



**CALIFORNIA STATE SCIENCE FAIR  
2016 PROJECT SUMMARY**

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<b>Project Title</b> Plants Out of Soil	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this research is to measure the growth rates of plants when grown in different growing systems. These systems include Hydroponics, Aquaponics and three different soils pots with different pH.</p> <p><b>Methods/Materials</b> 1 Gold Fish, 1 Hydroponic system, 1 Aquaponic system, Three soil pots with high, low and medium pH, 5 Green kale plants, 2 Red kale plants, cauliflour plants, metal garden cart, plant nutrients</p> <p><b>Results</b> The results following the experiment showed that the plants grown in soil specifically the low pH had a higher amount of growth at the end of the data collection period than the plants in Hydroponics or Aquaponics. Out of the two other systems the Hydroponic system grew significantly better than that of the aquaponics.</p> <p><b>Conclusions/Discussion</b> When all three of the varying plants were measured it was revealed that the hydroponics had a growth rate that was close to that of the soil growing, this might have been because the nutrients were very high and the oil/water was very rich in these two systems. The aquaponic system had an extremely disappointing amount of growth and at the end of the collection period, the plants had actually decreased in size. This was due to the fish not producing the correct nutrients and this was caused by over feeding thus souring the water.</p>	
<b>Summary Statement</b> When the plants were measured in each system, it was concluded that plants prefer natural soil growing in a low pH environment to growing in non traditional water based growing.	
<b>Help Received</b> I designed and built each system myself along with making my own synthetic nutrients and soil conditions. I was helped with the designing and maintenance process from Both Co. aquaponics. I was taught the key factors in a healthy fish tank and was provided by materials by Phil and Larry at "The	