SDSU Extension

South Dakota 4-H Robotics & Engineering

2020 Challenge Packet – Modified

Christine Wood | SDSU Extension 4-H Science Technology Engineering and Math (STEM) Field Specialist
Chuck Martinell | SDSU Extension 4-H Youth Program Advisor
Nathan Skadsen | SDSU Extension 4-H Youth Program Advisor
Amanda Stade | SDSU Extension State 4-H Events Management Coordinator

Department of **Agricultural & Biosystems Engineering**
College of **Agriculture, Food & Environmental Sciences**

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Due to the loss of time in teams preparing for the 2020 South Dakota 4-H Engineering and Robotics Challenge the decision was made to move the 2020 Challenge book to 2021. In its place we will be offering a new challenge for this year.

2020 Robotics Challenge (All Divisions)

You have been tasked in designing a challenge course for a robot to run this year. The robot course will be judged by its appearance, difficulty of tasks, and creative story lines. You must include a scoring mechanism and then design a robot you feel would beat your course.

The course itself can be created electronically or on paper. It must include mission log and both positive and negative scoring modifiers. You do not need to physically construct the course or have a robot complete a run on it.

Registration

Please register your team by email Christine Wood (christine.wood@sdstate.edu). Registrations are still due by August 11th.

Example

Challenge 1 — Starkiller Base Trench Run

Scenario – Intermediate

Mission Log

Before our attack on the Starkiller Base, we have been able to sneak you onto the planet. However, we can only risk you being on the planet for 3 minutes before you are detected. We have a list of tasks for you to accomplish and it is your goal to get as many of them done as possible. There is a canyon separating your landing zone from two of our objectives. Luckily, Bothan spies were able to mark a path that will safely lead you through the canyon. Good luck. May the force be with you!

Mission (Figure 1)

1. Your mission objective is to complete as many tasks as possible within your 3 minute time frame. Those tasks are:
    a. Press the call button
    b. Follow the line through the canyon (top to bottom)
    c. Follow the line through the canyon (bottom to top)
    d. Disassemble the tower located at the bottom of the board
    e. Deliver the dish part of the tower to the storage location
    f. Collect a sample rock from the bottom of the board
    g. Deliver the sample to the lab location
2. If you complete at least three of the above tasks and return to the Start Box, the points for each task you complete will be doubled.
3. The call button is considered to be pushed if some part of the robot comes to rest on the button for at least 1 second.
4. In order to score points for either successfully delivering the rock sample or the tower dish, the object must be placed completely within its drop off zone.
5. A line sensor may be used to make it through the canyon but does not have to be used
6. The mission ends when either the timer reaches zero or your robot returns to the start location.
7. Your team will get one attempt to accomplish the mission.

Scoring

Mission Objectives	**Maximum Possible Points**
Press the call button	200
Follow the line through the canyon from top to bottom	300
Disassemble the Tower	400
Deliver Dish from Tower to Storage Zone	700
Collect a Sample (successfully pick up a rock)	200
Deliver Sample to Lab Zone	500
Follow the line through the canyon from bottom to top	300
2x Bonus for Completing 3 Mission Objectives and Returning to Start Box	2x Total Points

Additional Points Available	**Maximum Possible Points**
Start in the Start Box (Launchpad)	100
Return to Start Box (Launchpad)	250

Challenge Dimensions 4'x8'

- Each Grid Represents 6"
- Squares Containing Cliffs will have a 6" vertical face. These squares will have some percentage of them covered by a cliff.
- The black line is a flat line that runs the length of the canyon
- The blue and red box is a flat surface

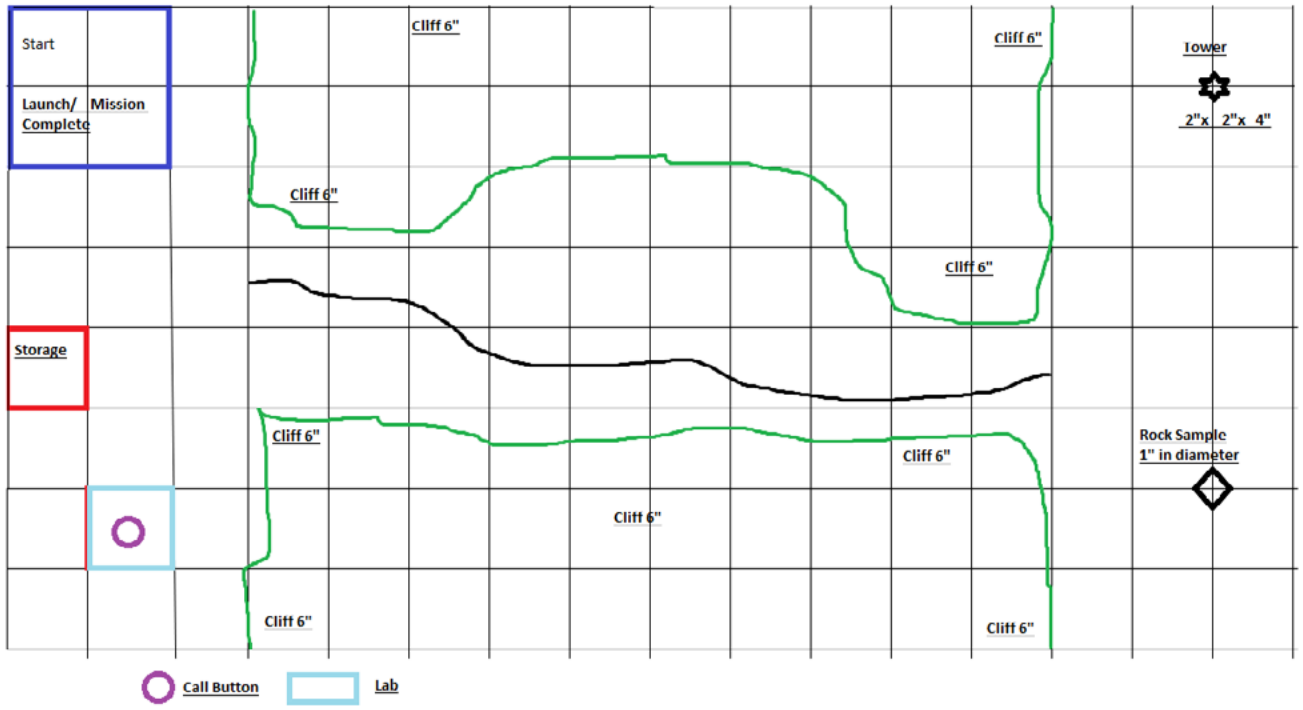

Figure 1
*Grid is 6 in. squares

Other parts of the challenge:

- Also include a photo or drawing of the robot that you feel would be designed to complete this challenge
- Your team would need to create a brief presentation to unveil your new challenge course. This can be done in person, a recording, or through a Zoom call.

Scoring Sheet for 2020

Creativity	Needs Improvement (1 point)	Average (2-3 points)	Excellent (4-5 points)
Difficulty (Specified for Recreational or Competitive)			
Robot Design			
Mission Log			
Scoring			
Presentation			
Total:			
Overall Points Scored	6-9 Points	10-20 points	21-30 points

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