

Winter camp Saint George Bolivia

Winter was particularly cold this year in Bolivia, but it did not stop a group of enthusiastic students at Saint George School in Santa Cruz, Bolivia from studying English and challenging their scientific minds. Winter concluded with a few presentations about topics related to space exploration and specifically landing in other celestial bodies.

To contextualize, let me just say that Bolivia had never dreamed about having a space program until recently when we sent our first satellite, Tupak Katari, into orbit. Topics related to space exploration are so new to our children that this series of workshops were first of their kind in the Bolivian education system. After a short series of discussions about the exploration of space, the workshop concluded with a very challenging egg drop and landing that achieved amazing results.

The presentations touched topics like the forces we need to overcome in order to send an object beyond our atmosphere and into space. They were introduced to the laws of motion by Newton and to concepts like gravity and its different values in different planets and our moon. Students were also introduced to some of the projects currently undergoing in the exploration of space by different agencies like NASA, The European Space Agency, and Chinese and Indian specific projects, which were used to encourage our young space enthusiasts to think in terms of exploring beyond our planet. Another workshop explored the Drake Equation as it was written out originally and with the changes based on new data about exoplanet research and identification. They were also encouraged to propose new variables that could play a role in view of new paradigms of space research.

The final workshops touched the topic of reaching other planets or moons in our solar system and beyond and landing on their surfaces. The topics discussed included acceleration, deceleration, construction and design of a spacecraft and landing gear that would make it possible to drop an egg from a first floor to the ground preserving the integrity of the egg with amazing results.

The materials used in the construction and design of the spacecraft were recycled materials that students brought such as plastic bottles, plastic bags, toilet paper, pieces of cloth, etc. that were gathered from discarded materials at their home. After the short theoretic presentation, they divided in groups and they spent time contributing ideas to design and build the spacecraft. And the mechanisms to make sure the egg would arrive safely to the ground.



All four projects succeeded landing their spacecraft and preserving the egg after dropping them from a first floor. This encouraged them to raise the stakes and try a second floor and even a third floor. The most successful were the two projects that included a parachute that help decelerate the ship and there was one that could land the ship vertically without any harm to the structure of the ship or the “passenger”.

After this experience, the next day, students wanted to challenge themselves even more and requested another egg drop, with two “passenger eggs”. They exercised their creativity even more because the materials necessary for the project were fewer and one condition was not to use the materials from the previous day. They divided into two groups only and the groups were composed of only boys on one and only girls on the other to make it more fun and competitive. They searched on internet and the girls decided to try using balloons as shock absorbers since they were not going to have a parachute to slow down the fall. The boys had a more difficult time since the only material left was plastic sticks that are normally used to tie the balloons to and keep them straight up. They built a structure that looked somewhat like a porcupine, but which was believed could alleviate the fall due to the flexibility of the material and the resistance it has to bending.

Once again, both teams succeeded bringing their “crew” to the ground safely. The girls group saw how the balloons not only dealt with the cushioning of their valuable cargo but also helped bringing the ship to the ground slowly. The boys’ group also witnessed how their structure dropped to the ground at full

9.81m/s², but survived the fall from the third floor thanks to the design they used to absorb the shock of the fall.



The activity added to their knowledge in many ways. Not only did they learn about the work undertaken by other countries in space exploration, but they also felt empowered to dream big and think about this field as their future careers. Among their conclusions they wrote it was important to design a spacecraft with the objective of transporting something as fragile as a real egg that had a strong, yet light, structure. They also valued the importance of reaching the destination with a very fast speed to save time, but also paid attention to the moment of arrival and discussed ways in which they could decelerate the spacecraft that included orbiting the planet, moon or asteroid before landing and designing gear to slow down the fall like parachutes, gas-filled balloons, or shock absorbers.

One of the most important activities, was to introduce these young minds to the project of Lunar Mission One and the incredible implications of studying deep below the surface of the moon and about storing the most comprehensive record of human societies in this time capsule that will preserve a record of life as we know it for many generations to come.

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