Presenter Name: _____ Location: 260

Subject (Circle All That Apply): Science Technology Engineering Arts Mathematics

Grade Level (Circle All That Apply): Middle School High School Collegiate

Topic Title: NASA's Exoplanet Excursions

Lesson Focus and Goals

SUBJECT OBJECTIVE:

1. Explain how NASA's Spitzer telescope, working in collaboration with other telescopes on Earth and in space, have discovered new Exo-Planets.

JHSL OBJECTIVE:

1. Work with students to get them a hands on experience with Virtual Reality technology in the classroom.
2. Expose students to critical thinking skills in the STEM field.

Texas Essential Knowledge and Skills (TEKS)

Principles of Applies Engineering; c.2.A, c.2.D, c.7.C & c.7.D. **Principles of Technology**; c.4.C & c.4.D. **Robotics I**; c.6.D. **Engineering Design and Problem Solving;** c.4.B, c.4.D & c.4.F. **Scientific Research and Design**; c.4.F. **Practicum in Science, Technology, Engineering, and Mathematics**; c.5.A. **Extended Practicum in Science, Technology, Engineering, and Mathematics**; c.6.A, c.6.B, c.6.C.

Structure/Activity

1. **Halliburton Introduction Talk** (*approx. 5 minutes, only if not have been completed before with students*)
   Even though Halliburton is an oil and gas industry, Halliburton is also very invested in the next generation of STEM Workforce. The Javelina Halliburton STEM Labs provide the opportunities to enhance high level critical thinking and problem solving skills associated with sciences, technology, engineering, math and geosciences (STEM) to talented, first-generation, at-risk and underserved high school and undergraduate students. Halliburton provides meaningful engagement and resources for students that want to explore the engineering field.

2. **Project Introduction** (*approx. 5 minutes)*
   Students will be immersed into 3 levels journeying through the TRAPPIST-1 solar system and to Nasa's Spitzer telescope and see how a 16 year mission opened the door to endless studies of the observable universe as it appears in infrared light.

3. **Level 1** (*approx. 5 minutes*)
   Students will explore 4 select planets in random order of this solar system, all titled TRAPPIST-1 with a designated letter assigned to each planet. The narrator describes them in detail, but pressing a button will display a few visual details of the

planet which includes size, density, and Illumination compared to Earth and other planets in the solar system and also their place in their solar system.

4. **Level 2** (*approx. 5 minutes)*
   Students will learn that there are 3 phases that the Spitzer telescope has; cold, warm, and beyond, which refers to the temperature of the telescope. They will also learn how each phase is unique as, depending on the telescope's temperature, its mission, and functionality, and capability will change. Students will also be taught how the telescopes orientation plays a big role in its procedure of capturing data across the universe. Students will find out this is how the solar system in level 1 was discovered.

5. **Level 3** (*approx. 5 minutes*)
   During this level students will be able to interact with the Spitzer Telescope. Student will be allowed to use the controls and orientations that were explained in Level 2 to navigate the Spitzer Telescope. Students will be able to capture locations and data/photos of locations in space, they will then interact and learn how to send that data to earth. There are 6 discoveries, 3 categories for each. Milky Way, Exo-Planets and Galaxies. There are 2 discoveries for each category. This is designated for 15 minutes but students can spend more time if they want to.

Learning Objective

Content Review

Students should know that…	*Students have been asked…*
● All of the planets in our solar system orbit around the Sun. Planets that orbit around other stars are called exoplanets. ● The Milky Way is the galaxy that includes our Solar System. ● Earth is the only planet known to harbor life and scientists search for habitable and inhabited planets beyond the Solar System that focuses on characteristics to our planet. Earth's atmosphere and surface environment are unique; liquid water on its surface, maintains life, and has active plate movement.	1. What is the difference between a Planet and an Exo-Planet? 2. Which galaxy does our solar system reside in? 3. How some of the planets explored today compare to our Earth?

New Content

Students will know…	*Students will be able to…*
● How the TRAPPIST-1 system's exoplanets compare to Earth.	● Explain what an Exo-Planet is. ● Explain what makes Earth unique when compared to other Planets and Exo-Planets.

• How the Spitzer Telescope functions when performing its job.	• Explain the process of how NASA obtains this data, specifically when it deals with the Spitzer Telescope.

Assessment

Students will be asked to complete a quick evaluation after the workshop so we can continue to improve our services.

Sources of Information:

1.