



# Classroom Activity

## 10 Big Question: How can we feed the World sustainably?

### Plant growth experiment

One of the most important nutrients found in soil which aids plant growth is Nitrogen. Nitrogen is important as it helps plants to build proteins and nucleic acids essential for development and growth. Free nitrogen is found naturally within the atmosphere and the environment but must be converted chemically into ammonium ( $\text{NH}_4^+$ ) and nitrates ( $\text{NO}_3^-$ ) before plants can utilise it.

In this experiment, students will grow plants within basic soil with and without the aid of Nitrogen fertilizer to determine the effects of ammonium uptake on overall plant growth.

#### Materials

- > Two small pots
- > Potting mix
- > One packet of seeds (fast growing plants that germinate within 5-7 days – radishes, marigolds, beans, peas and mustard are good choices)
- > Nitrogen-based fertiliser which contain nitrogen compounds useable by plants (ask at your local plant nursery if you are not sure)
- > An empty glass or plastic container suitable for mixing the nitrogen fertiliser

#### Procedure

1. Label one pot 'Control' and the other 'Nitrogen'. Ensure that there adequate holes in the bottom of the pots to allow for water drainage.
2. Pour out equal amounts of the potting mix into the pots and plant the seeds as directed on the packet. Place the pots near a sunny window or under a growth light if light levels are low.
3. Check the pots at regular intervals and water as needed. Try not to let the soil dry out too much but try not to over water and drown your seeds. Water the 'Control' pot with regular water. Water the 'Nitrogen' pot with a mix of the nitrogen fertiliser and water (as per the recommendations on the fertiliser container). All plants should receive exactly the same amount of water/fertiliser solution at each watering.
4. Record regular observations about the growth of the seeds planted. You should include data for both the 'Control' and 'Nitrogen' plants. The following information should be recorded:
  - a. Date and time of the observation

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- b. Height of the plant
  - c. Number of leaves
  - d. Observations on the physical characteristics of the plant
  - e. When you watered the pots and the amounts given
5. Grow your plants for 1-2 weeks or as long as time permits making regular observations and data entries.

### **Analysis**

Summarise your results in a bar or line graph to illustrate the rate of growth using the height of the plants to compare results. Has the nitrogen fertiliser made a significant impact on the growth of your plant?