

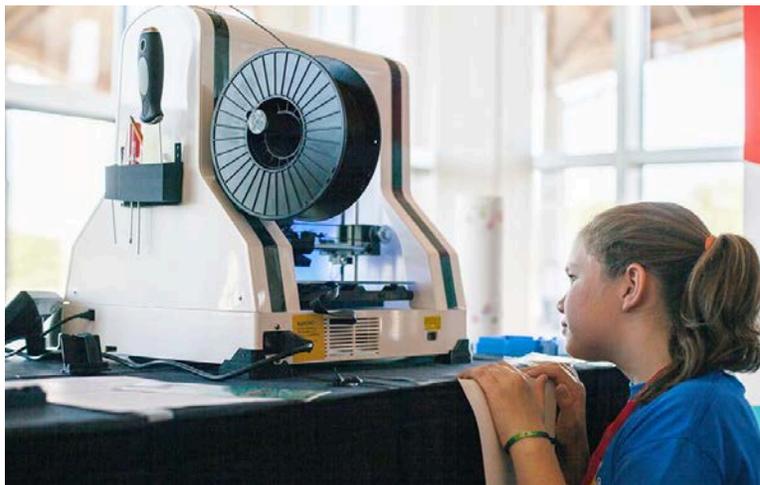
STEAM Space: New Worlds of Education

By Holly Melear



Exploration is in our nature. We began as wanderers and we are wanderers still. We have lingered long enough on the shores of the cosmic ocean. We are ready at last to set sail for the stars.
Carl Sagan.

The Space Revolution and Education



STEAM Space Student at Cities in Space 2015

We are in the midst of a revolution. One so important it will affect the entire future of humanity. Commercial space companies like SpaceX, Blue Origin, and Virgin Galactic are becoming household words. Concepts like asteroid mining, solar power from space, and the idea that people will be heading back to the Moon and settling Mars are entering cultural conversations around the world. Even governments are getting involved, as NASA, the Europeans, and others such as China and the United Arab Emirates announce their own new initiatives. At the exact same moment, there is a drive to excite and empower our younger generations to study, learn, and apply their knowledge to new careers and their own futures.

Currently, only the scientific and financial elite have options in the commercial industry; however, over the next 10 to 20 years that limitation will swiftly change. As reusable systems create more affordable space travel and tourism, projects and occupations such as asteroid mining and lunar construction will become in demand, and our description of the space worker will begin to look very different. Even now, people are undergoing studies and trials to be among the first one-way trip settlers to Mars.

Most likely, these first pioneers will be highly academic, scientifically trained, and deemed stable in numerous regards after extensive explorations by researchers here on Earth. Researchers and analysts argue who it is best to send to these new lands, be they the Moon, Mars, or free space. Is it better to send unattached singles? A married couple? All women? An even split? Psychologic testing abounds. These are all great things to consider, and only time will tell. When we look back into history, it was often those searching for everything from adventure and a new start to running from current political or religious persecution who blazed the trails and founded the first communities.

Making the Future Real and Personal – Today



St. Michael's Academy planning for Cities in Space 2015.

As time moves forward, it is essential to begin preparing our younger generations for the very real possibility that they will have the chance to join in the settlement and colonization of the new frontier of space. A cultural shift needs to occur, and quickly, as we watch the fast-paced push of the new space industry. We could push our pioneers out into the great beyond unprepared, but why, when we have the time now to let our children consider new worlds?

Just as we are watching the return of the space race, reminiscent of its 1960s predecessor, we are also watching a return to progressive education. However, this time, in both regards, we have learned a great deal and the stakes are very different.

Rather than planting a flag on the Moon, this new race is about who will lead the human expansion into space, and also who will reap the rewards of the abundance of the Solar System as well as the cultural and educational inspiration of being a part of the revolution. Collaboration and integration are occurring in both industries. Just as in the classroom between core areas of study such as the arts and sciences, great collaborations are happening between governmental and private companies – all for a higher good to go beyond what we know.

The STEAM Space Education Outreach Program



Westridge Middle School working on colony design.

The Science, Technology, Engineering, Art, and Math (STEAM) Space Education Outreach Program is part of the New Worlds Institute (NWI). NWI is a global, non-profit organization that helps to find common ground and between scientists, researchers, entrepreneurs, and businesses, and to aid researchers to develop the technology and culture needed for off-world settlement and colonization. We fully believe that some of the students we inspire will step onto the new worlds of space, and even as we impart this “you may be the one” attitude, we believe this very same attitude can inspire and motivate all sorts of students to study and work harder to achieve their own goals, no matter who they are.

STEAM Space is currently creating a K–12 curriculum to promote education and preparation for off-world settlement with its main focus on the Moon, Mars, and free space. By offering a free curriculum that connects classes to businesses in the commercial space community to educators and students, students can study real-world situations for off world problems. Businesses have agreed to mentor students on a calendared schedule and to provide video and data as well as certain scenarios and challenges that they have resolved or on which they are currently working. Students get to have first-hand communication and experience with successful businesses in the industry.

STEAM Space reaches far beyond astronauts, engineers, and scientists. If humans are truly to be successful in creating a permanent settlement that will thrive and grow, everyone will need to be invited, that is to say, all types of occupations will be needed. As in the formation of any community, a wide range of skills and specialties are required. From the scientists to the farmers, bankers, historians, architects, artists, and musicians – all are necessary. Classical ideas on space exploration have ignored this concept, but if we are talking about establishing true cities in space, at some point, everyone is needed. If you need proof, just look outside your window. Almost every career choice a student can make today will be needed in space, done just a bit differently.

STEAM Space focuses on all of those aspects that create a thriving culture. Students who are passionate about humanities or the arts light up when they find that though they have always loved space, but had been put off because they were not prone to loving math or pulled to engineering, they can now be a part of moving up, out, and beyond. Through activities and interactions in areas such as 3D printing, space architecture, art in space, and commercial astronaut training, along with aerospace and planetary science, STEAM Space students learn to see the whole picture. In fact, to survive and thrive in space requires a renaissance approach to education and knowledge. Students learn that creativity, problem solving, communicating ideas, and ingenuity are key skills when it comes to living in such dangerous places as the surface of Mars. And when living in a bubble of life with Earth in the sky, caring for the environment becomes far more than an abstract idea.

In addition to connecting businesses to students, STEAM Space supports progressive education. By promoting project-based learning, integration, and social emotional learning, STEAM Space helps students and educators to cross curricular borders as well as creating empathetic, collaborative, and accountable leaders.



Private astronaut Richard Garriott with the Ann Richards School for Young Women Leaders at Cities in Space 2015.



Students leading presentations at Cities in Space 2015

The current flagship project of New Worlds STEAM Space connects students across the globe through the Cities in Space Student Conference and Competition. This year held in downtown Austin, Texas, Cities in Space is a student conference and design competition. Targeted at Grade 5-12 students, STEAM Space has the goal of having K-12 inclusion in the future. In Cities in Space, student teams choose one of the three locations for their design – the Moon, Mars, or the free space between worlds. Teams then work together to create models, videos, and written work which they will present for judging at the conference. Colonies are based on 1,000 inhabitants, a level at which historically a real small town that can thrive and grow can be established. STEAM Space holds true to its progressive guidelines as teams are encouraged to explore what topic they want to present about their colony. This guideline encourages imagination and exploration within the context of community building. In recent events, students have chosen presentation topics ranging from a self-contained and 100% recyclable community to political and religious structures, fashion design on the Moon, and art and architecture.

As students enter the presentation rooms and see models from other schools and the chosen topics of focus, they are thrilled and intrigued as this is what project-based learning does. It brings all the many parts to the whole, just as a truly settled colony will need to do as it moves beyond the realms of earth. Students are encouraged along the way as they prepare for Cities in Space to video chat with other school teams and practice together creating a STEAM Space community, sharing ideas and insights. Much of the Cities in Space conference is student led. Designated guests are brought in to show the students real-life successful professionals in the commercial space industry. Having close interactions with entrepreneurs, astronauts, businesses, and makers is an inspiring way for children to dream big.

As Cities in Space grows, STEAM Space hopes to create interactive rooms connecting students via video all over the world to compete in and discuss the creation of new worlds. It is through these connections that true global collaboration and idea sharing can be made and boundaries can be crossed as all come together to look upwards as one.

We hope that the STEAM Space Education Outreach Program will roll out a curriculum this coming year and that it will be available across the globe. If you would like to support STEAM Space or Cities in Space, please go to our website, newworlds.space/steam-space/.

You will find us there, looking up.

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Editors' Notes: Holly Melear shows how it is possible to involve young people in thinking about living in space and to engage their enthusiasm and creativity. This program also encourages networking with professionals and collaborative work on real-world problems. It promises to be a valuable program for young people across the globe. **Bob Krone and Gordon Arthur.**