



the stars
challenge

Explore the Universe
Winter 2013



The universe is vast beyond our comprehension. Where do we fit in? How have events far away in space and time driven the evolution of life and permitted our existence? Is the Earth the only planet with life? Or is life common on worlds orbiting other stars? How can we use science and technology to begin to answer such profound questions?

We made Star Wheels and learned to identify some of the 10,000 stars visible on a clear night. We'll never get lost again, now that we know how to use the Big Dipper and Cassiopeia to find North. Some of us mastered the skills required to operate a telescope, and all of us were rewarded with views of the Moon and Jupiter that took our breath away.

Waves and light were investigated. An understanding of both is required to further our understanding of the Cosmos. We saw how cosmic collisions, when objects from space hit the Earth with devastating consequences, influenced our past and will impact our future. Finally, we used bunsen burners to simulate the most dangerous part of spaceflight, the re-entry into the Earth's atmosphere.

Look at the stars whenever you can. Exhale with wonder. Feel the shiver run down your spine as the grandeur sinks in. Smile. Curiosity about our place in the universe is part of what makes us human.

It's been a pleasure working with you.
E. Marc Coe



Cartesian divers were constructed as a way to simulate exploring an alien ocean, such as the one thought to exist on Europa, a moon of Jupiter.



We couldn't wait to get outside and play with the telescopes! Note our fashionable footwear.



Some of our sample return missions to alien seas were successful. By using subtle changes in density to sink or float, a cartesian diver allows underwater exploration with very little energy.



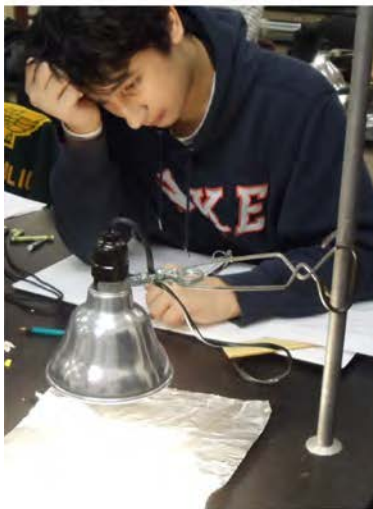
Slinkies and water in wine glasses were used to investigate the properties of waves. All information about the universe reaches us in the form of waves.



We used helium to vary the sound waves made by our vocal cords, to hilarious effect.



Telescopes provided a magnificent show. Jupiter was spectacular, with its array of Galilean Moons clearly visible. The existence of these moons was one way Galileo proved the Earth was not the center of the universe.



The relationship between color and heat was investigated. Darker colors turn more light energy into heat. This phenomena is of great concern regarding human induced climate change.



Collecting data by conducting experiments is the most reliable way to determine how the universe works.



Mirrors were used to investigate reflections. And to show us how fabulous we looked.



A vacuum chamber demonstrated what happened to Astronaut Fred if his space suit sprung a leak. Ouch!



Star Maps were constructed. We were able to identify many constellations. We'll also never get lost again, since we know how to use Polaris to find True North.



We were able to create artistic patterns of light by using diffraction grating to split light into many different colors. Astronomers using similar tools can identify the chemical composition of stars trillions of kilometers away.

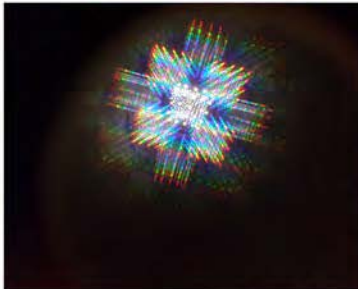


We applied our knowledge of light to make lasers do our bidding. It was also discovered that common sunscreens are ineffective at shielding us from much of the harmful energy present in ultraviolet light.











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The Stars Challenge at Monmouth University