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“Hacking Space: A Student Partnership to Sustain Life on Earth”

Project Brief

Introduction:

Science City, Kolkata in collaboration with Chabot Space & Science Centre, California, USA, is going to launch a prestigious project entitled ***“Hacking Space: A Student Partnership to Sustain Life on Earth”***. Through this project we are going to explore cultural and environmental impacts and identify innovations originally developed for space travel that could be put in practice here on Earth. To participate in this project and travel to USA in 2016, please read on for further details and application process.

About the Project

The project of Science City, Kolkata in partnership with Chabot Space & Science Centre, California, USA has been awarded the **AMERICAN ALLIANCE OF MUSEUMS 2015 MUSEUMS CONNECT GRANTS**. Museums Connect Programmes allow students and citizens across the globe to delve into issues impacting their local communities and to work together to address some of humanity’s most pressing challenges. Over the course of the one year, youths selected by Science City, Kolkata from India and from Chabot Space & Science Centre will develop a series of demonstrations and activities exploring the solutions that space travel innovations offer for the environmental and sustainability challenges we face - here in Kolkata and in California. The work will be overseen by an advisory board made up of local experts in the fields of space exploration, sustainable development and engineering, and shall involve a number of guest lectures and field trips. The conclusion of the project will be a travel exchange in the spring and summer of 2016, sharing the work with the community in Kolkata and in Oakland, California, USA.

To successfully complete this project, participants will need to be out of the box thinkers, interested in solutions based design and sustainable development. ***“Hacking Space: A Student Partnership to Sustain Life on Earth”*** will be a special team opportunity and will explore inter-disciplinary ideas in environmental science, engineering and design. While we have done the preliminary thinking, the direction of the project will be determined by the student participants.

Background of the Project

As the population increases, the human impact on the natural world has become increasingly huge. The Earth’s population has reached seven billion people and is likely to exceed nine billion by the year 2050. This growth will inevitably change the ways in which humans manage resources and adapt to changing environmental issues. The standards of living in various cultures around the world may no longer be sustainable or affordable. Current technology has already brought about

increased globalization, which has led to significant collaboration and innovation in virtually every sector, from business to education. As increased globalization continues, it will be the task of the next generation to collaboratively discover the innovations that will allow our growing population to sustain life in our planet.

Our proposed international collaboration between Chabot Space & Science Center in Oakland, California and Science City, Kolkata, India, seeks to use technology developed around space travel, as student-led lessons for how humans might develop better strategies for environmental sustainability.

The very innovations that have made space travel possible can also play an integral part in how we live here on Earth. Manned space travel requires precise engineering and efficiencies to build a craft capable of sustaining life in extreme environments. The construction of specialized machinery helps to regulate waste management, energy intake and use what is essential to effectively travel long distance into space. The spacecraft is also constructed to conserve fuel consumption, allowing the craft to ensure a broad range of activities, from take-off, to explore to landing. These considerations required engineers and designers to think differently about the craft's capabilities. Beyond the spacecraft, we have created an array of efficient means in which humans survive in space on board spacecraft. Basic functions from eating, breathing and communicating to experimentation and research are considered to use the least amount of resources possible.

Many technologies developed for space exploration have been adapted to needs on Earth. From medical devices to synthetic fire resistant materials, these products have drastically changed our potential future and the implications for environmental sustainability. For instance, solar panels and water purification systems are just a few examples of technologies originally developed for space programmes that have also contributed significantly to the sustainability of life on Earth. Many countries, including India and the U.S. are employing brilliant engineering minds to continue these advancements and new discoveries continue to promote sustainable life on Earth.

Our main project goals are to bring together a community of high-school students and adult adviser in the U.S. and in India to co-develop projects that will help to foster the next generation of engineers and researchers by building international collaborative skills to create solutions for sustainability using space engineering as a comparative base to grow ideas. These students will become the world's future decision makers. We want participants to research, envision and develop concepts of space travel technology to inform how we can sustain on Earth and more efficiently manage resources. Participants will examine what elements are necessary for ecologically sustainable life in their local communities and will educate their counterparts regarding their unique obstacles. Sharing insight and experiences from two different cultures provides diverse perspectives from which programme participants can benefit.

Activities

- Students in each country will gather information about their community through video and photographs and will identify current challenges to environmental sustainability.

- Participants will conduct research, exchange information, explore interesting avenues of inquiry and discuss commonalities and differences.
- Teens will investigate their countries' space programme (including private space exploration) and compare with their teammates to ascertain key identifying innovations that have been or are being developed.
- Participants will discuss how these innovations are or can be applied to address sustainability challenges on Earth.
- The results from the above will then be compiled into a continuing workshop curriculum for museum visitors, posted on Science City, Kolkata website and documented in printed material for public distribution.

Outcomes

- Teams will develop workshops that incorporate hands-on activities to illustrate environmental sustainability challenges and demonstrate how innovations for space travels can be applied as a solution. This work will be presented at least once in each country to museum visitors during the funding period with the goal of educating the broader community about the need for sustainability and increasing critical thinking, problem solving and awareness of 21st century challenges.
- Participants will develop a brochure to be distributed to museum visitors in both countries.
- A website will be created to showcase the project's progress as well as involving and educate the broader community about the collaboration and results.

Participant Requirements

Participants should have an interest in science, technology, engineering and mathematics and must belong to the age group of 15 to 18 years. Science students with the above criteria are welcome to apply to be part of the "*Hacking Space: A Student Partnership to Sustain Life on Earth*" Project team! Our funding will support eight students in travelling to Oakland, California and we are working to secure additional resources and may be able to offer the opportunity for more youth. We will be selecting eight participants and six alternates to develop the project over the course of the year. By submitting an application, you acknowledge that you have carefully read and considered the requirements for participation.

Due to the complexity of the project and the high profile nature of our partnership, all participants will be expected to be fully available and engaged in the project throughout the year. Full participation will be a requirement for travel on the exchange and students who do not meet their commitment will be replaced with alternates.

Participants will need to be available:

- For bi-weekly project meetings during September to December, 2015 and weekly for development and meetings in the early February to May, 2016;
- Occasional early morning and evening availability for video conferencing with USA participants;
- For 2-3 intensive work days during Winter Breaks and as per requirement;
- For short homework assignments outside regular meetings;
- During hosting dates (March/April 2016);
- During travel dates (May/June 2016);

Every effort will be made to align work times and travel dates to school breaks and to consider the ebb and flow of the school year.

In addition to availability, participants will also need to be able to meet key requirements for travel.

- Currently hold or be able to obtain a valid passport. (Visa fees funded through the project);
- Be prepared to travel to California, including intermittent contact with parents, cultural differences, lengthy and demanding travel, etc.

Development personnel will provide support and assistance. If this sounds like you, read on for information about how to apply!

How to Apply

Download the application form alongwith the Annexure 1 & 2 and project brief from the websites: www.sciencecitykolkata.org.in or www.ncsm.gov.in. Completed applications may be submitted in hard copy to the following address latest by Wednesday, **August 7th 2015**.

**Director
Science City
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Applicants must be available for Aptitude Test/Personal Interview between 11th - 20th August, 2015. Date of Aptitude Test/Personal Interview shall be informed to shortlisted candidates in due course of time by email. Final selection will be made on or before September 1st 2015.

Last date for submitting filled in applications	: 7th August 2015
Tentative interview dates	: 11th to 20th August 2015
Final selection by	: 1st September 2015

Selection Procedure:

- *The students will be selected **only on merit and aptitude** to do creative and innovative project in a team.*
- *Initially the students will be shortlisted on the basis of documents submitted by them.*
- *Shortlisted students will be required to appear for an Aptitude Test/ Personal Interview & Group Discussion (if required) with an expert committee.*
- *Only those candidates having flair for undertaking creative project with innovative content in a group will be considered for selection in the project team.*