Abstract: Science and Engineering Fair of Houston

1320

Ph Levels and How They Affect plants

Barrett Jones

Charter/SST - Champions College Prep - MS

Category:

Plant Sciences

This project was done on how a lower or higher Ph level would affect a plants growth and ability to survive on its own without much assistance. Using article such as "Ph Regulation in Plants by John A. Raven" or "Why Plants Grow Poorly on very acidic soils by Petra S. Kidd and John Proctor" I researched how Ph levels affects the soil and the plant growth around it. I made my hypothesis that the best results would be on the lower end of the Ph scale. In the conclusion of my experiment, I found that the best results were indeed from the lower end of the Ph scale.

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[ ] Vertebrate animals [ ] microorganisms [ ] rDNA [ ] tissue

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Abstract: Science and Engineering Fair of Houston

1321

Do Plant Sounds Reveal Their Health? Detecting Plant Health Through Bioacoustic Signals

Catherine Woods-Jimenez

Charter/School of Science and Technology, Houston - MS

Category:

Plant Sciences

Have you ever wondered if you could determine whether a plant is healthy or stressed just by listening to it? Scientists have discovered that plants make sounds, which can be detected using special tools like ultrasonic microphones. By recording and studying these sounds, researchers can figure out the health state of a plant. Stressed plants, such as tomatoes and tobacco, give off ultrasonic clicks when cut or dehydrated. It has been proven that computers can quickly analyze the sounds made by plants. Overall, this research supports the idea that listening to plants can help save resources and time, improving farming and expanding our understanding of plant life.

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Abstract: Science and Engineering Fair of Houston

1322

Super Stems!

Annabelle Murphy

Clear Creek ISD /Seabrook Intermediate School

Category:

Plant Sciences

Plants are highly adaptive organisms where different environments play critical roles in how plants evolve, adapt, and develop. What effect will varying degrees of wind exposure have on the growth of plant stems? The experiment will test the impact wind has on plant stem growth. Where, if plants are exposed to different amounts of wind, then 120 minutes of wind daily will grow the thickest stems. The experiment was designed with five groups of 15 lima bean plants constructed for exposure to 0, 30, 60, 90, or 120 minutes per day of wind from an electric fan. The mean fan speed of 12.5 km/h was measured using an anemometer. The lima beans were planted, exposed to 9 hours daily of artificial sunlight from an LED glow lamp, and water every other day. Once the lima bean plants the stem diameter was measured in millimeters using a 100 mm caliper. The measurement period for the experiment was 7 weeks. The stems of the bean exposed to no wind measured between 3.8 and 3.2 mm during the testing period. The stems of the bean exposed to 120 minutes of wind measured between 3.2 and 2.7 mm during the testing period. The experiment showed the hypothesis was not corrected. The lima exposed to no wind had the largest mean diameter stems. The lima beans exposed to 120 minutes of daily wind had the smallest mean diameter stems. These lima bean plants were not able to adapt in real-time to a harsher growing environment.

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Abstract: Science and Engineering Fair of Houston

1323

Vegetables: Double Helix Edition

Category:

Plant Sciences

Grace Brantley

Houston ISD/BCM Biotech Academy at Rusk - MS

My project was to see what could happen if I took DNA out of poly-ploidy and non-polyploidy vegetables. For a vegetable to be polyploidy it means that they have more than two sets of chromosomes. I got carrot, sweet potato, regular potato, and onion. I cut them up, added my DNA extraction buffer, and poured alcohol down the side of the cup it was all in. I expected the sweet potato to have the most DNA and the onion to have the least. When I took the DNA out and obtained the mass, I was surprised. My prediction about the sweet potato was correct, but the carrot actually had the least amount of DNA. This information could be used by farmers, or scientists, trying to genetically modify their vegetables. They could use the amount of chromosomes and how much DNA they produce to grow their crops the best possible way.

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Abstract: Science and Engineering Fair of Houston

1324

Plant growth at different areas and times

Daniel Camp

Houston ISD/BCM Biotech Academy at Rusk - MS

Category:

Plant Sciences

For this project I have planted radish seeds in different pots which are watered at different times, about 4oz of water given at morning, night, or both morning at night. I have measured the height of the stems above the soil every few days, I have discovered information confirming part of my hypothesis, about how being watered at both morning and night has grown the tallest, but I have been proven wrong on how at the last measurement, the one watered at night exceeded my expectations about it growing less than the one watered in the morning. This information could be useful for farmers looking to maximize their crop yield in a shorter amount of time.

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Abstract: Science and Engineering Fair of Houston

1325

How Does Soil Affect Plant Growth

Conroy Shackleford, Justin Wyatt

Charter/SST - Champions College Prep - HS

Category:

Plant Sciences

Have you ever questioned or wondered what the ideal living conditions are to properly grow and nurture a plant? Over the past few months, my partner and I asked the same questions. We started by researching what living factors can primarily affect the growth of the plants. Once we looked over the information, we began conducting tests to figure out which plant could best adapt to different environments and soils. In order to find out which plant would work, we researched a plant that would grow in a reasonable amount of time and best adapt to different conditions. We came to the conclusion that arugula would be best for different conditions and the most effective for plant growth. After conducting our experiment with potting soil, loamy soil, and chalky soil, we concluded that potting soil had the best means for arugula to grow.

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Abstract: Science and Engineering Fair of Houston

1326

How Water Types Affect Plant Growth

Henri Souto-marchand

Houston ISD/BCM Academy at James D Ryan - MS

Category:

Plant Sciences

I got interested in plants because I wanted to know how water affects plant growth, nutrients, and biomass. This can help the world by discovering what is a more efficient ways to grow plants. Seeds are: sunflower,golden corn, red kidney bean I got these seeds germinated them then I planted them in a pot then watered them We used 5 different waters to the plants and measured how they affected the plants. those waters are: tap, distilled, filtered, rain, bayou (river) After 34 days I can conclude: I found that filtered water provides the best water source for bean plants to grow because it has shown the highest biomass and second highest height. This is important because it can help farmers to grow the bean plants much more efficiently.

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Abstract: Science and Engineering Fair of Houston

1327

Plant Growth

Natalie Robinson

Houston ISD/BCM Academy at James D Ryan - MS

Category:

Plant Sciences

Plant growth can be affected by many environmental factors, including sunlight, soil quality, temperature, air quality, music, and especially water. Water is essential for transporting nutrients, supporting cell structure, and helping plants carry out photosynthesis. In stores today, water comes in many varieties, such as bottles, purified, alkaline, and spring water. Each type is advertised as offering different benefits. This made me think if these differences would affect how plants grow. The purpose of my project was to compare how five different types of water, rainwater, tap water, bottled water, alkaline water, and Zen water affected the growth of wheatgrass over a 10- day period. I selected wheatgrass because it grows quickly indoors and I would have consistent temperature and lighting throughout the experiment. Before planting, I soaked the seeds for 12 hours to speed up germination. Each plant received the same amount of water daily so that the only variable was the type of water used. Although I originally thought that rainwater would produce the best growth, my data did not support that hypothesis. While rainwater performed well, the wheatgrass watered with 30 mL of alkaline water showed the greatest overall growth and produced the tallest plants by day 10. In conclusion, my hypothesis was incorrect. This experiment showed that alkaline water resulted in the best wheatgrass growth under the conditions tested. These results suggest that pH levels and mineral content in water may play a larger role in early plant development than I originally

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Abstract: Science and Engineering Fair of Houston

1328

Impact of Color Spectrum on Growth of Plants

Category:

Plant Sciences

Saveri Bose

Conroe ISD /McCullough Junior High

This project is about understanding the effect of different light colors from the light spectrum on plant growth. It is important because appropriate light growth spectrum results in healthier plants with better taste and nutritional value. Better and faster plant growth will increase photosynthesis, decrease carbon dioxide and increase oxygen for humans and animals. This project tests two plant species – basil and black-eyed beans using red, green, blue, violet (and white light for black-eyed beans only), to see if the scientific observations about light spectrum and plant growth hold true. Every day the plants and seeds are watered and the basil plants are measured for height. Once the beans/seeds began to sprout, the number of germinations are counted and measured for height. In the end of the germination experiment, measurements are taken for length and width of the leaves along with the number of leaves. These data are plotted on scatter and bar graphs and to draw conclusions. Red is the most impactful light for length in the basil plant but for germination and growth of black-eyed beans, blue light has the biggest impact on initiation of germination and overall growth and health. Green light has a moderate impact on germination but lowest impact on growth and health. Violet light produces the largest leaves and white light has an average impact on germination and growth. The results of this project are consistent with other findings in the literature.

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Abstract: Science and Engineering Fair of Houston

1329

Measure It: How Air Quantity Affects Plant Height

Sam Fazeli

Houston ISD/BCM Academy at James D Ryan - MS

Category:

Plant Sciences

My project is about how air quantity affects plant height for a texas bluebonnet plant, which is interesting because it shows how factors in nature can affect each other. My question is: “How does air quantity affect plant height?”, and my hypothesis is that more air will equal better plants. I did it by using 5 different-sized pots, 5 different-sized bags, 15 texas bluebonnet seeds, 15 syringes, a relatively small bag of soil, and a basin filled with water which I put the seeds in to where they’ve been soaked in there overnight, then putting in the soil to where they’re between ½ and ⅞ full, depending on the pot itself, leaving a small hole into which we plant the soaked seeds, and after that, adding water to the dirt to where it’s moist to the touch, then putting the bags around the pots, removing (as in taping or putting under the pot, if it reaches) any slack, and, only if the project lasts longer than 3 weeks, putting a hole in the plastic bag into which the syringe goes, taping it afterwards to where air cannot go in the pot. I found out that the more air a plant has, the less height it’ll have. This is important because it answers the question: “How does air quality affect plant height?”, which environmental conservationists can use to increase a plant’s quality, like when people make a tree give more wood to use less of them.

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Abstract: Science and Engineering Fair of Houston

1330

Rice Water Fertilizer for Plant Growth

Amir Elrique Bayabao

Alief ISD/O'Donnell MS

Category:

Plant Sciences

Houseplants improve air quality and help reduce air pollutants indoors. Fertilizers provide nutrients to plants and using homemade fertilizers - such as rice water - is cost-effective and a good way to nurture plants naturally. The purpose of this project is to find out which amount of rice water fertilizer will make the plants grow fastest. Over the span of four weeks, potted Pothos plants were given different amounts of rice water (200 ml, 100 ml, or none at all) once each week. The number of leaves were recorded. In the end, data showed that the plants receiving 200 milliliters of rice water grew the most number of leaves; 100 ml rice water grew less, and no rice water grew the least. I conclude that putting the most amount of rice water fertilizer to plants once a week keeps plants thriving and growing more lush and healthy.

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Abstract: Science and Engineering Fair of Houston

1331

How does the salt concentration affect the height of chia seeds in over a week?

Guadalupe Hernandez

Houston ISD/BCM Academy at James D Ryan - MS

Category:

Plant Sciences

This experiment tested how different salt concentrations in soil affect the growth of chia seeds over one week. Four groups of chia seeds were planted in cups of soil containing increasing amounts of salt (45g, 65g, 85g, and 105g). All plants received equal sunlight and water. After 10 days, the chia seeds in the lowest-salt soil (45g) grew the most, reaching an average height of 13 cm. Growth decreased as salt levels increased: the 65g group averaged 7.62 cm, the 85g group grew only 1.5 cm, and the 105g group did not grow at all. These results show that higher salt concentrations reduce plant growth, supporting the hypothesis that increased soil salinity negatively affects chia seed height. The experiment demonstrates how salt causes water stress and nutrient imbalance in plants, and suggests that excessive soil salinity is harmful to crop development.

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Abstract: Science and Engineering Fair of Houston

1332

pH-enomenal Hydroponical

Category:

Plant Sciences

Lyla Sterbanz, Mary Le

Spring Branch ISD/Spring Branch Academic Institute

This project looks at how different water pH levels affect the growth of hydroponic plants. The idea is that plants will grow best in water with a neutral pH of 7.0, compared to water that is more acidic or more alkaline. To test this, we set up three hydroponic systems with water at different pH levels: acidic (4.5), neutral (7.0), and alkaline (7.5). We put the same type of plant in each system. We checked their growth every three days and made sure to measure and adjust the pH every day. After a certain amount of time, we recorded how much the plants grew to see which pH level helped them the most. The goal is to find out how water pH affects plant growth in hydroponics and to help improve growing methods.

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Abstract: Science and Engineering Fair of Houston

1333

Cacti Hybrid

Dante Tamez, Dominic Hernandez

Aldine ISD/Hambrick MS

Category:

Plant Sciences

The purpose of our project was to see if we would be able to grow beans inside of a cactus so that people around the world would be able to use desert land to grow food and decrease starvation rates. To do this, we began by sprouting both lima and pinto bean seeds by using wet paper towels, ziploc bags, and a plastic container. Once the seeds had sprouted, we cut the Nopal Cactus pad in half and then grafted the seedling into the center of the cactus pad. As of now, the first trial of beans were not successful due to not being able to quickly adapt to their new environment. We have now began a second trial using the same procedures and type of beans.

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Abstract: Science and Engineering Fair of Houston

1334

Organic vs. Convential Produce

Kanchi Joshi

Conroe ISD /McCullough Junior High

Category:

Plant Sciences

Many people spend a lot of extra money on their groceries by choosing organic foods. The topic of whether organic food is a scam or not is largely debated. I wanted to test for myself if organic produce was worth it. Organic produce standard has nothing to do with how it's harvested or what they do to it after it's harvested. The term "Organic" refers to how it was grown. The crops are not allowed to be grown with synthetic fertilizers, antibiotics, certain pesticides, genetic engineering, or sewage sludge. In my research, I found that the three main differences to test for were vitamin C levels, antioxidant levels, and pesticide residue. I tested spinach, strawberries, and grapes, as these are all on the dirty dozen. I used iodine for the vitamin C test, green tea for the antioxidant test, and cabbage juice for the pesticide test. After the experiment, I concluded that there was a very slight difference in antioxidant and pesticide levels. To sum it up, it's a very personal choice. While my tests showed minimal differences, some may find the slight difference in pesticide residue or antioxidant levels worth the price.

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Abstract: Science and Engineering Fair of Houston

1335

The Strawberry Patch

Hope Myers

Clear Creek ISD /Brookside Intermediate School

Category:

Plant Sciences

The purpose of this project was to figure out which liquid kept strawberries the freshest over seven days. Strawberries spoil quickly due to moisture, mold growth, and microbiology movement, so finding an effective storage method can help reduce spoilage. The hypothesis stated that strawberries stored in vinegar would remain fresh the longest. To test this, six strawberries were placed in identical red containers, each strawberry was exposed to different conditions: vinegar, club soda, water, salt water, lemon juice, or no liquid. Daily observations were recorded in a daily log for changes in color, mass, texture, shrinkage, and smell. The results showed a clear pattern, the strawberry stored with no liquid stayed fresh the longest and experienced the least mold and spoilage growth and ended with 2/5 vs 4/5 from the other liquids. 1/5 means fresh and 5/5 means rotten and spoilage. Samples exposed to liquids rotten faster, showing greater moisture buildup, texture weakening, and color changes. Overall, keeping strawberries dry was the most effective method for maintaining freshness. These findings support the scientific idea that brings moisture to accelerate microbiology growth and speeds up spoilage in strawberries quicker.

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Abstract: Science and Engineering Fair of Houston

1336

Rhythmic Changes in Water and Light Negatively Affect Root Exudation in Corn

Breydon Butler

Houston ISD/BCM Academy at James D Ryan - MS

Category:

Plant Sciences

Plants are the very foundation of the Earth, they bring oxygen and life with them wherever they go. However, hearing the word “root exudation" might sound like gibberish, and completely random when talking about plants, I would know, but that very word turned into something you would never expect, a testable question, and a good one at that. “Does fine scale, rhythmic changes in root exudation affect the structure of the surrounding soil of a growing corn plant?” is my testable question, and I think it does! I also think that if we can control root exudation, we can practically control the chemicals in the soil, and all the other things, like its defense and such. If we enact the plan to implement the rhythmic changes, it could lead to a possible increase/decrease in the root exudation rates. This could also lead to the surrounding soil having more available nutrients and microbes! After this information i did some experiments and came to an interesting conclusion, which was that fine scale, rhythmic changes in root exudation DOES affect the structure of the surrounding soil of a growing corn plant, just very little for the amount of time I was given. This could be a big deal to the farm/plant community, or really any community, because it means that this leads to the surrounding soil having more available nutrients and microbes, which leads to bigger and better plants! If properly able to harness this, it could lead to a whole multi-million business forming! And other cool things too!

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[X] yes [ ] no

Abstract: Science and Engineering Fair of Houston

1337

Soil VS. Systems: How different growing methods affect plant growth

Ariana Penaloza-Renteria

Alief ISD/Holub MS

Category:

Plant Sciences

What if there's a way to grow plants faster and with less space than traditional farming? In this project I observed plant growth in different growing methods (DWC and Wick Hydroponic system and in soil) Understanding how plants respond to hydroponic systems can help individuals that live in a region with poor weather, limited space, and water constraint. My hypothesis was if plants are grown in a DWC hydroponic system, then being grown in soil or a Wick system because they receive a steady supply of nutrients and water. To test how different growing methods affect plant growth, I created 3 Systems: A DWC hydroponic system, Wick hydroponic system, and a soil system. For the DWC system, I used a container with net pots, an air pump, and air stone to provide oxygen to the roots. For the Wick system, I used a container and cotton wicks that's transfer water to the plants. The soil system used pots filled with nutrient-rich soil and watered regularly. All systems were kept in sunlight and maintained for over several weeks. Over the course of 3 weeks, I found that the plants in both hydroponic systems performed better than soil but slightly less than the Wick system. This experiment helps me understand how science can be used to improve forming and plant growth in new ways.

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Abstract: Science and Engineering Fair of Houston

1338

Basalt Soil for a Better World

Alicia Repka, Daisy Chen

Conroe ISD /McCullough Junior High

Category:

Plant Sciences

Basalt For a Better World tests whether crushed basalt can be used as a simple and sustainable way to support plant growth. The purpose of this project was to find a way to strengthen food security and fix decreasing crop yields. Basalt could provide an affordable and environmentally friendly way for agricultural communities worldwide to improve crop yields, fight soil degradation, and help mitigate climate change on the side. For this experiment, eight pots were filled with soil and divided into four groups: powdered (fine) basalt, medium-sized basalt particles, basalt pebbles, and a control with no basalt. One plant (Epipremnum aureum) was planted at the same depth in each pot. All plants were watered consistently each week and measured every two days for height and leaf growth above the soil. Data were collected by recording plant growth in centimeters and converting the measurements into percentage growth at the end of the experiment. The results showed that the plant grown with finely crushed basalt grew the most, supporting the hypothesis. This result suggests finer basalt particles caused more growth by improving soil health through its carbon capture abilities. In conclusion, this experiment shows that finer grains of basalt are the most effective at supporting plant growth. These results are important because basalt could be used to improve food security while contributing to climate change mitigation as a positive side effect. Future experiments could test finely crushed basalt on multiple plant species to determine which plants benefit most from this method.

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Abstract: Science and Engineering Fair of Houston

1339

Can a Plant Eat Plastic?: Assessing the Efficiency of Nepenthes Digestive Fluid in Decomposing Synthetic Polymers

Hannah Li

Katy ISD/TAYS Junior High - MS

Category:

Plant Sciences

This project tested whether or not digestive fluid from Nepenthes plants can decompose different types of plastic. Plastic is one of the most important global issues. I wanted to see how fast the plastic degraded under different circumstances. I used 4 types (PBAT, PLA, PETE, and PP) of common plastics as experiment subjects. Around 200 samples were placed in separate pitchers with a combination of variables. Samples were then retrieved after various days, rinsed with distilled water, and photographed under a microscope. The erosion observed was measured and quantified with an image processing software, ImageJ. The PLA, PETE, and PP showed no visible signs of erosion. PBAT samples in a healthy, new pitcher with mealworms placed had the greatest amount of erosion than all the others after approximately 10 days. The PBAT control samples that were in water showed minimal erosion, proving that the Nepenthes digestive fluid accelerated the breakdown of the polymers. These findings suggest that the Nepenthes digestive fluids can decompose plastics in a short span of time and could have potential applications in new environmentally friendly plastic degradation.

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Abstract: Science and Engineering Fair of Houston

1340

Plants vs. Pollution

Claire McKinney

Clear Creek ISD /Seabrook Intermediate School

Category:

Plant Sciences

This project was inspired by a cancer cluster map of Houston, and the experiment tested the areas with the highest cancer rates. The hypothesis is, if different regions of Houston are tested for the effect of soil pollution on plant growth, then San Jacinto River will have the least plant growth because that area had the highest cancer rates. The problem was about how the amount of soil pollution in the areas tested affected plant growth. The experiment was done by driving to the data collection sites and finding a place, and then taking four samples from each location plus four from the control (which was organic potting soil from Walmart.) Then nine arugula seeds were planted in each of the sixteen pots. Every day the plants were watered and measured. Soil test kits were used to test the soil in each of the sixteen pots for pH, Ammonia, Nitrogen, Phosphorus, Potassium, and Lead. In conclusion the hypothesis was correct because it predicted that the plants from the San Jacinto River would do the worst, and those were the plants that did end up all dying. Therefore, pollution might have a similar effect on plants' growth, as it has had on humans. A real-world recommendation from this experiment would be that if people live in the areas where the soil samples were collected to take caution when growing food or letting children play in the dirt. Using raised garden beds or sandboxes would be a good safety precaution.

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Abstract: Science and Engineering Fair of Houston

1341

How different Homemade Fertlizers Affect Sweet Basil Plant Development

Marziya Shaikh

Private/AL-HADI SCHOOL OF ACCELERATIVE LEARNING

Category:

Plant Sciences

The purpose of my experiment was to find out how different homemade fertilizers affect sweet basil plant growth and if they help a plant grow better than one with no fertilizer. This is important because homemade fertilizers are cheaper and better for the environment, and they use leftover food that would normally be thrown away. This project helps see the contrast between the three plants with different homemade fertilizer compared to one without it. My hypothesis is that if basil plants are given different natural fertilizers, then the one with banana peels and coffee grounds will grow the most because they contain more nutrients that help plants grow taller and stronger. To test this, I used three basil plants. Plant A was given fertilizer made from banana peels and coffee grounds. Plant B received fertilizer made from orange peels, eggshells, tea leaves, and almonds. Plant C was the control and didn't get any fertilizer. All three plants were watered the same amount and I measured their height and leaf growth over the next several weeks. The results of my experiment showed that Plant A grew the most, reaching a height of 11 5/8 inches with many new leaves. Plant B grew to 10 2/8 inches, while Plant C grew the least at 8 1/8 inches. This proves my hypothesis was correct because the nutrients in the banana peels and coffee grounds helped the plant grow faster and healthier.

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Abstract: Science and Engineering Fair of Houston

1342

Blades To Pages

Liam Phan

Charter/SST - Champions College Prep - HS

Category:

Plant Sciences

The purpose of this project is not to necessarily make a new idea but to expand and teach others about ways to use every day annoyances and turn them into solutions in this case, paper. What I basically did was harvest things like weeds or plants that I didn't want in my yard and broke them down using a chemical, commonly called washing soda. I did this by boiling water with the washing soda in order to active the chemical since by itself, it's unable to break down the plant compounds. Then, I laid the remnants of the plants onto canvas and waited for it to dry, for around 4 -6 hours in the sun. After making this paper I realized it felt more like cardboard or construction paper, perhaps that is because of how much washing soda I used, or the composition of the plants. In conclusion, this project was successful even if the paper did come out more crude than expected.

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Abstract: Science and Engineering Fair of Houston

1343

NeuroLeaf: Detecting Hidden Plant Stress Signals Using AI and Low-Cost Sensors

Arvin Krishna

Private/THE HONOR ROLL SCHOOL - MS

Category:

Plant Sciences

Texas agriculture loses billions to drought every year, yet plants may be able to "tell" us when they need water. According to Texas A&M AgriLife, Texas agriculture uses ~60% of the state's water and lost over $7 billion to drought in 2022, highlighting the need for early plant-stress detection .This project tested whether a pepper plant (Capsicum annuum, a common Texas garden crop) produces distinct electrical signatures in response to touch, light, and watering. A single pepper plant was connected to an Arduino Uno using sterile acupuncture needles (0.25 mm) gently inserted into the leaf and stem, and amplified with an LM358 operational amplifier for clean, low-noise signal capture. Leaf voltage was recorded once per second with CoolTerm serial monitor and analyzed in Python. Each stimulus was applied for 10–20 minutes and repeated 3–5 trials. Results showed clear, repeatable differences: touch produced fast ±0.02 V spikes, light triggered sustained drops up to –0.111 V, and watering caused the strongest response, a prolonged +0.078 V rise. Baseline voltage remained stable at 1.2–1.5 V. These findings show that plants encode environmental events in distinct electrical patterns. Because watering produced the largest and longest-lasting signal, low-cost Arduino-based sensors could enable real-time drought-stress monitoring for Texas farmers, reducing water waste and protecting crops across Texas. Future work will test multiple plants and explore a simple machine-learning model to classify stress signals.

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Abstract: Science and Engineering Fair of Houston

1344

Category:

Plant Sciences

Do Fragrance Chemicals Matter? Analyzing Plant Sensitivity to Perfume-Based Solutions

Matias Mora

Alief ISD/Albright MS

The purpose of this experiment was to find out how commercial perfumes, with chemical fragrances, impact the environment compared to cleaner perfumes like DIME fragrances, and this was done by observing their effects on plant growth and health. My hypothesis was that if DIME has more natural ingredients, then the plants watered with DIME would grow better and look healthier than the plants watered with Perry Ellis. This is because the strong chemicals in Perry Ellis might interfere with how plants sprout and grow. To test this, radish seeds and marigold seeds were planted in small labeled pots and watered every three days for 21 days with one of four solutions: DIME perfume diluted with water, Perry Ellis perfume diluted with water, ethanol mixed with water, or plain water as the control. Plant height, germination, leaf number, and overall health were recorded. The results showed that radish plants grew the tallest with water, averaging 8.16 cm, while plants watered with ethanol and Perry Ellis grew a bit less. The radish plants watered with DIME grew the least, averaging 5.28 cm and having fewer leaves, and tests like an ANOVA showed this difference was significant. Marigold plants did not show significant differences in growth or leaf number between groups, meaning they were less affected by the perfumes. My hypothesis was not supported because the plants watered with DIME did not grow better. This shows that even perfumes labeled as “clean” can still affect plants, and that different plants react differently to chemical exposure.

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Abstract: Science and Engineering Fair of Houston

1345

Lettuce grow.

Adriana Holliday

Conroe ISD /Peet Junior High

Category:

Plant Sciences

Romaine lettuce is one of the most consumed vegetables in America. In fact, people spend $1.54 billion on romaine lettuce each year! The question of this study is, how will romaine lettuce grow in 3 convenient water sources such as pond water, distilled water, and well water. This demonstrates which water source is most beneficial to lettuce growth and how this project saves money. In this project, the lettuce will be measured over a 6 week time frame, doing 1 trial every 2 weeks, while recording both the lettuce growth and root growth. According to the hypothesis, the distilled water would have the most lettuce growth, however, after the study it was concluded that the pond water had the most growth because its total lettuce growth was 26 grams. The well water came in second with a total growth of 24.8 grams, and the distilled water had the least growth with 15.7 grams as its total lettuce growth. Since pond water was able to abundantly grow the most produce, it can be confirmed that growing lettuce at home saves money. This study proves growing lettuce at home, with any of these water sources, saves money because people aren't throwing away the leftover romaine lettuce and buying new ones, but they are reusing it instead.

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Abstract: Science and Engineering Fair of Houston

1346

Can Artificial Intelligence help with plant care?

Charisse Ding

Private/The Emery/Weiner School

Category:

Plant Sciences

Our hypothesis is that if we care for plants with AI, then the plant will grow faster than if a human cared for it. We believe this because AI makes little to no mistakes, while humans often make mistakes. During our experiment, we found that the Ai Plants grew at about the same rate compared to the Human Plants, though the Human plants drooped a little bit more, meaning that it was slightly more unhealthy. Because of this, we found that our hypothesis was incorrect, but the AI would still benefit others without agricultural experience. If others were to make the Artificial Intelligence Plant Caretaker, it would not be efficient, but if we turned this into an app (Something we plan for future research), we could benefit others. For future research, we wanted to try and or create more options and features for plant care, we could even make an app. For example, if a plant does not receive enough sunlight, then the AI could tell humans that the plant must be located in a brighter area. We could also do more research and trials to see what other "nice-to-haves" for plant care could be. We also wanted to convert what we trained in AI to become an app, so others could use it for their own benefit.

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Abstract: Science and Engineering Fair of Houston

1347

Optimization of liquid media for mushroom cultivation

Theodore Stefanov

Private/Our Lady Queen of Peace

Category:

Plant Sciences

This project is about optimizing liquid culture media recipes for mushroom growth. The rationale for this project is to contribute to making mushroom growth easier for the world. Mushrooms are healthy food, and are relatively easy to grow. If an optimal liquid culture media is found, the process could be exploited even more. A recipe with the most diverse composition was hypothesized as the optimal liquid culture media because it contains all the nutrients the mushroom needs to thrive. 25 50 ml vials, with 5 cultures, and one control culture (Distilled Water) were cultivated. The mushroom strain is Pleurotus Cornucopia. The growth in the vials was measured photometrically for a month. At the end of the testing period, all the results are tabulated and analyzed against the hypothesis. The evaluation of the hypothesis at the end was considered inconclusive.

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Abstract: Science and Engineering Fair of Houston

1348

Moisture Detector

Juan Brito

Conroe ISD /Knox Junior High

Category:

Plant Sciences

The problem addressed in this project is the challenge of knowing how much water plants truly need, since overwatering can cause leaves to yellow and underwatering can lead to wilting. The hypothesis states: If they use the homemade moisture detector and water the plant only when the LED turns on, then the plant will grow better, with firmer and greener leaves, and the soil will maintain a more balanced moisture level, because the detector provides a clear signal of when the soil actually needs water, preventing both overwatering and underwatering. Research shows that soil moisture is critical to plant health, as water held between soil particles determines nutrient absorption and growth. Efficient water use also reduces waste and improves sustainability in agriculture. The experiment compares two identical plants: one watered using the homemade moisture detector and the other watered by eye. Observations focus on leaf color, firmness, and overall plant stability to determine whether the detector provides measurable improvement. This simple design highlights how electronics can be integrated into plant care to test whether technology enhances everyday gardening practices. Results showed that the plant watered with the detector maintained healthier leaves and more consistent soil moisture than the plant watered by eye. This supports the hypothesis and demonstrates that a low-cost detector can improve plant health while reducing water waste. Future applications include helping gardeners and farmers use affordable technology to care for plants more effectively, promoting sustainability and better resource management.

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Abstract: Science and Engineering Fair of Houston

1349

Can AI accurately Analyze Plant Growth?

Omar Gill, Youssef Abdou

Conroe ISD /York Junior High

Category:

Plant Sciences

This project investigates whether a custom AI can accurately predict plant growth using a single initial photo and information about growing conditions. Radish, mint, and green onion seeds will be grown in identical pots with uniform soil, water, light, and temperature conditions. The AI, developed as part of this experiment, will use the initial photo and environmental data to predict daily growth over a 20-day period. Actual growth will be measured manually and compared to AI predictions. Prediction accuracy will be calculated using a standardized formula, and results will be displayed in tables and graphs. Additionally, predictions from the custom AI will be compared with predictions from other AI models serving as controls. This experiment evaluates the precision of AI in monitoring plant growth and assesses performance differences between AI systems.

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Abstract: Science and Engineering Fair of Houston

1350

What's a plants favorite color

Cassidy Cronje, Jaycelee Gillen

Galveston ISD/Crenshaw School of Environmental Studies

Category:

Plant Sciences

In our project we used seeds from scratch the seeds we used are bean seeds.we also used radish seeds.We started the project 3 months ago.We used red,blue,and normal led lights. At the end of the project we know that the red,and blue led lights helped the plants grow better than the normal led lights. At the beginning of the project we thought that the normal light would work better.

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Abstract: Science and Engineering Fair of Houston

1351

Blame It All on My Roots

Category:

Plant Sciences

Quinn Watson

Clear Creek ISD /Brookside Intermediate School

There are many partnerships when it comes to plants and their environment, but one critical partnership has been overlooked, the symbiotic relationship between plants and mushrooms. The symbiotic relationship between these two organisms is that plants expel oxygen and take in carbon dioxide, while the opposite is true for mushrooms. This project examines if plants with the help of a red light can sustain mushrooms in an oxygen enclosed environment. This project is important because if scientists want to create a new ecosystem and sustain it, it requires reproduction of plants and mushrooms. For 22 days, the plants and mushrooms were in an oxygen sealed chamber where they could only live off each other. The hypothesis failed because even with the oxygen, the mushrooms didn't grow caps or at all with the new environmental conditions. Although the plants produced enough oxygen, the mushrooms made too much CO2, which outweighed the oxygen. The data showed that in both chamber A, B had no clusters grown, while chambers C and D only had 13 and 9 clusters at the end of the project. Not only was the outcome worse than last year's project, but it has also changed my theory from last year about the reason why the mushrooms didn't grow caps. Without caps there are no spores that allow reproduction. This contributes to scientists by showing how they might need to change the CO and oxygen levels in order for an environment to survive.

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Abstract: Science and Engineering Fair of Houston

1352

What do plants like

Makenzie Garrison

Galveston ISD/Crenshaw School of Environmental Studies

Category:

Plant Sciences

Hydroponics is a great process for plant growth. My experiment was used to see how best the liquid fertilizer worked under various conditions. I put six plants under different conditions and recorded their growth over five weeks. The conditions were that I had 3 plants with liquid plant food, 3 without liquid plant food, one liquid plant food plant in the sun and one plant without liquid plant food in the sun. At the end of the 4 week period I saw that the plant in the sun without liquid plant food grew the best and all of the plants with liquid plant food molded.

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[X] yes [ ] no

3. I/We worked or used equipment in a regulated research institution or industrial setting.

[ ] yes [X] no

4. This project is a continuation of previous research.

[ ] yes [X] no

5. My display board includes non-published photographs/visual depictions of humans (other than myself):

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[X] yes [ ] no

Abstract: Science and Engineering Fair of Houston

1353

Category:

Plant Sciences

Effect of Garlic (Allium sativum) Extract on Plant Growth and Soil Microbial Diversity of Green Gram (Vigna radiata)

Vidyut Manoj Kumar

Conroe ISD /McCullough Junior High

This study investigates the effect of Garlic (Allivum Sativum) extracts on Green Gram (Vigna Radiata) growth and soil microbial diversity. Garlic contains bioactive compounds such as allicin that are known for their antimicrobial properties and ability to influence plant growth. For the microbial test, soil was diluted in water and cultured on nutrient agar plates. After 5 days of incubation, the lower concentrations showed higher microbial growth, whereas higher concentrations showed reduced microbial growth. Fo the plant growth test, the Green Gram plants were grown for 7 weeks. Garlic extracts and residues were applied once every week. The results showed that higher concentrations had a negative impact on plant growth, lower concentrations showed moderate growth, and the control (no garlic, just water) showed the best plant growth. these findings highlight garlics antimicrobial property, its ability to influence plant growth, and future tests on weed control

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[ ] Human participants [ ] potentially hazardous biological agents

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Abstract: Science and Engineering Fair of Houston

1354

How does water alter plant growth

Mitchelle-Miracle Eleonu

Charter/School of Science and Technology, Houston - MS

Category:

Plant Sciences

Plants can't grow without air, water, and sunlight. I am researching how the amount of water a plant is given affects its growth. During drought, shrink to survive but eventually die. During over-saturation, they store water in their central vacuole (vacuole, which acts as a sack for holding water, but it eventually dies. The project is important because it shows how much water affects plants and how important water is to plant growth. The plant with a little amount of water died after shrinking. The plant with too much water died after over-saturation. The plant with the right amount of water grew but died after the amount of sunlight it was given was reduced, and it got too much water.

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Abstract: Science and Engineering Fair of Houston

1355

Using Used Tea Leaves and Coffee Grounds to Help Improve Plant Growth of Spinacia oleracea

Parth Natoo

Conroe ISD /McCullough Junior High

Category:

Plant Sciences

Fertilizers are known for giving out nutrients to plants, specifically Nitrogen, Phosphorus, Potassium (NPK), and are used highly by gardeners for their crops. However, these fertilizers are in high demand and the prices for fertilizers rise every day. An effective alternative for fertilizer is used tea leaves and coffee grounds, instantly providing ideal nutrients that stimulate the growth of the plants. The plant (Spinacia oleracea) was supplemented with three levels of used tea leaves: 0, 50, and 100 grams. Three of the nine plants experienced lower growth compared to the others. The plants that got the NPK boost from tea leaves and coffee grounds grew an average of 4-5 cm more. Therefore, implementing used tea leaves for spinach (Spinacia oleracea) as a replacement or supplement to fertilizer works better because it gives nutrients that are key to growth. Used tea leaves can be a key component to help gardeners keep their crops growing, especially because it is cheaper and can be composted, helping reduce waste. The next step is to test various plants through different growing seasons, allowing farmers and gardeners to use this finding to improve their own plant growth.

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Abstract: Science and Engineering Fair of Houston

1356

Plant Reactions to Changes in Light Stimuli

Hailey Sutin

Private/The Emery/Weiner School

Category:

Plant Sciences

Plants will grow towards light, but to what extent and how could they get around obstacles? This experiment looks at how a bean plant can find its way to light and it studies phototropism. As cities get more crowded and polluted, plants may have a harder time getting enough light to carry out photosynthesis. To test how plants reacted to unusual light conditions, a barrier with a hole was placed between a plant and its light source, and a control plant was given full access to its light source. Both plants were recorded on a video timelapse to observe and compare their growth. In general, the growth of the plants were similar, but the growth rates towards the light were unique to each plant. The control plant grew straight to the light, while the experimental plant was forced to move and bend to access light. This experiment supported my hypothesis as it attempted to prove the limits of phototropism by showing that plants can move around barriers when exposed to insufficient light. This experiment provided plant observations and data around plant growth, stimuli and how plants react to changes in their environment.

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