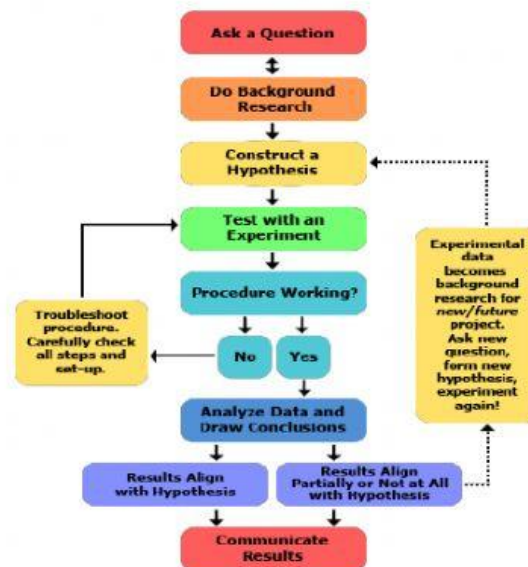


TOPIC I: GROWTH

The Scientific Method – Write A Report

Refresher:

The scientific method is process of objectively establishing facts through testing and experimentation. Last class we learnt about the scientific method, today we will use the method to write a report. The activity will require you to use the internet to answer questions. We will be following the method below to design our experiment and to complete a report.



In today's activity, we will be investigating growth in a red bean seedling.

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Instructions:

1. Plan and design an experiment to investigate the ways in which plant growth can be measured, using data that will be presented to you.
2. You must design an experiment to investigate this question:
"How do seedlings grow and change throughout their lifecycle?"
Follow the scientific method to answer the question.

Title: Growth in a Red Bean Seedling

Question: How do seedlings change as they grow?

Hypothesis:

A hypothesis is *a proposed explanation* for an event or observation.

Write your hypothesis for this experiment:

.....
.....

Aim/Objective:

An aim or objective outlines what the researcher would like to accomplish in the experimental procedure itself. It is usually presented in terms of a *verb* that describes what you are supposed to be doing during the experiment. Write your aim for this experiment:

.....
.....

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Background Theory:

Here, you'll do research to learn about the conclusions other scientists have made when doing similar experiments. Use the internet to answer these questions:

How do you know that the seedling is growing and how can that growth be measured?

From where would you measure growth?

Apparatus/Materials: Red bean seeds, paper towel, plastic cup, water, soil, ruler, fertilizer

Diagram:



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Procedure:

1. Moisten a small wad of brown paper towel and place it in the bottom of the plastic cup. Place 3 or 4 kidney beans on the paper towel. Moisten another wad of paper towel and gently set it atop the kidney beans.
2. Gently remove the bean and its developing roots from the brown paper towel. Remove the remaining paper towel from the plastic cup. Put a layer of small pebbles at the bottom of the plastic cup for drainage. Fill the remainder of the cup with soil. Dig a small hole for each bean. Drop a bean in each hole and gently cover the bean. Track the progress of the bean plant's growth measuring its growth and drawing the plant as it develops.

Progress



We started with regular of Red Kidney Beans. They've been sitting in my kitchen for at least the last 2 years.



After one day our beans were much larger, were lighter in colour and a few had developed a white "tail"



After the Thanksgiving long-weekend, our beans, still in the brown paper towel had developed further, sprouting roots, a stem and tiny leaves.



Having transplanted the germinated seed into soil on Thursday, the plants immediately started to grow. After only one day, some of our plants had grown up to 19 cm tall. (Friday October 17th)



By only that afternoon, our plants had developed further! The leaves had very noticeably increased in size and definition.



After a few more days of sunlight, water and good soil our plants continue to flourish. Some of reached 20cm tall and have begun to sprout new stems.

Adapted from: <https://mrpakert.wixsite.com/room220/red-kidney-bean-experiment>

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Results: Complete the results table by finding the average of growth of the seedlings.

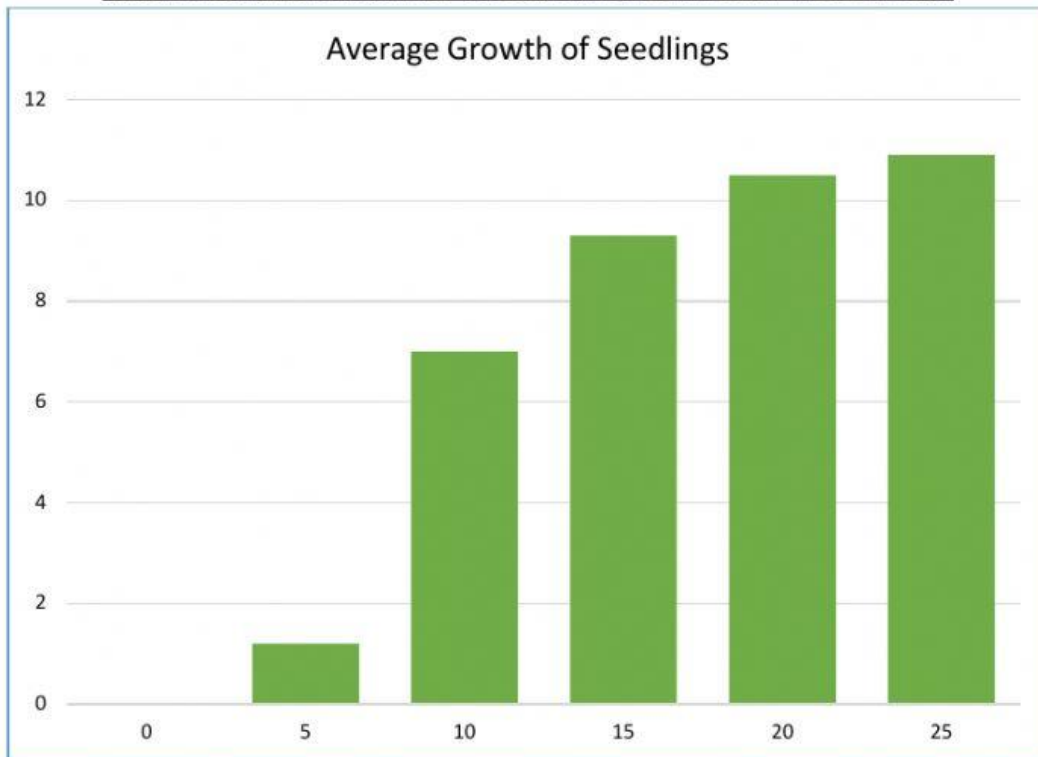
TABLE 1: GROWTH OF SEEDLINGS OVER 20 DAYS

Time (days)	Height of plants (in centimetres)				
	Plant 1	Plant 2	Plant 3	Plant 4	Average
0	0	0	0	0	
5	1	1	2	0.8	
10	8	6	7	7	
15	10.2	9	10	8	
20	12	10	11	9	
25	12.5	10.5	11.2	9.4	

TOPIC I: GROWTH

The Scientific Method – Write A Report

GRAPH 1: BAR CHART OF AVERAGE GROWTH OF SEEDLINGS



Discussion:

TOPIC I: GROWTH

The Scientific Method – Write A Report

Questions:

1. Between which days did the plant growth the most?

2. Does the growth measured accurately represent the amount the seedlings grew?

3. How much did the seedlings grow over on average over 25 days?

4. From day 20-25 the seedling should little increase in height, what other changes may have occurred to demonstrate growth in the seedling.

Conclusion:

1. Is your hypothesis true?
2. How do plants change as they grow?
