

# Lab Report Template

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## 5.3.5 Optimal Growth Ranges

### Problem

How does the amount of nitrogen in a soil affect the growth and development of a radish seed?

### Hypothesis

I believe that with the addition of nitrogen there will be additional growth in the oats. However if we add too much nitrogen it will cause a nitrogen deficiency.

### Materials

#### Per group of 4 students:

- Oat seeds
- 12, 6 1/2" diameter X 7" tall clay pots
- Soil to fill all 12 pots (will need 25 g)
- Scoop
- 1 250ml beaker
- Urea solution (provided by instructor)
- 4 plastic spoons
- 12 plastic cups
- Electronic balance
- 0.01 molar potassium chloride

- Nitrate test strip 1 per plastic cup
- Nitrate color chart
- Ruler
- Graduated cylinder
- 12 plant labels

#### Per Student:

- Safety glasses
- Disposable gloves
- Pencil
- Agriscience Notebook

### Procedures

#### Day 1:

1. Retrieve 12 clay pots, a scoop, a 250ml beaker, and soil to fill each pot.
2. Label 4 plant labels as 1, 2, 3, 4, and 0lb/ac. Label the remaining labels with 5-12 and their concentrations of N added.
3. Fill the clay pots to the bottom lip with soil.
4. Retrieve 10 oat seeds for each pot. Place them on the soil in the pots and lightly cover with another layer of soil.
5. Dispense the correct amount of Urea per pot.
  - a. 0lb/ac – 0ml Urea
  - b. 25lb/ac – 10ml Urea
  - c. 50lb/ac – 20ml Urea
  - d. 75lb/ac – 30ml Urea
6. Place your pots in the greenhouse, the instructor will water the oats for the next 5 weeks.

## Day 2:

1. Retrieve your 12 clay pots, 4 plastic spoons, 12 plastic cups, 1 ruler, and a graduated cylinder.
2. Measure the height of the oats in each pot. Take the average of the heights.
  - a. Measure the height of all the oats and then divide by the number of plants.
  - b. Do this for all of the pots.
3. Write down a general observation of the color of the plants in each pot.
4. Count the number of sprouts you have growing in your pots
5. Dump out one pot at a time and weigh out 25 grams of soil using the spoons and balance into the plastic cups.
6. To the plastic cups add 10 ml 0.01 M potassium chloride. Mix the cups using the plastic spoons.
7. Let the cups sit for five minutes. Retrieve 1 nitrate strip per cup and 1 nitrate color sheet.
8. Place the pad of the nitrate strip in the liquid in the cup. Hold it in the cup for 5 seconds.
9. Pull out the strip and let it rest for 1 minute.
10. Match the color of the pad to the color on the chart.
11. Write down the amount of nitrate based on the strip.
12. Rank the treatments from most effective (1) to least effective (12).

## Data Collection

Pot #	Amount Urea Added	Measured amount of Nitrate (ppm)	Plant Height (cm)	Color of Plant	# of Seeds Germinated	Ranking
1	0lb/ac					
2	0lb/ac					
3	0lb/ac					
4	25lb/ac					
5	25lb/ac					
6	25lb/ac					
7	50lb/ac					
8	50lb/ac					
9	50lb/ac					
10	75lb/ac					
11	75lb/ac					
12	75lb/ac					

## Analysis of Results

There is no data at this time.

## Conclusions

1. Why would too much nitrogen have a negative impact on plant growth?
2. Based on your results what would be the most effective rate of nitrogen application?