Science: Controlled Experiment Worksheet

Two scientists, Dr. Schnitzelfingers and Dr. Noodledrop design experiments to test which plant fertilizer works best. Their experiments are described below. Your job is to read the two experimental designs and decide which scientist has designed the better experiment.

**Experiment 1, Dr. Schnitzelfingers:**

**Study on the efficacy of Plant Supplements.**

The purpose of this experiment is to determine which commercial plant growth supplement provides the greatest benefit to the plants to which it is applied.

Hypothesis: Pete’s Miracle feed will provide the most positive effect as my brother’s name is Pete.

The fertilizers to be tested are: 1. Mi-T-Plant 2. Zupa Gro 3. Pete’s Miracle Feed 4. Plant-B-Big

The fertilizers will be tested on bean plants, tomato plants, carrots and tulips.

The growth period will be two months.

Procedure:

1. Label 8 pots with the letters A through H.

2. Fill the pots with potting soil.

3. In pots A and B plant beans, in pots C and D plant tomatoes, in pots E and F plant carrots and in pots G and H plant tulips.

4. In pots A and C put 100g of Mi-T-Plant, in pots B and D put 220g of Zupa Gro, in pots E and G put 150g of Pete’s Miracle Feed and in pots F and H put 200g of Plant-B-Big.

5. Place plants A through D in a sunny window sill, place plants E through H in a shady corner.

6. Water all plants with 250mL of water.

7. Every two days water plants A, C, E, and G with 250mL of water. Every four days water plants B, D, F and H with 350mL of water.

8. After two months measure the plants growth.

Data:

After two months the results are as follows.

The bean plants: Pot A - Final mass of plant: 175g

Pot B - Final mass of plant 190g

The tomato plants Pot C – Final height of plant 26cm

Pot D – Final height of plant 17cm

The carrot plants Pot E – Length of root 21cm

Pot F – Length of root 15cm

The tulip plants Pot G – Final mass of plant 310g

Pot H – Final mass of plant 205g

Conclusion:

Pete’s Miracle feed is the best fertilizer as the tulip in pot G had the greatest mass.

**Experiment 2, Dr. Noodledrop**

**Which Fertilizer is Best?**

The purpose of this experiment is to determine which commercial plant growth supplement provides the greatest benefit to the plants to which it is applied.

Hypothesis: Zupa Gro should provide the best results as it is the most expensive and best selling fertilizer.

The fertilizers to be tested are: 1. Mi-T-Plant 2. Zupa Gro 3. Pete’s Miracle Feed 4. Plant-B-Big

The fertilizers will be tested on bean plants. The final result will be determined by comparing the final masses of the fertilized plants compared to the control plants which will receive no fertilizer.

The growth period will be two months.

1. Label 25 pots (all standard 600mL plant pots). 5 pots labelled A, 5 labelled B, 5 Labelled C, 5 labelled D and 5 labelled E.

2. Put 500mL of Plantmart potting soil in each pot.

3. Plant one lima bean in each pot.

4. The 5 pots labelled A are control plants and receive no fertilizer. The 5 pots labelled B receive 200g of Mi-T-Plant. The 5 pots labelled C receive 200g of Zupa Gro. The 5 pots labelled D receive 200g of Pete’s Miracle Feed. The 5 pots labelled E receive 200g of Plant-B-Big.

5. All plants are then watered with 150mL of water, and are placed in the same window sill.

6. Every three days all plants are watered with 150mL of water.

7. After 2 months all plants are carefully removed from the soil and the masses measured.

Data

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Group** | **Plant 1** | **Plant 2** | **Plant 3** | **Plant 4** | **Plant 5** | **Average** |
| **A. Control** | 190g | 140g | 160g | 210g | 150g | **170g** |
| **B. Mi-T-Plant** | 220g | 230g | 220g | 250g | 210g | **230g** |
| **C. Zupa Gro** | 70g | 90g | 40g | 60g | 60g | **64g** |
| **D. Pete’s** | 180g | 190g | 170g | 150g | 200g | **180g** |
| **E. Plant-B-Big** | 310g | 260g | 260g | 300g | 230g | **270g** |

Conclusion:

The results show that both Mi-T-Plant and Plant-B-Big provide a significant advantage over no fertilizer (control group A). Pete’s Miracle Feed provides no real advantage over the control and Zupa Gro actually damaged the plants.

Questions:

1. Which experiment was a controlled scientific experiment?

2. Explain what is wrong with the experiment that was NOT controlled.