

Experiment Planning

Instructions for completing the blanks in this guidebook can be found at www.mrzielen.com.

#1 Research Question

What is the effect that different brands of potting soil will have on growth of cilantro plants?

#2 Rationale

My family uses a lot of cilantro in the meals we cook. We've tried to grow our own cilantro, but compared to our other herbs and vegetables, it never grows well. This experiment will help determine if our problem may relate to the soil and will allow us to fix the issue and produce more cilantro in the future.

#3a Research Log 1

Identify your source (title, author, date, URL, etc.)

What information did you learn that is valuable to your project?

*Where can you find it once you get to the source?
(Page/Paragraph/etc.)*

#4a Citation 1

#5 Hypothesis & Reasoning

Hypothesis

If testing the potting soils Brand X, Brand Y, and Brand Z, then Brand Z will grow the highest cilantro plant.

Reason for Choosing this Hypothesis

According to my research, cilantro needs well drained soil and Brand Z has the largest particles. The large particles are intended to help drainage.

#6 Variables

Independent Variable:

Type of Potting Soil

- *Brand X*
- *Brand Y*
- *Brand Z*

Dependent Variable:

*Height of Cilantro Plants
(centimeters)*

** Include units so you are sure of how you will measure the dependent variable.*

Controlled Variables:

Time given to grow

Amount of sunlight

Amount of water

Ambient temperature

Humidity

#7 Materials

- *24 Cilantro Seedlings (purchased from a local nursery) of approximately the same size*
- *24 two-liter soda bottles, cut in half so bottom half can be used to pot plants*
- *3 kg bag of Brand X Potting Soil*
- *3 kg bag of Brand Y Potting Soil*
- *4 kg bag of Brand Z Potting Soil*
- *3 kg dirt collected from back yard*
- *Watering Can with water spreading spout*
- *500 ml Glass measuring cup with volume markings*
- *Tape Measure*
- *Kitchen Scale (accurate to ± 1 gram)*
- *Paper and Pencil (for recording results)*

#8 Treatment Groups

- *Group 1: 6 cilantro plants planted in Brand X Potting Soil (fine particles)*
- *Group 2: 6 cilantro plants planted in Brand Y Potting Soil (course particles)*
- *Group 3: 6 cilantro plants planted in Brand Z Potting Soil (very fine particles)*
- *Control: 6 cilantro plants planted in natural dirt from back yard*

#9 Controlled Variables

- *Time given to grow: I am using seedlings to avoid variation in germination time. All plants will be given 3 months to grow before measuring the results.*
- *Amount of water: Plants will be watered with 250 mL of water every 3 days. They will be kept under cover and will not be able to receive rainfall.*
- *Amount of sunlight, Ambient temperature, Humidity: Plants will be grown in the same area, and thus will receive the same amount of sunlight, ambient temperature, and humidity.*

1. *Measure 1 L of loosely packed dirt and add to two-liter bottle planting container. Repeat for five more planting containers. Mark containers with "D" to represent "dirt"*
2. *Repeat with Brand X, Brand Y, and Brand Z potting soil to add 1 L of loosely packed soil to 18 more planting containers so that there are 6 containers of each brand. Mark containers with "X", "Y", or "Z" to indicate which brand they contain.*
3. *Randomly assign plants to containers by first writing "D", "X", "Y", and "Z" on 6 slips of paper each. Draw one slip from a hat to determine which type of container the plant will be planted in and repeat until all plants are assigned.*
4. *Plant the seedlings in assigned containers by digging a 6 cm hole (approximate length of roots) in soil, placing seedling in the hole, and covering roots with displaced soil. Water each with 200 mL of water.*
5. *Place all containers in an area that receives full sun but has cover from rain (I used a space on my back patio)*
6. *Water each plant with 250 mL of tap water every 3 days.*
7. *Continue to water every 3 days for 3 months.*
8. *After 3 months have passed, measure the height of each plant from top of plant to soil level. Record results in a table that includes the type of soil each was planted in.*

#11 Possible Risks and Safety Measures

- *There may be additives in the potting soil that could irritate skin. To avoid the risk, gloves will be worn when handling materials.*
- *When cutting the two-liter bottles, they may create sharp edges. Additional care will be given when potting or handling plants.*

#12 Data Analysis

At the end of the experiment, I will calculate the average height of trials in each treatment group. To make a conclusion, I will compare the averages to see which treatment grew the tallest cilantro plant. If the results are interesting I will create a scatterplot to show plant growth over time.