



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

<b>Name(s)</b>  <b>Joseph Dadlez</b>	<b>Project Number</b>  <b>J1009</b>
<b>Project Title</b>  <b>Engineering an Independent Robotic Sidewalk Weed Killer</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b> GOAL: My objective was to engineer and program an automatic self-driving robot that can destroy weeds with a minimal amount of weed killer.</p> <p><b>Methods</b> METHODS/MATERIALS: Laptop computer, Makeblock software (Scratch coding - I developed by own code for independent line-following, collision avoidance, and weed-killer delivery), arduino board, Makeblock parts (I used a variety of Makeblocks kits to design and create my own unique robot which included ultrasonic distance sensor, light and dark line following sensor, and 3 servo motors.) wood (I had to build a wooden basin and drill holes the proper size for the salt delivery bin), and black electrical tape for creating a line to test the robot on.</p> <p><b>Results</b> RESULTS: My robot is coded to independently follow a 4-cm. line, detect a break, and deliver salt, killing the weed, and continue on. This robot is coded to independently turn and follow curves. It is also able to detect an object in front of it, thus stopping and avoiding a collision. Multiple iterations (apprx. 20+ ) in coding and building were done until the robot could reach the objectives 99% of the time.</p> <p><b>Conclusions</b> CONCLUSION/DISCUSSION: After approximately 20 trials, I reached my goal of successfully building a functional robot that independently follows a line, delivers salt at line breaks, and does not collide with anything. Future iterations need to include color or shape recognition in order to reach to goal of weed killing independently. I also need to engineer a waterproof cover, a docking station, and an app to monitor the robot. This robot will save time and labor for consumers, as well as potentially reduce the amount of toxic weed-killing chemical run off.</p>	
<b>Summary Statement</b>  I invented and programmed an automatic self-driving robot that independently follows a straight or curved line, delivers salt at line breaks, and can destroy weeds with a minimal amount of weed killer (salt) without collisions.	
<b>Help Received</b>  Thank you to my dad for buying robotic parts, and my mom for editing my report.	