

## Experimental Design Scenarios

**Instructions:** After reading through each scenario identify the variables within the experiment.

### Scenario 1: Miracle-Gro and Basil

John really likes the herb basil. He likes it so much he eats it faster than it grows in the 8 pots he has on his window sill. John decided he needed to find a way to make the basil grow faster because he is limited on space. He decided to design an experiment. John took eight seeds and planted them in eight pots that all received equal amounts of sun and were all spaced 20 centimeters apart. Each day John gave each of the eight plants equal amounts of water using a large graduated cylinder, depending on how dry the soil was. John then divided the eight plants into four groups, A-D. For the two plants in Plant Group A, John only gave them water. For the two plants in Plant Group B, John gave each plant a cup of Miracle-Gro solution mixed at 25% less than the recommended concentration once a week in place of the water. For the two plants in Plant Group C, John gave each plant a Miracle-Gro solution mixed exactly at the recommended concentration once a week in place of water. For the two plants in Plant Group D, John gave each plant a cup of Miracle-Gro solution mixed at 25% more than the recommended concentration once a week in place of the water. After 30 days, John measured the height of each plant. The results were as follows:

	Basil Plant Height After 30 Days (cm)			
Plant Group	A	B	C	D
Plant Height (cm)	21	23	30	26

Identify the Dependent Variable: \_\_\_\_\_

Identify the Independent Variable: \_\_\_\_\_

Control Group: \_\_\_\_\_

Constants:

What can be concluded based on the results presented and how do you know?

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How can the experiment and data table be improved?

**Scenario 2: Rats and diets**

Jenn was very interested in nutrition and fitness, especially in children. She wanted to determine the effects of diet on the growth of children however, she was not able to get anyone to give her permission to complete experimentation on their kids. She had to resort to using rats. She designed an experiment that measured the effect of a sugar water diet compared to a diet of whole milk. One measure she used to determine the effect of the diet was mass which she measured weekly. In the experiment she used six rats that were split into two groups: sugar and water (Group A) and milk (Group B). She gave them all the same amount of “food” each day.

		Rats			
		Week 1	Week 2	Week 3	Week 4
Group A	Rat 1	7.0	8.0	8.5	9.2
	Rat 2	6.0	8.0	9.0	9.7
	Rat 3	7.0	7.0	8.0	9.0
Group B (milk)	Rat 1	7.0	8.0	9.6	11.0
	Rat 2	7.0	8.0	9.9	10.8
	Rat 3	6.0	7.8	10.0	10.6

Identify the Dependent Variable: \_\_\_\_\_

Identify the Independent Variable: \_\_\_\_\_

Control Group: \_\_\_\_\_

Constants:

What can be concluded based on the results presented and how do you know?

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How can the experiment and data table be improved?