

Bringing DOCTOR DEMO'S LABORATORY SCIENCE SHOW

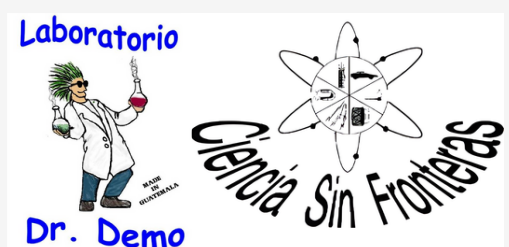
to girls from public
schools in rural
Guatemala



Diversity in Science Grant Report

INTRODUCTION

To foster scientific literacy and encourage STEM interest among young girls, we successfully delivered our Science Show (Doctor Demo's Laboratory Science Show) to girls from elementary public schools in Alta Verapaz, Guatemala; with the financial support of the Biochemical Society through the Diversity in Science Grant. This initiative aligns with global efforts to close gender gaps in STEM fields and empower girls through education. We chose the rural area of Alta Verapaz because, outside Guatemala's capital city the opportunities to have this type of scientific experience are significantly lower, and the gender disparities in education and economic limitations impact educational opportunities even more. Our science show is a tool to introduce scientific concepts in a captivating manner, aiming to promote an enjoyable science learning experience and spark curiosity and motivation for STEM careers among participants.



PROJECT BACKGROUND

Guatemala faces significant challenges in science development and is classified as one of the science and technology-lagging countries, in Latin America. Factors contributing to this include limited national investment in science education, scarce research and development opportunities, and low public awareness of the benefits of scientific advancement.

In schools across Guatemala, science instruction is often theoretical and lacks the hands-on, exploratory approach, essential for fostering a deep understanding of scientific concepts. For students, especially girls, this limited exposure makes science seem abstract and detached from their everyday lives. This trend is particularly pronounced in rural areas like Alta Verapaz, where the lack of trained teachers, educational materials, and lab facilities further restricts access to science education.

Alta Verapaz, located in the northern highlands of Guatemala, is characterized by its rich natural resources, lush landscapes, and diverse indigenous communities.

Despite its natural beauty, the region faces high poverty rates, limited infrastructure, and substantial barriers to education, particularly for girls.



Girls in Alta Verapaz are often encouraged to prioritize domestic responsibilities over formal education, which can lead to high dropout rates and reduced school attendance. Consequently, many girls do not have the opportunity to engage deeply in scientific subjects, let alone consider careers in STEM fields.

Presenting the Doctor Demo's Laboratory Science Show in Alta Verapaz aimed to overcome these barriers by offering an interactive and visually engaging approach to science education.



PROJECT GOALS

● TO DELIVER AN ENGAGING SCIENCE SHOW TO GIRLS IN GUATEMALA'S RURAL COMMUNITIES

● TO INTRODUCE STEM CONCEPTS IN AN ACCESSIBLE AND ENJOYABLE FORMAT

● TO BREAK GENDER STEREOTYPES AND ENCOURAGE GIRLS TO PURSUE EDUCATION AND CAREERS IN SCIENCE.

● TO IMPROVE PARTICIPANTS' ATTITUDES TOWARD SCIENCE AND THEIR SELF-PERCEPTION IN THEIR ABILITY TO ENGAGE WITH STEM SUBJECTS.

● TO IMPROVE THEIR KNOWLEDGE OF BASIC SCIENTIFIC CONCEPTS THROUGH ENGAGING DEMONSTRATIONS.



PROJECT IMPLEMENTATION

PLANNING AND COORDINATION

Including UNICEF as a partner for bringing the science show to Alta Verapaz was instrumental in the project's success. With its deep understanding of the region's terrain, educational landscape, and the specific needs of local communities, UNICEF played a crucial role in organizing and coordinating the event across girls' public schools. They helped identify schools with suitable spaces to host the girls and set up an engaging, safe environment for the shows. UNICEF's logistical support, from arranging transportation to securing the school venue, was very helpful.



DOCTOR DEMO'S LABORATORY SCIENCE SHOW

"Doctor Demo's Laboratory" is an engaging science show, that uses captivating demonstrations led by Julián Amorín under the persona of "Doctor Demo". Inspired by the Christmas Lectures from the Royal Institution, Julián Amorín and Jayne Cabrera founded Ciencia Sin Fronteras 27 years ago and developed the science show aiming to explain complex scientific concepts, utilizing elements like balloons, soap, fire, and toys to elucidate principles like Newton's laws, Bernoulli's Principle, Archimedes' Principle, Polymers, Energy, and more, the show is comprising around 35 to 40 demonstrations carefully sequenced to thread the concepts and maintain audience attention, tailoring the approach and depth of explanation based on the audience's age.



ENGAGEMENT AND PARTICIPATION

To ensure maximum engagement:

- **THE GIRLS WERE ALLOCATED BASED ON AGE AND GRADE.**

Groups with girls from 1st to 3rd grade.

Groups with girls from 4th to 6th grade.



ENGAGEMENT AND PARTICIPATION

To ensure maximum engagement:

- **GIRLS WERE ENCOURAGED TO VOLUNTEER IN SOME OF THE DEMONSTRATIONS AND ASK/ANSWER QUESTIONS DURING THE SHOW.**



ENGAGEMENT AND PARTICIPATION

To ensure maximum engagement:

- **DEMONSTRATIONS RANGE FROM USING HOUSEHOLD ELEMENTS TO ENSURE GIRLS FEEL CLOSE TO SCIENCE, TO THE USE OF SPECIALIZED EQUIPMENT SUCH AS THE VAN DE GRAAFF GENERATOR TO INTRODUCE THEM TO THOSE LABORATORY TOOLS.**



In total, we reached an attending of of
1125 girls
from elementary school



This project has not only introduced essential scientific concepts to young girls but has also empowered them to envision a future in STEM, breaking down traditional barriers and inspiring them to pursue further education and careers in science.

The hope is that these science shows have planted seeds of curiosity and ambition that will flourish in the coming years, driving positive change in both the local and national context.



RECOMMENDATIONS NEXT STEPS

Following the success of the science shows, a promising next step involves building on the enthusiasm and interest shown by teachers, many of whom expressed a desire to integrate science demonstrations into their regular lessons. Recognizing this eagerness, we see a need to provide specialized training for teachers, equipping them with the skills and resources to conduct engaging, hands-on science activities in their classrooms. This training could focus on developing science demonstrations using household materials, making these activities both accessible and sustainable for schools with limited resources. By empowering teachers with practical knowledge and simple, adaptable science tools, we can create a more permanent culture of scientific curiosity and experimentation within these schools, ensuring that students continue to benefit from active learning long after science shows.



ACKNOWLEDGMENTS

We extend our heartfelt gratitude to the Biochemical Society for their invaluable support through the Diversity in Science Grant, which made it possible to bring this impactful project to life. This funding allowed us to reach and inspire 1,125 girls in Alta Verapaz, providing them with a unique opportunity to engage with science in an interactive and exciting way.

Through your commitment to fostering diversity and inclusion in science, we overcame logistical challenges, delivered quality science demonstrations, contributed to their science learning and sparked interest in STEM among young girls in Alta Verapaz, Guatemala who face significant educational barriers.

The Biochemical Society grant was a pivotal resource that not only enabled us to deliver our science shows to girls in Alta Verapaz but also attracted key partners like UNICEF to support and enhance our mission. This collaboration was possible because of the Biochemical Society's trust, which validated our project's goals.



We extend our thankfulness to UNICEF for their support in coordinating safe and efficient transportation throughout Alta Verapaz, their assistance in covering logistical needs, from arranging necessary routes to providing resources for our journey and coordinating with the local schools allowed us not only to reach the location smoothly and securely but also to impact more girls than our original target!

FROM THE GIRLS...

¡Muchas
GRACIAS!

Thank
you!



BIOCHEMICAL
SOCIETY

1. Gusto el último experimento el cortocircuito. **I LIKED THE LAST EXPERIMENT!**



2. Me gusto el experimento de la coca cola que se balanceada. **I LIKED THE BALANCING SODA CAN DEMONSTRATION**

3 me Gusto lo que experimentaron y lo que explicaron **I LIKED THE EXPLANATIONS**

4 Me gusto el corto circuito y la forma en que lo expresaron y explicaron. **I LIKED THE "HUMAN CIRCUIT"**

5. Lo que me gusto fue que la pelota estaba volando y también lo que explicaron. **I LIKED THE FLYING BALL**

6 Me gusto todo el show, "4" "A" 😊



7 Me gusto todo el show x como hablan. "4" "A" 😊

Ciencia Sin Fronteras

Laboratorio
Dr. Demo

MANY GIRLS EXPRESSED THEY LIKED LEARNING HOW ELECTRICITY TRAVELS BY ACTING OUT THE "HUMAN CIRCUIT"



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