

What Do Microbes Do For Plant Growth? Protocols

Materials You Need:

- At Least 6 Seeds of One Type (seeds can be from fresh fruit and vegetables, dry beans, popcorn kernels, seed packets, collected from plants outside)
 - Example: 6 seeds from a bell pepper
- Bleach, rubbing alcohol, or soap/water (if you are using soap/water, mix about 3 drops of soap into a small container of water)
- Tweezers (or a spoon if you don't have tweezers)
- 2 Ziploc Bags
- Sharpie or Pen
- 1 Paper Towel (ripped in half)
- 2 Bowls/Containers to Hold Liquid

Set Up Your Experiment:

Prep Steps

1. Make sure your "work bench" (counter, or other hard surface) is clean.
2. Label one ziploc using a sharpie or pen as "With Microbes" and label the other ziploc as "Without Microbes."
3. Wet the two halves of the paper towel so that they are wet, but not dripping with water.
4. Clean your tweezers (or spoon) by washing them with soap and water.
5. Fill one bowl with water and fill the other bowl with [bleach, rubbing alcohol, or soap/water].
6. If you have gloves, please put them on at this step.

Seed Steps

7. Divide the seeds you have in half (so if you have 6 seeds, make 2 groups of 3 seeds).

For your first group of seeds:

8. Pick up one seed using tweezers (or spoon).
9. Dip the seed in water and wait for it to soak for about 30 seconds.
10. Place the seed on a wet paper towel.
11. Repeat steps 7-9 for the remaining seeds in your first group.
12. Once you have all of your seeds on the paper towel, fold the paper towel over the seeds once (so the seeds are enveloped in the paper towel).
13. Place the wet paper towel with the seeds in it inside of the ziploc bag labeled ("With Microbes").
14. Place the ziploc in a sunny area (near a window) or tape directly on a window.

For your second group of seeds:

15. Pick up one seed using tweezers (or spoon).

16. Dip the seed in [bleach, rubbing alcohol, or soap/water] and wait for it to soak for about 30 seconds.
17. Now, dip the seed in water and wait for it to soak for about 30 seconds.
18. Place the seed on a wet paper towel.
19. Repeat steps 7-9 for the remaining seeds in your second group.
20. Once you have all of your seeds on the paper towel, fold the paper towel over the seeds once (so the seeds are enveloped in the paper towel).
21. Place the wet paper towel with the seeds in it inside of the ziploc bag labeled (“With Microbes”).
22. Place the ziploc in a sunny area (near a window) or tape directly on a window.
23. Make observations once a day looking for signs that the seeds have germinated or sprouted (started to grow). Look for tiny roots or leaves emerging from the seed. Perhaps take a photo each day to see how the seeds are changing over time.
24. Record your data in a notebook or on a piece of paper. Write a tally mark for each seed that has germinated or just record the total number of seeds that have germinated on each day for each treatment (with microbes and without microbes). Create a chart like the one below.

DAY	Number of _____ Seeds Germinated (type of seed)	
	with microbes	without microbes
1	0	0
2		
...add as many rows as you need		

25. Send us your data! Email your results and be sure to include which type of seeds you used to: seedsforsciencefest2020@gmail.com