Presenter Name: _____   Location: 253_____

Subject (Circle All That Apply): <mark>Science</mark>   <mark>Technology</mark>   Engineering   Arts   Mathematics

Grade Level (Circle All That Apply):   <mark>Middle School</mark>   <mark>High School</mark>   <mark>Collegiate</mark>

Topic Title: _Spheros Modules 1 & 2 _____

Lesson Focus and Goals

SUBJECT OBJECTIVE:	JHSL OBJECTIVE:
1. Be able to learn coding through block coding by utilizing the spheros; going through various levels and learning the basics when it comes to programming.	1. Work with students to get them a hands-on experience with blocking coding and showing its practicality for the real world. 2. Expose students to critical thinking skills in the STEM field.

Texas Essential Knowledge and Skills (TEKS)

Principles of Applied Engineering; c.2.B, c.7.B & c.10.A. **Principles of Technology**; c.4.A. **Solid State Electronics**; c.3.A, c.3.B & c.3.C. **Robotics I**; c.3A, c.3.B, c.6.A, c.6.D, c.10.A & c.10.C. **Robotics II**; c.6.A & c.6.D. **Engineering Design and Presentation I**; c.7.A, c.7.B & c.7.D. **Engineering Design and Presentation II**; c.3.C & c.3.D. **Engineering Design and Problem Solving**; c.5.C, c.5.D, c.5.F, c.5.G & c.5.K. **Practicum in Science, Technology, Engineering, and Mathematics**; c.5.A. **Extended Practicum in Science, Technology, Engineering, and Mathematics**; c.3.A, c.3.B, c.3.C & c.6.A. **Fundamentals of Computer Science**; c.4.F & c.4.J. **Computer Science I**; c.2.D, c.4.A, c.4.C, c.4.G, c.4.H, c.4.J, c.4.K, c.4.O, c.4.P, c.4.U, c.4.V, c.4.W, c.6.C, c.6.F, c.6.P & c.6.Q.

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*)
   A brief introduction will be given to the participants about what the spheros is and the language it uses in its code. Students will then be asked to set up the spheros application in order to proceed with the following lessons. The lessons themselves will require a smart device, preferably a tablet, so that way they may connect with the spheros. They may or may not be asked

to create an account with spheros, however, the process should not take so long either. Students will then be directed on how to connect their device with the spheros.

3. **Module 1** *(approx. 15 mins)*
Students will be introduced to the blocks the spheros application has to offer. They will use these blocks and each block's parameters to make the spheros move into the shape of a square. Students will be then asked to 'refactor' the program to make the same square previously asked. Students will also explore concepts like comments, operators, and loops. After this, students can challenge themselves to make and program the ball to track their own shape.

4. **Module 2** *(approx. 15 mins)*
Students will be asked to make a 'Toss Game' which utilizes conditional statements in the code. The game will involve students carefully tossing the spheros, and with its sensors, and will detect 'g-force' and then act once this force has surpassed a certain magnitude. Loops, If/Then or Else statements, and the movement data from the spheros will be utilized in this level.

Learning Objective

Content Review

Students should know that…	*Students have been asked…*
● Coding may be complicated ● Coding is a process of trial and error.	1. What is coding? 2. What are the benefits of a loop? 3. What do they repeat every day? How would they loop that? 4. What is a conditional statement?

New Content

Students will know…	*Students will be able to…*
● How to define and when to use loops. ● How to define and when to use conditionals. ● How the spheros utilizes its sensors.	● Creating and executing block codes. ● Practice refactoring and debugging. ● Make the spheros track a shape of their choosing. ● Use conditionals.

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.