ROBOTICS – Middle School

DESCRIPTION: Programming and Problem Solving with a Sphero Robot
To participate in the Robotics Competition at the Middle School level at the ROCAME Jamboree, the following items should be presented: an engineering notebook, rap cheer or poem, and knowledge of how to program a "Sphero" robot to complete a maze using the Sphero Edu application. **Two MS Teams per County, with two students per team.**

APPROX. TIME: 50 MINUTES

EVENT COMPETITION:
Engineering Notebook (maximum of 15 pts.) – The engineering notebook should reflect the effort put into learning how to program the Sphero. The entire team's thoughts, action, failures, and successes must be included from each robotics meeting. Judges will score the following components:

- Performance Testing (8 pts):
    - Show there is a linear relationship between the time, speed, and distance to which you program the Sphero. Use the roll command to compare "Speed vs. Distance" and "Time vs. Distance". Record results in table format.
- Mazes (6 pts): Create three practice mazes and develop a program to navigate the Sphero through each of them. Include dimensions with each maze drawing and written lines of the program.
- Reflection (1 pt): A written paragraph addressing "What was the best part about learning how to program with Sphero?"

Rap Poem (maximum of 10 pts.) - The cheer or poem (8 line minimum for middle school) should be written using appropriate science, engineering, and computer programming vocabulary. A minimum of 8 vocabulary words should be used (1 per line). Extra consideration will be given to teams poems that have extra vocabulary words, creative lyrics, performed by team with enthusiasm, and/or robot "reciting " text with flashing lights.   Written out versions of the lyrics should be documented in the engineering notebook for review as well.

   Sample Science Word List: Speed, velocity, motion, force, acceleration, mass, momentum, force, friction, gravity, weight, circular, action, reaction, hypothesis, work, power, machine, energy, input, output, software, microprocessor, computer, software, Sphero, tablet, robot, algorithm, program, app.

Maze (maximum of 15 pts.) – The middle school robotics teams will receive a layout of the competition maze with outer dimensions and 1 foot wide paths at least two months prior to the jamboree. Prior to the competition, students should practice autonomously programming their Sphero to navigate the outlined maze using the block programming on the Sphero Edu App. During the competition, the teams will be randomly selected for two separate attempts to complete the maze. Teams will be judged on their ability to compete the maze (5 minutes maximum) and then by the amount of time it takes to complete the maze. Each team will have 15 minutes (maximum) to make adjustments before the second and final attempt for the robot to pass through the maze is made. Results from the better run will be used in the official scoring.

- Completion of the maze – 10 pts

- 1st to complete maze – 5 pts
- 2nd to complete maze – 3 pts
- 3rd to complete the maze – 1 pts

<u>Obstacle Course (maximum of 10 pts)</u> – After a team finishes their final maze attempt, they will have a maximum of 3 minutes to steer their Sphero through an obstacle course using manual operation. The obstacle course will include various accessories from the provided Sphero kits and several different surfaces. Teams will be judged on their ability to complete the obstacle course and by the amount of time, it takes.

- Completion of the obstacle course – 5 pts
- 1st to complete obstacle course – 5 pts
- 2nd to complete obstacle course – 3 pts
- 3rd to complete obstacle course – 2 pts

Points in each of the 4 categories will be added together to determine the total scores for each team and the winner. (Maximum of 50 pts.)

Note 1: The "Obstacle Course" will be omitted during the virtual or "COVID-19" edition of this competition.