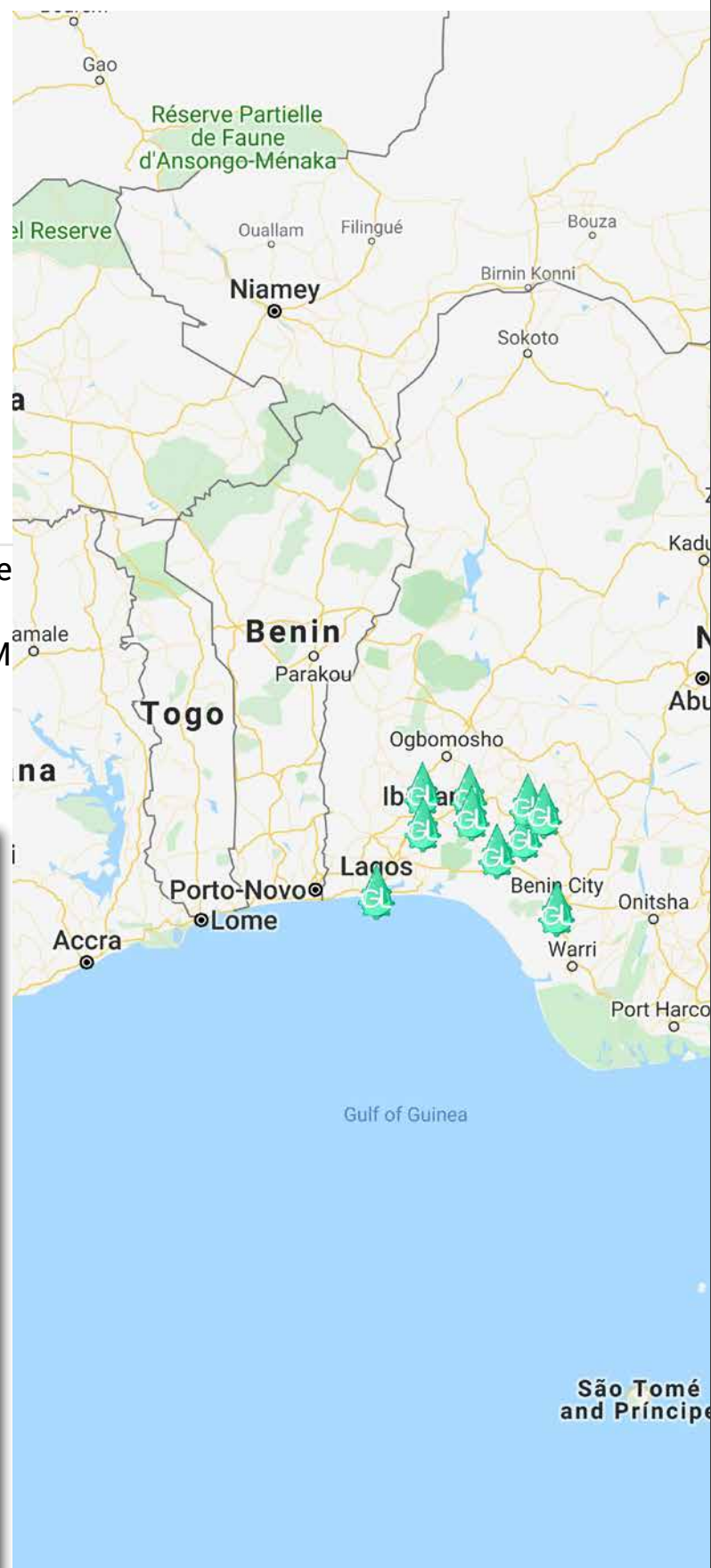
Tick-Stem Activities:

Number of Student:
20,000 Students

Number of states:
☑ Ibadan
☑ Lagos
☑ Ekiti
☑ Benin
☑ Akure

Number of Schools:
50 Schools

Other Activities:
Several Community Outreach.

Participants Outcome

At the end of the workshop, the students were so reluctant to go home, even though the program was outside their normal school curriculum, they were so much drawn to these technologies that they did not want to do away with them. They were assured by the GreenLab officials that they can come over to the garage every Saturday to learn something new.

☑ Every Student was taught the Importance of Green Environment and the importance of making their environment clean and how to make their environment clean, and more importantly, making Nigeria Green Again.

☑ Every student was taught how to Greenovate, not just learning but they were taught how to make something creative from what they have learned in various practical sessions.

☑ By the end of the session at each school, the participants were able to individually explain what they understand about Dimension and were able to identify how many dimensions any given object has.

☑ How to use a 3d pen to create a basic prototype.

☑ How to use Makey-Makey board

☑ Every student that participated have deep understanding about conductors and various object around that are poor conductors and good conductors of electricity.

☑ Basic knowledge about Energy Conversion, Solar Panel and different types of Battery and their voltage.

Tick-Stem Appraisal

The school and teacher were so appreciative of the knowledge imparted on their student and requested for their teacher to be trained so that they can continue to teach the student so that their learning can be progressive, they also requested that for the financial cost of getting a FabBox (Tick-Stem Box).

You only know something is fun when you lose track or ignore the time factor. The students were so engrossed for more than 5 hours while learning these technologies, as they were moving from one section to another learning different aspect of these technologies from their angle to make an amazing project from the different section.

For example, all the students that attended learned how to identify and differentiate between a conductor and insulator using Makey-Makey electronic board. They learn about electronics prototyping using the various type of Arduino board, from the robotics section, they were taught how to assemble a robotic car from scratch by themselves and they were taught how to program the robot to do whatever they want to achieve. The 3D printer tutor exposed each student to the world of three-dimension, where everything has a length, width, and height, and exposed them to how to 3D print a product prototype using the 3D printer. In the 3d pen section, they were taught how to creatively use the 3d pen to create artworks without much effort.
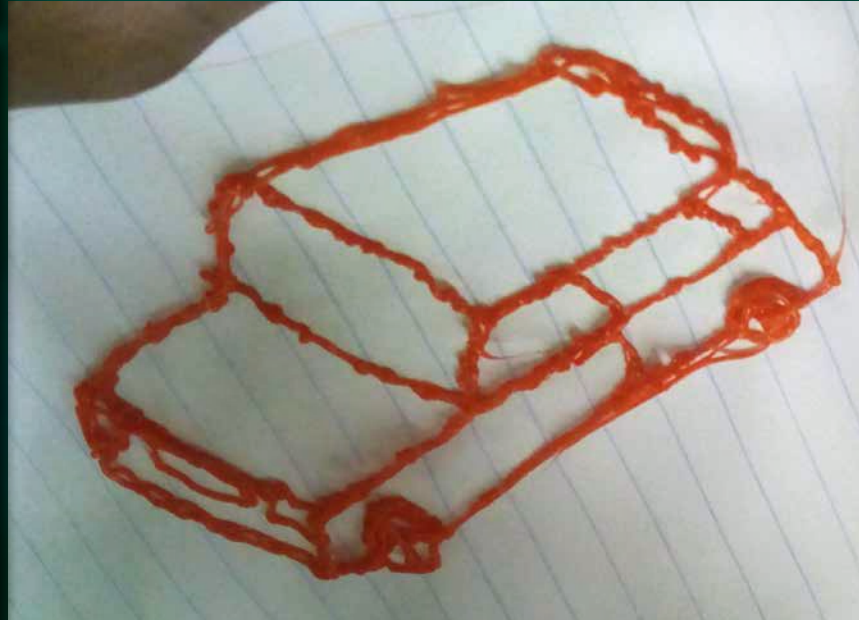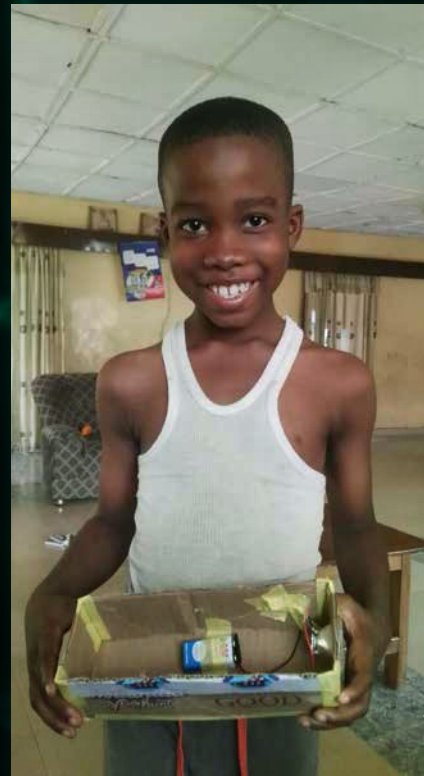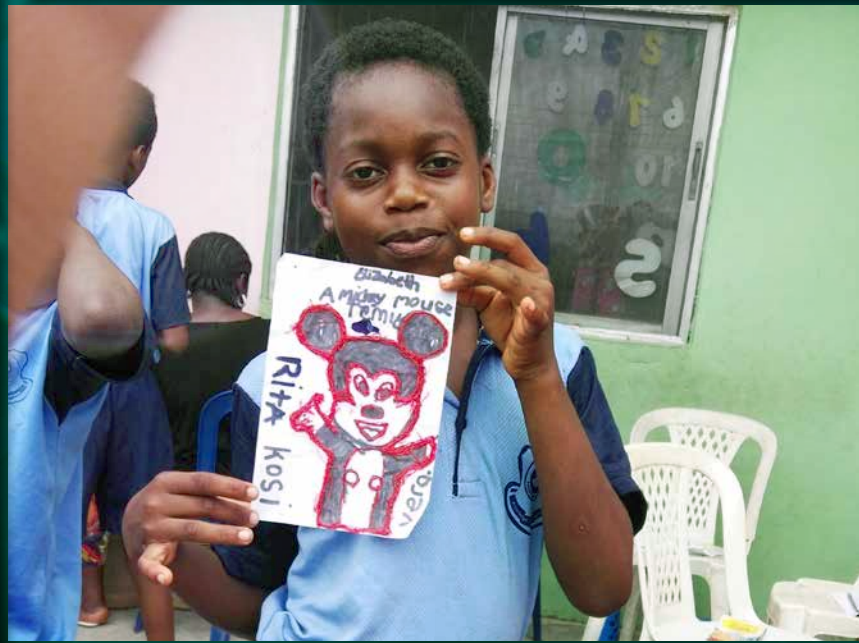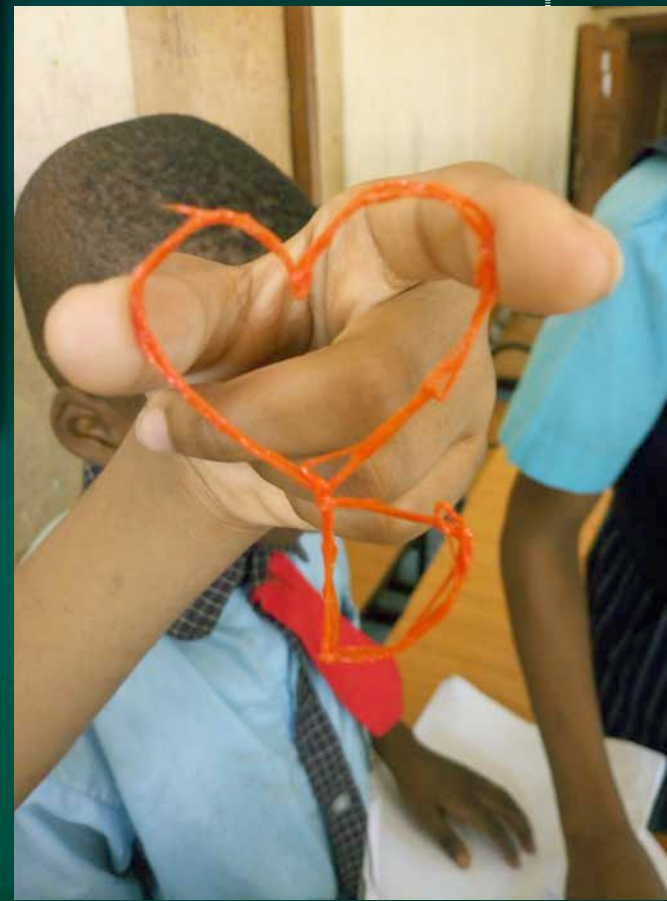
Picture Catalog

A VAN
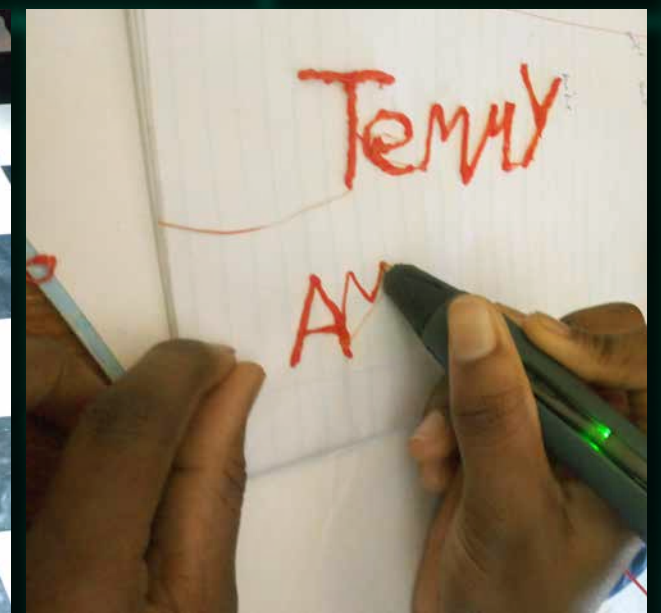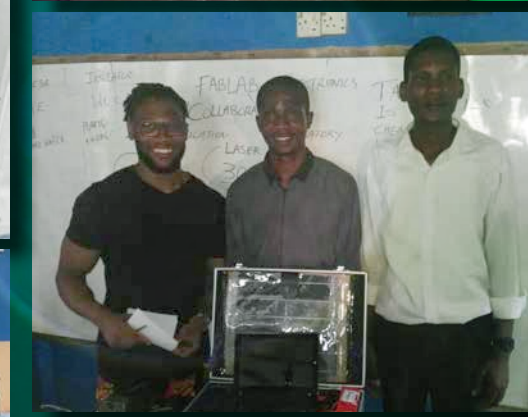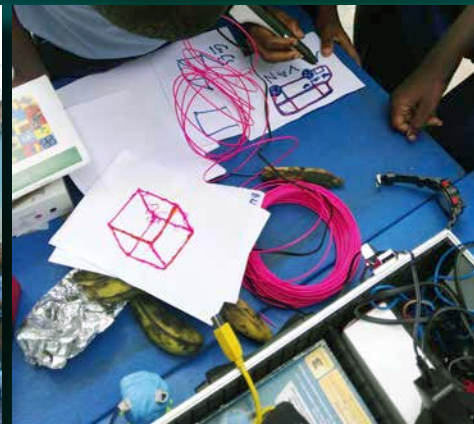
Meet The TEAM

Babasile Daniel

Caretaker

Antonia Akinola

Project Coordinator

Ogunranti Adebayo

Greenovator

Kolawole Oluwasegun

Greenovator

Onyemaechi Ogiri

Legal Adviser

Ogawa Yuji

Project Adviser

Agamini Emmanuel

Intern

Raji Bolaji

Intern

Green Garage

Do You Know?

"Almost everyone at a point in time has an idea full of potential, no doubt. But not every idea accomplished the said potentials." The question is are you going to take action?..

your idea needs:

- A space, where you brood and execute it
- A Backer, Someone that will finance your Idea.
- An Expert, Someone that will guide you through the ideation process.
- motivation, passion e.t.c....

All this and more is available at the Green Garage...
Contact us to get a Free Space...

To make enquires, **CONTACT:**

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+2348092205588 📞

Do You have an Idea?

Are You using Hardware to solve a major problem?
You want a place to work?

Use Our Space for FREE!!!

Green Garage
No 5,Stateline Road,
FUTA Southgate,
Akure.