

BRINGING MARS SCIENCE AND EXPLORATION TO UNDERREPRESENTED AND UNDERUTILIZED STUDENT POPULATIONS. Arlene S. Levine, Science Directorate, NASA Langley Research Center, Hampton, VA 23681, arlene.s.levine@nasa.gov

Introduction: NASA's New Vision for Exploration (VSE), which includes the return of humans to the Moon and then on to Mars and beyond, requires the best talent and brainpower that the country has to offer. In order to reach the nation's best talent and brainpower, NASA must inform and inspire all populations including those that have been underutilized and underserved in the past. These populations, such as females, African-Americans and Native Americans, have been largely underutilized and underrepresented in space activities.

Workshops for underrepresented and underutilized student populations: Over the last decade, we have developed a series of workshops to bring topics in Earth, planetary and lunar sciences to these underrepresented and underutilized student populations. We have utilized both national and local organizations to achieve this goal. Our program includes in-person lectures and demonstrations, site tours and videoconferencing across the country. We have worked directly with students and also trained educators. To illustrate Earth, planetary and lunar science topics, we have utilized a series of projects that the students can perform by themselves and take home. These projects include the distribution of star maps showing the position of Mars and the other visible planets in the evening sky, the building of a simple refracting telescope from a commercially purchased kit, the construction of a spectroscope using a paper towel tube and a commercially purchased diffraction grating, and the building of a simple terrarium. The students were asked to plot the location of Mars and the other visible planets against the star background every clear night. The telescope construction illustrates the principles of optics and astronomical telescopes and the role of ground-based and space-based telescopes in the study of Mars, the Moon and the planets. The spectroscope illustrates how spectroscopy can provide important information on the composition and mineralogy of a planetary surface and the chemical composition of a planetary atmosphere. Students used the terrarium to investigate the components of the Earth system, including the atmosphere, the hydrosphere, the lithosphere and the biosphere, and contrasted the Earth terrarium to a Mars terrarium. The students were asked to identify and discuss the similarities and differences between an Earth terrarium and a Mars terrarium? Impact craters are an important feature on Mars and the other terrestrial planets. As part of our Girl Scout training program, more than 200 Girl Scouts and their leaders were on site for a day during the drilling into the 35-million year old Chesapeake Bay Impact Crater, a joint United States Geological Survey (USGS)-NASA research project, conducted at the NASA Langley Research Center. As part of this activity, we employed a series of demonstrations and experiments detailing the role of impacts in modifying the surfaces of the planets and the Moon, illustrating the planetary impact process, the geological interpretation of the cores being retrieved from the impact crater and how the environment (the atmosphere, the hydrosphere, the lithosphere and

the biosphere) was changed by the impact. The workshops included lectures and discussions on the new Vision for Space Exploration and how humans will travel to and explore the Moon and Mars. In a workshop entitled, "How Airplanes Fly?," we discussed the challenges of flying a robotic airplane through the thin atmosphere of Mars for scientific exploration. The students constructed paper airplanes to illustrate the principles of flight. Each workshop includes a discussion on careers in the Earth, planetary and lunar sciences. The presentation will be illustrated with photographs of the workshops.