



HOMESCHOOL SCIENCE LAB

GROWING PEAS AND BEANS AND COMPARING THEIR NITROGEN FIXATION

Name: _____

Date Started: _____

Date Finished: _____

QUESTION

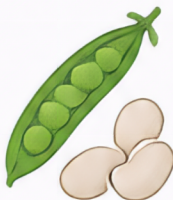
Do peas and beans (both legumes) fix nitrogen in the soil? Is there a difference in the amount of nitrogen they add?

HYPOTHESIS

If peas and beans are grown in nitrogen-poor soil, then they will add nitrogen to the soil, and one may add more than the other.

MATERIALS

- Pea seeds
- Bean seeds (e.g., bush beans)
- 4 identical pots or containers with drainage holes
- Potting soil (low in nitrogen, if possible)
- Water
- Ruler
- Labels or plant markers
- Notebook
- (Optional) Soil test kit for nitrogen or simple color comparison chart



WHAT TO OBSERVE AND RECORD (WEEKLY)

- Plant height (measure in cm)
- Number of leaves
- Overall plant health (color, vigor)
- Any visible nodules on roots (at the end)
- Notes or drawings



HOW TO CHECK FOR NITROGEN INCREASE

Option 1: Soil Test Kit (Best)

- Collect a small soil sample from each pot at the end.
- Use a soil test kit to measure nitrogen levels.



Option 2: Color Comparison (Simple)

- Moisten soil samples and compare their color.
- Darker soil can indicate more organic matter and potentially more nitrogen. Record observations.

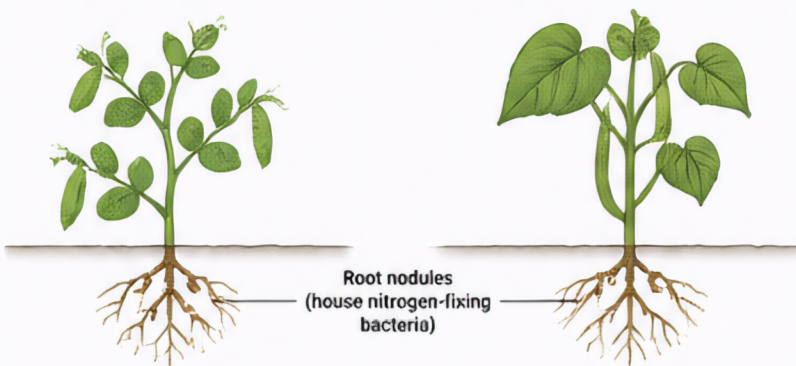
SAFETY

- Wash hands after handling soil.
- Do not eat any seeds or plant parts.
- Clean up spills to avoid slips.



BACKGROUND

Peas and beans are legumes. Legumes have a special partnership with bacteria (*Rhizobium*) in nodules on their roots. These bacteria take nitrogen from the air and convert it into a form plants can use. This process is called nitrogen fixation. By fixing nitrogen, legumes improve the soil for themselves and for other plants.



EXPERIMENT DESIGN

1. Fill all 4 pots with the same type and amount of low-nitrogen soil.
2. Plant peas in 2 pots and beans in 2 pots. Label them.
3. Place all pots in the same location with the same amount of light.
4. Water all pots equally. Do not add fertilizer.
5. Grow the plants for 6–8 weeks, observing and recording data weekly.
6. At the end of the experiment, examine the roots for nodules and test or compare the soil for nitrogen.

DATA TABLE

Week	Measurement	Peas (Pot 1)	Peas (Pot 2)	Beans (Pot 1)	Beans (Pot 2)
1	Height (cm) # of Leaves Plant Health (1–5)				
2	Height (cm) # of Leaves Plant Health (1–5)				
3	Height (cm) # of Leaves Plant Health (1–5)				
5	Height (cm) # of Leaves Plant Health (1–5)				
6–8 (Final)	Height (cm) # of Leaves Plant Health (1–5)				

CONCLUSION

What did you find out? _____

Which plant fixed more nitrogen? Why do you think so? _____

What would you change if you did this experiment again? _____