



The Effects of Compost on Plant Growth

Background Information

The aim of this activity is to show the importance of nutrients for healthy plant growth.

Garden compost looks very different from the compost you buy in bags from a garden centre (bagged garden centre compost is a mixture of lower nutrient value than garden compost.)

Garden compost is nutrient rich and acts as a slow release plant fertilizer. It provides plants with the three main nutrients – nitrogen, potassium and phosphorus. It also contains other nutrients and trace elements which are all essential for healthy plant growth. However, growing plants in just compost can trigger soft sappy growth, as the compost is too nutrient rich. Resulting in the plants being more prone to pest and diseases in the long term.

Soil is a combination of materials; various rocks that have been broken down over time by wind water and chemical processes, organic matter which is made up of decaying plant and animal matter, water and air. In a good garden soil, about 45 percent will be rock particles, 5 percent organic matter like leaves, 25 percent water, and 25 percent air. Also living within the soil are millions of organisms whose activity maintains a healthy soil.

Sand contains no nutrients. In this activity it is used as an inert growing medium. Seeds should germinate but healthy plant growth will not be maintained.

Seeds contain their own food-store. They will germinate successfully in nutrient-free material. However, their food-store will soon run out. They then need nutrients from the growing medium to promote healthy growth.

Best Seed to Use

- Dwarf French bean
- Pumpkin
- Sunflower

All these seed germinate fairly quickly (5 to 10 days) and are dramatic as they emerge through the surface of the soil. They grow rapidly and generally produce sturdy plants which are easier for children to measure and count the number of leaves.

Use seed no more than 2 years old, as they loose viability and may not germinate.

Science

Unit 3B Helping plants grow well

Unit 5B Life cycles

Unit 6A Interdependence and adaptation

Learning objectives. Children should learn-

- that a plants growth is affected by what it is growing in.
- to suggest how a fair test could be carried out.
- that in experiments and investigations involving living things, using just one plant in each set of conditions does not give sufficient evidence.

Learning outcomes. Children -

- identify compost as a factor affecting plant growth.
- suggest that to keep the test fair all plants need the same amount of light, warmth and water.
- explain that some seed may not grow whatever the conditions and so it is necessary to test different conditions on many seeds/plants.

Equipment

- 4 seed trays
- sieved garden compost
- garden soil
- sand
- 40 (minimum) - French bean seeds
- ruler
- record sheets

**This experiment will take at least
4 weeks to complete**



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Teaching activity

1. Look into the differences between garden compost, soil and sand and discuss with the group which will produce the best plant growth and why.
2. Prepare the 4 seed trays.
3. Fill the first seed tray with sand and label.
4. Fill the second with garden soil and label.
5. Fill the third with garden compost and label.
6. Fill the fourth with a 50:50 mix of soil and compost and label.
7. Sow 10 french bean seeds, (2 rows of 5 seeds) in each of the 4 seed trays. Push the seed down with your finger until they are at least 2cm below the surface (approx half a child's index finger deep) then smooth the surface over.
8. Water each tray with the same amount of water and position them all where they will receive the same levels of light and warmth.
9. Water each tray with the same amount of water on Monday, Wednesday and Friday (do not let the trays dry out).
10. Record the germination rate, plant growth in height and leaf growth using the record sheet provided.
11. Also make notes on general plants health. Does it have yellowing leaves? Is it very long spindly growth? How vigorous are the plants?
12. Continue for a minimum of 4 weeks however, 6 weeks would be better.
13. Graph the germination rate and plant growth over the 6 weeks for the different seed trays.

Analysis and Interpretation

1. Draw a graph and compare:-
 - The average germination rates for each tray.
 - The average plant growth for each tray.
2. Determine the overall health of the plants in each tray.
3. Based on the experiment what was the best growing medium for plant germination? For plant growth? For plant health?

You may not find differences between the trays. Or you may discover that the plants grown without compost did the best. It is difficult to determine whether the compost had no effect, the tendency is to assume the compost really has an effect and to attribute insignificant or negative results to experimental mistakes. Often unexpected results lead to important insights. Maybe your compost is of poor quality?

Seeds sown in the :-

- sand should germinate, however, once the seeds run out of their food store there will be poor growth.
- soil may not germinate as well due to the soil being more compacted and there being less air.
- garden compost will germinate well and growth after could be vigorous which could be too soft and sappy in the long term.
- mix of soil and compost will germinate and should then produce good sturdy plant growth.



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Name _____

1. In the table below record the total number of seeds that have germinated each week.

	Tray 1 - Sand	Tray 2 - Soil	Tray 3 - Garden compost	Tray 4 - soil and garden compost
Week 1				
Week 2				
Week 3				
Week 4				
Week 5				
Week 6				

2. In the table below record

a) The average height (cm) of the plants in the different trays.

b) The average number of leaves per plant in the different trays.

		Tray 1 Sand	Tray 2 Soil	Tray 3 Garden compost	Tray 4 soil and garden compost
Week 1	Average height (cm)				
	Average no. leaves				
Week 2	Average height (cm)				
	Average no. leaves				
Week 3	Average height (cm)				
	Average no. leaves				
Week 4	Average height (cm)				
	Average no. leaves				
Week 5	Average height (cm)				
	Average no. leaves				
Week 6	Average height (cm)				
	Average no. leaves				