

Explore: Dear science mentor, two of us know quite a bit about plants the others not so much. One person has a garden and knows how to grow plants. Another group member has a green thumb and knows a little bit about plants. We know plants get energy from photosynthesis and make glucose as their form of energy. Plants also need water, sunlight, energy, and carbon dioxide to carry out these life processes.

Research question: We want to test if plants can survive growing in different things other than soil. We are going to have two plants that will grow normally in the soil. We will take care of these plants normally. The other four plants will be growing in wet cotton balls and wood chips instead of soil. These plants will be taken care of similarly to the other normal plants in the soil. All of the pots will get the same amount of sunlight, but we will adjust the amount of water for each plant to keep the soil, cotton balls, and wood chips moist. We are testing to see if the plants will grow successfully through measuring their heights, how many leaves are on the plant (if any), and their overall size. We are going to see if the plants can sprout in the cotton balls and wood chips, and if they can, will they continue to grow? How do they compare to the other plants in different pots? We are going to have 6 different pots. 2 of the pots will have normal potting soil with one pot having 5 onion seeds, and the other pot having 4 pea seeds. This will be the same case with the next 4 pots, but 2 pots will have cotton balls as soil, and the other 2 will have wood chips as soil. This will be a good topic to test because, for areas that don't have a lot of good growing soil in the world, we will be able to figure out if these plants can grow successfully in these other resources.

Prediction:

We think that the cotton balls will be able to grow the plants, while the wood chips won't or won't as much. If we grow plants in soil, cotton balls, and wood chips, we think the soil plants will grow normally. We think the cotton ball plants are going to grow a little bit slower. We also think it will be difficult for the seeds to grow in the wood chips. We think that because cotton is very absorbent and wood does not absorb a lot of water. We think that the cotton balls will most likely be able to at least sprout the plants because of how absorbent and how much they are able to decompose. We think it will be hard for the wood chips to sprout because it looks like the wood chips don't absorb water well at all.

Experimental Design: We are going to have six different pots. Two of the pots are going to have normal planting soil, with four pea seeds in one pot, and five onion seeds in the

other. In the next four pots, two will have cotton balls as soil, and the other two will have wood chips as soil. These pots will also have five onion seeds in one, and four pea seeds in the other. All of these plants will have the same amount of sunlight, but we are going to adjust the amount of water in each cup depending on how much water is needed to keep the soil moist. We are going to see if these plants are able to grow successfully by first seeing if they sprout. If they do sprout, will they continue to grow? We will be measuring the plant's height, the amount of leaves it has (if any), and the overall size of the plant if it does grow in these certain materials as the replacement soil.

Materials: Cotton balls, Planting soil, Wood chips, Water, 15 Onion seeds, 12 Pea seeds, 6 pots. Steps to the project: 1. Get six small pots. 2. Fill two of the pots with regular potting soil. (Make sure that the soil is almost to the top of the pot.) 3. Fill two of the pots with cotton balls. (Make sure it's not overflowing.) 4. Fill the last two pots with wood chips (Make sure the wood chips are similar to the amount of the soil and cotton balls in the other four pots.) 5. After filling the pots with the contents, start planting your seeds. 6. Soil pots= one pot will have four pea seeds, the other will have five onion seeds. Dig small holes in the soil about one inch- two inches down in the soil. Space the seeds evenly in both pots. Drop one seed in each of the holes you made. Make sure to cover up the holes with potting soil. 7. Cotton ball pots= Separate the cotton balls in both pots to make small holes to plant your seeds in. Plant four pea seeds evenly spread out in one pot, and five onion seeds spread evenly in the other. 8. Repeat steps 6 and 7 except with wood chips as the soil. 9. Water all of the pots so that the contents of the pots are evenly moist. (The water does not have to be the same in each pot, just make sure the soil, cotton balls, and wood chips are moist.) 10. Place the pots in a sunny window, and let your plants grow! Over time, monitor the seedlings in the pot. Make sure that the soil is always moist enough for the plants to grow, but not too wet. If the seedlings do start to sprout, record your observations and measure the size of the sprouts. Record the height of the plants, the amount of leaves (if any), and the overall size compared to each plant.

March 7 2024,

We checked our plants and there is no growth other than this one plant that had a little green part (i think). Brook was the one to find it, and it was pea #1. We checked the cotton balls but no growth yet. I don't think the wood chips will sprout anytime soon(in fact I don't think they will at all.).

Observations:

Cotton ball (pea)	Cotton ball (onion)	Wood chip (pea)	Wood chip (onion)	Soil (pea)	Soil (onion)	March 4
Nothing yet	Nothing yet	Nothing yet	Nothing yet	sprouted	Nothing yet	March 7
Nothing yet	Nothing yet	Nothing yet	Nothing yet	Grew just a bit, but not much	Nothing yet	March 8
15 cm long	4.3 cm long	9 cm long	Hidden under the chips	20 cm long	2 cm long	March 12
Average 22.1 cm	There was only one growth(no available measurement)	There was only one growth(no available measurement)	There was only one growth(no available measurement)	Average 22.2 cm	Average 1.7 cm	March 15
Average of 22.2 cm	Average of 6 cm	Average of 21 cm	Average of 2.3 cm	Average of 19.5	Average of 2.9 cm	March 18
Average of 21.9 cm	Average of 4 cm	Average of 16.3 cm	Average of 0.3 cm	Average of 18.8 cm	Average of 0.1 cm	March 22
Average of 27.8 cm	0	Average of 28.03 cm	0	Average of 18.5 cm	0	April 1st

March 15, 2024

Control #2 is growing a bit but not much(it's much slower than control #1). Control #1 is growing rapidly and is increasing in height. I haven't noticed any buds to show that the peas/onions are growing; only the stem and leaves are noticeable. I wonder if there will be peas/onions growing in the plant?

March 18, 2024 (journaling this on the 19 of march)

For all of our pea pots we decided to put skewers in and help them hold up the plant. The onions are growing slowly but are growing quick if that makes sense. We didn't put skewers in the onions so it was only the peas because the peas were growing too quickly!

March 19, 2024

I observed that the soil for the peas is wilting(i think that's the word I can use). We think we added too much water to the pea soil pot but were not sure. The cotton balls are still a bit soaked but not too much to the point where it's overflowing. And the wood chips are very dry when we come back to school the next day.

March 22, 2024

Some of the plants in one pot have dried out and maybe have died, we are not sure if it died or not. The onions are the ones who are dying (i think). The peas are still going strong. Some of the peas are drooping and wilting because of too little water or drenching them in water.

March 25, 2024

There are no changes, other than that the wood chips 2 (onions) and control 2(also onions) have no growth(pretty sure they have died :().

April 1, 2024

All the plants in the pea pots started to droup and there are a couple of the pea plant stems with crinkly/ dried out tops and some leafs. There was a whole week where we didnt get to see them or water them(we had school Monday, but not on Tuesday, Wednesday, Thursday, and Friday). The onions dont have any growth, sadly. It's mainly just the peas that are growing(no growth in the onions :()