

Call for Proposals 2013 - TF2

Contact person

Mponda Malozo

Contact email

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Project details

Task Force

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1. Project title:

Astro-Science Curriculum for Tanzania

Project title abbreviation

AsCT

2. Project summary (maximum 2000 characters):

Astro-Science Curriculum for Tanzania is a project designed to prepare the integration of astronomy in the teaching of science in Tanzania schools. It is originating from the endeavor of establishing a Center for Science Education and Observatory (SCEO). Currently UNAWE-TZ and Telescopes to Tanzania are collaborating with a Tanzanian NGO on the development of the Center.

The creation of the SCEO is based on an understanding of the critical role of astronomy in teaching science and the importance of building the curiosity of students for the love of science subjects. In recent years national examination results in Tanzania have shown poor performance in science subjects as well as a decreasing number of students who are taking science subjects.

There are a number of reasons for this trend, but teaching methodology is one concern.

Despite of the mention of astronomy in the national curriculum as one of the areas to enhance academic performance there is still poor integration. Solar system is all that is known to most teachers and students.

The center for science will be a pilot facility where teachers will learn new methods of teaching science using astronomy on which the government would watch and use to spread the idea across Tanzania. The Center's program will have a curriculum which can easily be adapted to various schools within the country and East Africa region. In this process we will bring together teachers, government education officers, representatives of astronomical organizations and experts in teaching astronomy.

The participants will review the current science teaching curriculum of Tanzania; identify areas where astronomy can be integrated; and add hands on astronomical activity to enhance understanding of the concepts. The drafted curriculum will then be tested at the schools of the participating teachers, and eventually adopted as the teaching curriculum for SCEO. We are hopeful that it will go on to be used for Tanzanian schools.

3. Project start date:

15/01/2014

4. Project duration (how long will the project take to complete?):

Preparation and follow-up will be 10 months with a 7 day retreat for participants at the mid-point

5. Project Location (where will the project take place?)

The Project will take place at Ailanga Secondary School in Arusha, Tanzania which is the site for the Center for Science Education and Observatory.

6. Total grant applied for in Euro

10,000 EUR

7. Objectives (what do you hope to achieve with this project?)

There are a variety of objectives being pursued for 7 components of the Center for Science Education and Observatory. They are:

1. The development of a core curriculum and teaching pedagogy for the Center for Science Education.
2. Developing a relationship with science, geography, and mathematics teachers in Tanzania to build an ongoing use of the Center as a resource for them and their students.

In this proposal we are focusing on Objectives 1 and 2.

3. Building relationships with other astronomers, astro-physicists, and other science teachers in East Africa to insure a quality teaching staff and resource base for the center.
4. Development of a non-governmental status organization.
5. Creating institutional structures that are based in Tanzania and administered by a governance board of Tanzanians.
6. Developing the infrastructure to build an observatory and the refurbishing of the 12 inch Cassegrain scope to be housed there.
7. The development and/or construction of additional space needed for the Center at the Ailanga location.

The objective outcomes for this proposal are:

- Identified areas where astronomy can be integrated when teaching science (An evaluation indicator will be the successful completion of the first phase of the project.)
- Teachers who are equipped in the use of astronomy to teach science. (An evaluation indicator will be the successful completion of the third phase of the project.)
- A curriculum which uses astronomy to teach science subjects. (An evaluation indicator will be that the curriculum is used in the 6 pilot schools.)
- A curriculum for teaching teachers at the Center for Science Education. (An evaluation criteria will be the successful completion of phase four of the project)
- Involvement of government in understanding the potentials of astronomy in Tanzania. (An evaluation criteria will be the successful recruitment of two government/education leaders as participants in this project)

8. How does your project satisfy the call's criteria?

The project will help many Tanzanian teachers and children to have a better understanding of or interest in astronomy and science which aligns with the goals of IAU's 10 year strategic plan on:

- Raising the level of astronomy development in as many countries as possible, so as to maximize the size of population reached
- Works to include aspects of astronomy as aids to the primary and secondary education of as many children as possible.

It also concentrates on the important components outlined in the call for proposal which includes the component of:

- Teacher Training and development

The Center for Science Education aims at developing astronomical knowledge linked with the science curriculum in Tanzania for teachers, students, and amateur astronomers. The center will focus on education and learning. It will generate income through astro-tourism activities. It will contribute to the economic development of Tanzania and serve as a model for the development of similar centers in other areas of Tanzania and East Africa.

- Resource development and vetting
- Explore distance learning options applicable to school level education including: continuity of distance learning work with Vivianne Hoete at Yerkes Observatory in Wisconsin in the USA.

Working with Dr. Mick Storr, (Coordinator of High School Teacher Programmes at CERN) to make arrangements for Tanzanian teachers to participate in CERN distance learning activities. We will have remote telescope access through Skynet and will present this material to teachers

Through Telescopes to Tanzania and UNAWA-TZ we have many world-wide contacts who are available to present various subject matter as needed.

- Establish reference group for curriculum evaluation

- Support existing networks for education

At least one of the participants in the project will be a representative of the Tanzania Teachers Union (over 200,000 members nation-wide) In addition a government district education officer will participate

9. Target Audience (who will benefit from this project?)

The target audience for the project shall be teachers and their students; plus government education officers, astronomical organizations, and education stakeholders. The project will create the needed buy-in and support for educators using the government curriculum and syllabus. The enhanced teaching methodology of science subjects will improve national test outcomes and encourage students to continue their studies in the fields of science, technology, engineering and math.

10. Overall project implementation plan (how will you carry out the project?)

The project shall be implemented by UNAWE-Tanzania and Telescopes to Tanzania in collaboration with the Tanzanian Founding Board of the Center for Science Education and observatory.

The Board is composed of Tanzanian community members and science enthusiasts who work at universities, schools, private organizations, charitable organizations, finance institutions and research institutions within the country. The NGO is in its formation stages. The first activity the Board is sponsoring, will be held at Alinga School, (the location of the Center) on 3 November 2013 in conjunction with the hybrid solar eclipse.

The project organizations are working closely with leaders of different astronomy programs throughout the world as advisers for the program. These includes: Rosa Duran (GTTP), Mike Simmons (AWB), Pedro Russo (UNAWE), Carl Pennypacker (GHOU)

The entire process shall be implemented in four phases as follows:-

1. First phase: Project leadership and advisors will review the Tanzania national curriculums for science and geography. Currently, the Ministry of Education and Vocational Training includes the Solar System in the Form I curriculum. Additional astronomy related topics are scattered throughout the Physics, Chemistry and Biology curriculum. Project leadership will identify topics where astronomy related subjects occur and outline areas where materials can be developed to supplement the curriculum. The focus will be on areas where the Center can provide additional astronomy resources and teaching methodologies.

2. Second Phase: Project leadership will identify and recruit teachers, government education officers, representatives of astronomical organizations and education stakeholders to review and comment on the revised outlines in preparation for the educator retreat. Involving a wide range of stake-holders will be essential for the successful completion of the project.

3. Third phase: The five member team will bring together the identified participants for a one week retreat to develop teaching plans for an Astro-science curriculum. The teaching team has the science, education and hands-on pedagogical expertise to lead the participants in a variety of development sessions during the week. Participants will work as an interdisciplinary cadre to create and assess the hands-on teaching activities the group generates.

4. Forth phase: The leadership team will follow up on the effectiveness of the proposed Astro-science curriculum with the teachers in an interval of two weeks for immediate evaluation, then two months of feedback by phone and e mail on their progress.

Under the leadership of the project coordinator the team will make visits to the participating schools during the final project period to get assessment from students and teachers. Based on feedback the team will revise and edit the Astro-science teaching outlines for use at the Center for Science Education.

11. Project timeline (please provide specific dates and activities throughout the project)

- From 15 January to 28 February, 2014 Review of Tanzania science curriculum and available astronomy resources will occur.

a. Project team will get copies of current science and geography curriculums

- b. Team will evaluate and ascertain where astronomy subjects are taught
 - c. Team will ascertain where astronomy subjects and study will enhance the overall science curriculum
- Between 1 March and 31 May, 2014 Identification and recruitment of participants to review different resources from March to May 2014
- a. Through the leadership of the Center for Science and the world-wide contacts of the project team, teachers of science subjects grounded in astronomy will be asked to evaluate and make suggestions regarding the current curriculum.
 - b. Beginning in the fall of 2013 teacher participants will be sought. In October 2013 the team will be at 6 secondary schools in the Meru area of Tanzania. At the visits teachers who are interested will be identified and relationships with the heads of the schools further established.
 - c. In March the heads of the 6 schools will be contacted for their commitment to the project .
 - d. Each teacher selected will need to have the support of their school heads and a commitment to carry out the testing of materials developed.
- From 8 to 14 June 2014, One week retreat for all participants to draft Astro-science curriculum from 9th-14th June 2014
- a. Teachers will live on campus and be provided with their housing, food and necessary materials to study and create curriculum models.
 - b. The process for the week will include hands on learning of various science subjects related to the curriculum.
 - c. A process of inquiry, exploration and experimentation will be used to test the various curriculum ideas.
 - d. Each participant will write up and develop a specific model for teaching one aspect of their science subject using astronomy as a base.
- Immediate evaluations follow up from 22nd to 28th June 2014.
- a. Evaluations will be in written form at the end of the full week, with follow up phone conversations as needed.
- From July 1 to August 31: Two month feedback from Teachers in the end of August via phone and e mails.
 - Starting September 1 school follow up visits by the coordinator will be held. All follow up visits will be completed within five months after the development of the curriculum.
 - From October 1 to November 15 Report writing and way forward. Based on the tested material a manual for the Center for Science will begin to take shape.

12. Project deliverables (at the end of the project what will you be able to measure to see whether the project has been successful?):

At the end of the project we shall have the following deliverables:

1. A drafted Astro-science curriculum in place for Tanzania schools and Center for Science based on the existing required Tanzanian curriculum.
2. Have a total of 6 teachers, 2 education officers from the government, 2 representative of astronomical organization and 2 education stakeholders fully informed, involved and trained on the use of astronomy for science teaching in Tanzania.
3. Have 6 teachers exposed to and trained in a pedagogy of science education that is inquiry and experiential

based.

4. Have 6 different schools benefited from the new Astro-science curriculum

5. Have impacted 700 students with the new Astro-science curriculum and with hands on experience in learning. (The focus on 6 schools and 700 students reflects the scope of this pilot project that would be watched by education officials and used to spread the idea across Tanzania.)

6. Have created an enthusiasm for the potential of the Center for Science building a base for future involvement of teachers and students in astronomy.

7. Initiate a working partnership with the government, education stakeholders, astronomical organizations in Tanzania and East Africa, and government education officers.

13. Contact details of project leader:

Full name of project leader

Title First name Last name

Mr. Mponda Malozo

Nationality

Tanzanian

Mobile phone number

+255715338272

Email address

mponda.malozo@gmail.com

Organization

UNAWE-Tanzania

Position in organization

Project Coordinator

Physical address of organization

Mbezi Sacuveda

Kawe

Tanzania

Organization website

<http://www.unawetanzania.org>

Postal address of organization

P. O. Box 22679 Dar es Salaam

Any other preferred means of communication (e.g. Skype)

Skype Name: malozo.

14. Background details of project leader:

Summary of academic qualifications

- Has a science, arts and agricultural background from the elementary to Advanced Secondary education as per Tanzanian system.
- Holds a Bachelor of Science in Environmental Sciences and Management from Sokoine University of Agriculture in Morogoro Tanzania
- Earned a Master's of Science in Agro-Food Chain with specialization in non-food valorization from the University of Toulouse III

Summary of relevant experience

He was introduced to astronomy by his Physics teacher in the year 2002 at secondary school. Before that he studied the solar system in the geography curriculum.

His understanding of astronomy deepened in 2008 when he helped the country node prepare for the International Year of Astronomy (IYA). He was chosen to represent Tanzanian students in the Opening ceremony of IYA at UNESCO Headquarters.

During the IYA he conducted public outreach activities, using astronomy to inspire children to like science subjects. The impact on students led him to organize a group that is registered with the purpose of promoting science through astronomy in Tanzania.

He attended international workshops related to astronomy and has created a broad network of individuals to ensure astronomy is considered important in promoting science in Tanzania. He has assisted Tanzania to receive books, teaching material, telescopes, and experts from abroad to help teach Tanzanian teachers.

Brief career history

He devotes much of his time to ensure science is embraced by the children of Tanzania and has committed to promote science through astronomy. He is an amateur astronomer, and works with the Tanzanian Ministry of Agriculture as an environmental and agriculture expert.

He is the national coordinator for Universe Awareness-Tanzania. The program is currently represented in six regions with more than 15 astronomy science clubs nation-wide.

He translates Space Scoop News into Swahili for Tanzanian children and the general public through www.unawetanzania.org and www.unawe.org. Through translation of various news items, articles, and books he works to ensure his community is well informed about astronomy.

He collaborates in the teaching programs of Telescopes to Tanzania and is the national coordinator of Astronomers Without Borders, the Galileo Teacher Training Program, and Star Peace in Tanzania, through which he conducts outreach activities.

Alternative contact person if project leader is unable to complete obligations

Name: Chuck Ruehle

Position: Co-project coordinator

Organization: Telescopes to Tanzania

Email of alternative contact

chuck.ruehle@yahoo.com

Proposed team members (name, position, email, organization) and their responsibilities

Chuck & Susan Ruehle - founders of Telescopes to Tanzania (TtT), TtT@astrowb.org

TtT has been working in Northern Tanzania since 2010. It focuses on using telescopes and astronomy to provide a hands-on methodology for teaching math, science, and geography. The program conducts GTTP teachers' training workshops and supplies teaching resources to schools and astronomy clubs. It is a project of Astronomers without Borders. www.astronomerswithoutborders.org.

The Ruehles have Teacher Education degrees (Sue Elementary, Chuck Secondary) from the University of Wisconsin-Milwaukee (UWM). Chuck also has a Masters degree in the Cultural Foundations of Education and is a GTTP Ambassador, and NASA Galileo Educator. As amateur astronomers they also conduct outreach programs in the US. They are participants in GTTP and GHOU network activities.

Currently UNawe-TZ and TtT are collaborating with a Tanzanian NGO in the development of a Center for Science Education and Observatory.

Mdm. Lydia John Mbise, Headmistress of Ailanga Lutheran Junior Seminary, and Secretary of the Founding Committee for the Center for Science Education; Lydia.mbise@gmail.com
She has a Bachelor of Science from the University of Dar es Salaam. She was a secondary school Chemistry and Biology teacher for many years and views astronomy as a way of improving teaching in schools. She also worked as a Human Resources Manager in two NGOs

Mr. Thomas J. Mbise, retired, and member of the Founding Committee for the Center for Science Education; mbise@habari.co.tz

He holds a Diploma in Education, (Changombe Teacher training College, Dar-es-Salaam) a BSc in Zoology, Botany and Education, (University of Dar-es-Salaam), and a MSc in Technology of Crop Protection, (Reading University, UK.)

He has been a Secondary School Physics, Biology and Math teacher, a research scientist in the fields of pests and pesticide management and a leader of donor and government funded research projects.

15. Project Budget

Professional costs (e.g. number of people, rates, etc.)

Review of curriculum :

12 participants (6 teachers/ 6 advisors consultants)@ 10 EUR/day

Total Amount 1200 EUR

Travel and subsistence (e.g. distance, rate per km, etc.)

Travel for Ruehles from USA

2 round trip tickets @ 1885 3770 EUR

Travel for the coordinator

3 trips from Dar e Salaam @ 300 for transportation 900 EUR

Land transportation 50 EUR / Day for 6 days 300 EUR

Per Diem meals 6 days @15 EUR 90 EUR

Rooms for 3 nights 220 EUR

Travel for event for teachers and staff:

6 teachers @ 50 300 EUR

Staff travel in country 300 EUR

Participant subsistence:

6 teachers @ 100/ day for 5 days 3000 EUR

4 Staff at event @100 day for 5 days 2000 EUR

Total Amount 10,880 EUR

Consumable items (e.g. meals, materials, etc.)

•6 teachers @ 50 for lab materials for Chemistry and Biology study (300 EUR)

•6 teacher s @ 20 for workshop consumables (ie: notebooks, pencils, graph paper, scissors, rulers, compasses, etc) (120 EUR)

•Teacher Curriculum manuals 6 teachers plus 2 training staff
Physics, Geography, Chemistry, Biology (800 EUR)

•Galileo telescopes, tripods, and accessories , eye pieces for each teacher @100 each (600 EUR)

Total Amount 1820 EUR

Event Costs (e.g. venue hire, sound system hire, etc.)

• Venue Hire---use of rooms, equipment and housing at Ailanga 2000 EUR

• Computer hook ups and installation of soft ware 450 EUR

Total Amount 2450 EUR

Production and printing (e.g. pamphlets, posters, etc.)

Copies of classroom activities from various venues

o 100 pages x 15 @ .10 150 EUR

• Copies of graphics, pictures, star wheels, sky charts and diagrams

o 100 pages x 15 @.20 300 EUR

Total Amount 450 EUR

Distribution of materials (e.g. postage, etc)

Postage for 10 months @ 50 per month 500 EUR

Phone calls and contact 10 months @ 50/month 500 EUR

Copies for Reviewers and planners 6 @ 10 for 10 months 600 EUR

Total Amount 1600 EUR

Administration and support costs (e.g. phone, fax, etc)

Phone and internet for coordinator for 12 months @25 300 EUR

Secretarial support 2 days month for 10 months at 20 400 EUR

Total Amount 700 EUR

Other costs

8 computers to be left for the Center for Science @302 each 2416 EUR

Transport and delivery of computers 200 EUR

Total Cost 2616 EUR

Total cost

21,716.00 EUR

Other funding (amount/source/purpose)

Telescopes to Tanzania = 5000 EUR (Travel of Trainers)

In kind contribution of Ailanga Secondary school = 2450 EUR (Venue hire)

Contribution from donors and through affiliated organizations (ie: AWB) 4266 EUR (Teaching aid, materials and equipments)

Total = 11,716 EUR

Amount requested from the IAU

10, 000 EUR