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: Exploring the Universe from Antarctica

Lesson Focus and Goals

SUBJECT OBJECTIVE:

1. Explain how IceCube Neutrino Observatory at the South Pole conducts it's research on Neutrino particles.

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. 10 minutes)*
   Students will be immersed into a quick journey that covers what the research covers at the IceCube facility. Students will follow a Neutrino back into outerspace to learn what a Neutrino is and where it comes from. The journey also covers different facts about our solar system and Black holes (where Neutrinos come from).

Learning Objective

Content Review	
Students should know that… ● 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.	*Students have been asked…* 1. Which is denser, Sun or Blackhole? 2. Can a Neutrino pass through a dense planet like Pluto? 3. Does a planet show up on a X-Ray?
New Content	
Students will know… ● Where most Neutrinos come from. ● How scientists locate Blackholes.	*Students will be able to…* ● Explain what a Neutrino is. ● Explain how Scientists study and find blackholes.

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.