INTRODUCING PLANETARY SCIENCE RESEARCH TO STUDENTS AT GEORGE WEST HIGH SCHOOL, GEORGE WEST, TEXAS. K. W. Zeigler[1] and B. W. Hanshaw[2], [1]George West High School, George West, Texas 78022, kzeigler@gwisd.esc2.net, [2]George West High School, George West, Texas 78022.

Introduction: The ongoing program of planetary science research at George West High School in George West, Texas is described. Planetary science and astronomy in general, are subjects that is not dealt with in any great detail in American public high schools. They are considered too fringe in the view of many professional educators. Today, in an age of limited educational budgets, there is an emphasis on teaching the core curriculum. Indeed, most science educators have only a limited knowledge of these space science disciplines. As a chemistry and physics instructor, the author considered this to be a significant oversight in the educational community. Space is the ultimate physics and chemistry laboratory. Advances in computer image processing, CCD technology, astronomical instrumentation, and the internet, now make it possible to bring research in planetary science directly into the classroom.

In the past, high school astronomy courses and their associated lab activities, were largely limited to simple paper and pencil exercises. If a school district was so fortunate as to own a planetarium, a somewhat more emersive experience in space science was possible. Still, these programs lacked a hands on aspect that might have caught the interest of young people, encouraging them to pursue a career in the physical sciences and engineering. Since 1983, the author had endeavored to develop educational material and true discovery based lab activities that give students the opportunity to contribute to our knowledge of the universe. They became familiar with the use of telescopes in a real observatory, as well as the technique of photoelectric and CCD photometry. They learned how to measure the diameters and depths of craters on images returned by NASA spacrafts exploring the moon, Mars, dwarf planets, and the moons of the outer planets. Through these programs their science horizons expanded.

Methods: The primary research endeavor of this program was the photometric study of asteroids, first with photoelectric photometers and later with CCD cameras. The goal was to determine their approximate shapes and rotational periods of these objects. In the early days of the program, the tenth or eleventh magnitude asteroid was located using setting circles and finder charts. Once located, the instructor or students had to keep late hours with the telescope, often on school nights to gather the data in a cold observatory dome. Today, at our dark observatory site on the Star Z Ranch in South Texas, fifteenth and even sixteenth magnitude asteroids are easily identified using our Meade 14 LX600 telescope. The telescope tracks the asteroid with high accuracy, and the CCD camera performs the programmed observation largely without human intervention throughout the night. Several times a month the students gather at the computer stations in the physics classrooms after school to reduce and analyze the gathered data. Once per semester, the data is incorporated into a paper that is submitted for publication.

Laboratory activities in CCD asteroid studies and planetary imaging are incorporated into both the general and pre-AP Physics class, giving most of the students within our high school an opportunity to experience this research program.

Results: Over the course of over 30 years, this program has yielded the rotational periods of dozens of main belt asteroids. Observations were conducted from Gila Observatory, Lowell Observatory, Table Mountain Observatory, and our latest facility, the George West Mobile Observatory. Student science fair projects that have resulted from this program have catapulted nine students into competition at the International Science and Engineering Fair. High school students with relatively modest instrumentation can contribute to our knowledge of the universe.

References: Zeigler, K., Hanshaw, B. "Photometric Observations of Asteroids 3829 Gunma, 6173 Jimwestphal, and (41588) 2000 SC46", (2016) Minor Planet Bulletin, 199–200.

Acknowledgements: The author wishes to thank The George West Educational Foundation, and the McCarthey Dressman Education Foundation for their support to this research program