

The Possibility of Sustainable Human Life on Mars: A Literature Review

Cameron Cadena, Jennah Fayziev, Cora Hill, Shaad Issa, Ryan Khalife, Sara Mines, Anne Marie Olson, Hayan Raffi

Wichita Collegiate High School

Abstract: Life on Mars is considered possible due to advancements in technology and research on sustainable habitats. Colonization and potential terraforming efforts may be in our future. Due to its harsh conditions, there are challenges that must be considered and overcome in order to successfully support life on Mars. Researchers examine the viable implementation of innovations and modifications to determine the feasibility of a long-term Mars mission. Eight students gathered data from several online scientific databases and journals. Each article answered a distinct research question, with subsequent articles further investigating each topic. Specific innovations used to benefit human health on Mars include telemedicine techniques, advanced medical devices, greenhouse-grown food, preserved food from Earth, and genetic modification techniques in the synthesis of medicinal plants. 3D printing and resources on the planet can be used to engineer infrastructure that will combat the environmental hazards posed by Mars. A Mars oxygen in-situ resource utilization device (MOXIE) will terraform Mars's atmosphere. The use of brine electrolysis, bioremediation, and freeze concentration techniques will be instrumental in extracting pure water, rocket fuel, and salts from reserves on the planet. Electromagnetic waves are important for communication, navigation, and remote sensing on Mars. With continued research and innovation, the once far-fetched idea of a self-sustaining Martian colony could become a reality, marking a new era of interplanetary exploration and survival.

Faculty Sponsor: *Maricar Harris*