Presenter Name: _____

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

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

Topic Title: _____Morse Code Using Sphero_____

Lesson Focus and Goals

SUBJECT OBJECTIVE:	JHSL OBJECTIVE:
1. Be able to decode morse codes and learn coding through the block coding of Spheros as a learning experience to programming and robotics	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 Technology; c.4.E. **Digital Electronics**; c.4.B, c.5.C, & c.5.D. **Robotics I**; c.3.A, c.4.B, c.6.A. **Robotics II**; c.3.B, c.3.C, & c.3E. **Engineering Design and Presentation II**; c.7.B & c.7.D. **Practicum in Science, Technology, Engineering, and Mathematics**; c.2.B, c.2.D, & c.3.B. **Extended Practicum in Science, Technology, Engineering, and Mathematics**; c.6.A & c.6.C. **Fundamentals of Computer Science**; c.2.B. **Computer Science I**; c.1.A, c.1.B, c.2.H, & c.4.W.

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 spheros and its block coding. Students will be provided with the spheros and an iPad for the lesson. The students will be asked to decode morse coding and to use the block coding in the app to make the sphero go through a bridge successfully. This lesson is to be done in a team of 2 or more.

3. **Level 1** (*approx. 30 mins*)
   One of the team members will be asked to code the given morse code into the block coding of the sphero app. The dots are indicated by red color, dashes by blue color and green color is used once between each digits/numbers and it is used twice between each parameter/field. The students must code the morse code for 2 parameters/field, namely the speed and time. The

speed field is usually in two digits (e.g.24) so student have to code for the number 2 using the morse code for 2 and then use a green color LED in the program to denote the next digit, then code for number 4 using morse code. Once they have finished coding for the first parameter, move on to the next parameter, which is time. Time usually is coded using single digit for this exercise, before starting to code for time (e.g. 5), the students should add green light that goes for 2 times to indicate the beginning of the next parameter. Then, they can code for the number 5 using morse code

4. **Level 2** (*approx. 20 minutes)*
   Once the team member decoded the morse code, he/she will code (use roll function) the sphero using the clue which is speed value and time value that was decoded so that the sphero will stop at the end of the bridge and not fall off it.

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 is Morse Coding? 3. Why was Morse coding used? 4. How morse code can be implemented visually using color codes?

New Content

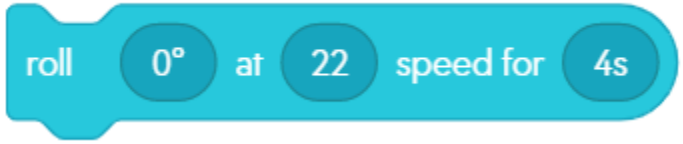
Students will know…	*Students will be able to…*
● How block coding works ● How color coding can be done using sphero	● Use block coding to code the sphero ● Decode morse code ● Understand how robotics and block coding works

Assessment

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

Example:

The Image below translates to 22, 4: where 22 is the speed and 4 is time in seconds. The green LED with 1 time indicates the same parameter but the next digit of speed and green LED 2 times means switch to time. For the number of seconds, the LED is on field, 2s is preferred. Roll is always set at zero for this exercise. Level 1 is the coding using Strobe and level 2 is the roll function where the sphero moves on the bridge



Red LED for DOTS Number of seconds the LED is on Indicates the number of DOTS/DASHES In a given number' digit