



Where Did the Nutrients Go?

Furnished as a Free Service to Home Educators

By

The Backyard Scientist

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The following experiment from the Backyard Scientist was developed expressly for use in newsletters serving home educators. This experiment is NOT contained in the award-winning *Backyard Scientist* books and science kits. As in the *Backyard Scientist* books, it is designed to be simple, fun, and of course to teach an important scientific concept.

Note: this experiment will take several weeks to complete.

Gather the following supplies:

- Corn, sunflower or other vegetable or flower seeds
- Two small opaque cups (Styrofoam coffee cups work well)
- Nutrient/soil testing kit (available at garden and home improvement stores)
- Potting soil
- Water
- Two plastic spoons
- Paper and pen for recording observations

Begin experimenting.

1. Mix the potting soil so there is a uniform consistency.
2. Review the capabilities of the testing kit. Many will test for one or more of the following: pH, nitrogen, phosphorous, and potash).
3. Determine the soil nutrients you will test for.
4. Set aside the amount of soil required for the tests—see instructions on soil test kit.
5. Analyze the soil for the nutrients you selected.
6. Record your observations.
7. Fill the two cups with potting soil.
8. Plant the seeds according to the directions on the seed packet—don't forget to cover the seeds with soil.

9. Water and generally maintain the seeds according to growing directions on the seed packet.
10. After 14 days, seedlings (small plants) should extend beyond the soil surface.
11. Select one cup of seedlings for the initial tests.
12. Use a spoon to remove one soil sample from the edge of the cup where no roots have reached and another spoon to obtain a soil sample from the same cup from within the area of the web of roots. (You do not want to contaminate the soil samples by using the same spoon to obtain both samples.)
13. Test both samples and record your observations.
14. Maintain the second cup for an additional two weeks.
15. Repeat steps 12 and 13.

Extension: grow additional types of plants and grow some for longer periods of time.

Can you answer the following questions based on your observations?

1. What happened to the level of soil nutrients over time?
2. What might have caused the change in soil nutrient levels?
3. Was there a difference in the nutrient level from samples taken between the roots and those taken outside the root system near the edge of the cup?

Backyard Scientist solution to the experiment.

Your data should have shown that the nutrient level in the soil dropped as the seeds germinated and began to sprout and mature. Different plants use more of some nutrients than others. You may have been able to determine that from your data by observing larger changes for specific nutrients.

The nutrient levels changed more from the soil samples taken from the web of roots than from the edges of the cups. Plant roots take up water and nutrients through the root system through a process called osmotic pressure and carry these throughout the system to all portions of the plant.

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About the author.

Jane Hoffman, the Backyard Scientist, is the internationally known author of the award-winning *Backyard Scientist* hands on science books and science kits. The nine science books and three kits will excite, motivate and instruct any student.

Also available from the Backyard Scientist is the "Parent Guide to Teaching Science." This work covering grades

K –12 helps parents insure they are teaching the science subjects and materials their students should be learning by grade level. Her newest book, *A Science Wonderland for the Very Young* targets children ages 2-7 years.w

In addition to writing and developing these exciting materials, Jane is a sought-after speaker at Home School and other educational conferences nationwide where she makes science come alive. Everyone

leaves her sessions better informed as well as motivated and enthused to apply the concepts they learned. Hoffman's teacher inservice workshops for teachers are rated the best available by teachers and administrators. She has been serving the homeschool and educational markets with quality materials for more than 20 years.

For a free brochure, send a self-addressed, stamped (\$.55) envelope to: Backyard Scientist, PO Box 16966, Irvine, CA 92623 or visit her on the Worldwide Web at: www.backyardscientist.com