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Combine a pre-dawn ascent of the Soda Mountains, one post-lunch descent into a Cima field lava tube, a bat, a subterranean wood rat, some robotics play with heads-up display, cave thermal imaging, soil crust photosynthesis analysis, and a tad of DNA extraction from Spaceward Bound Mojave's west-east transect. Finally, add intelligent, kind, fun scientists and energetic, diligent teachers from throughout the Western Hemisphere. What do you get? Science geek teachers doing authentic learning, grounded in analog research for future Moon and Mars missions, and silly, giddy, contented grins on participants cognizant of the privilege they've been afforded: to work with and learn from top-notch researchers and learn yet even more, and be inspired, by teachers that honor their profession through their intellect, diligence, enthusiasm and good nature.

Several of Koby's Krew, led by the indomitable, yet understated, Koby himself left at 4:20 a.m. for the Soda Mountains due west of the Zzyzx research station. They saw a satellite, innumerable stars, a sunrise, and strangely, a summit top playing card! After breakfast, the Krew went to the microbiology lab for DNA extractions, or the field for photosynthesis research.

We are very thankful for Sabine's patience as we practice the art of DNA extraction of the soil samples that were obtained from Elaine's transect across the Mojave Desert. Extracting DNA provided us the hands-on experience of following a very detailed protocol and a very tedious fashion where the attention to detail is of utmost importance. Thank you, Elaine for trusting us in your very important research. We can't wait to hear what some of the results might be!

Lunch followed, a gopher snake made its way across the parking lot then, in the lot, Jut, a USGS cave research scientist, conducted a briefing, prepping the group for our Cima field lava tube investigation. Once onsite, the group descended via ladder, amidst abundant evidence of pyroclastic activity, into the tube. Inside, a rover was activated as shafts of ambient light infused the dust-strewn tube with a nearly ethereal air. The Krew is not quite sure what that means, but it sure reads artsy, don't it?

The rover, with cool heads-up display, provided teachers real-world realization of the difficulties of recognizing terrain features while remote assaying, and the challenges of remote repair and maintenance. A solitary bat, disturbed by the human activity did a couple of flybys then disappeared to points due east. The western extreme of the cave housed a wood rat, ensconced in a burrow constructed of, presumably, cave detritus. Above ground, Jutt's group continued thermal cave recognition studies.

All week we have been hearing about extreme environments here on Earth and how they might be analogous to that of the environment to the Moon and Mars. In fact, all of the research being done here has that common theme. Soil crusts in the ground strata have numerous colonies of cyanobacteria, lichens and mosses and to help understand the interrelationship that all of them have together it is necessary to look at their photosynthetic processes under these extreme conditions. Jim and Henry took a short afternoon trip along Kelbaker Road to survey a sample of the soil crust and look at the

amount of the photosynthesis that was taking place by using a Photosynthesis Field Test Analyzer. Using a beam of light from the Analyzer it measured the amount of reflected red light back into the instrument which determined the amount of energy by the movement of electrons energized by the photosynthesis reaction.

In the distance from the Zzyzx Desert Research Studies Center we are able to see the continuous stream of traffic streaming from Las Vegas to Los Angeles or vice versa. We wonder as they drive to and from whether or not they realize what they are not actually seeing. Sure they see the mountains, the road, the desert, but do they truly know what this place is all about? We do, or we are just beginning to, and this Spaceward Bound experience helps confirm our desire “to know” but wait isn’t that what Science is all about...”*to know*”

Teachers know good learning is good fun for all. There was lot of good fun today. And the Krew continues to be thoroughly charged up by the good people surrounding it, and the quality and depth the Spaceward Bound Mojave 2007 expedition will bring to their teaching craft.