The Scientific method

What is the scientific method?

The Scientific Method is a general pattern followed by scientists when conducting an experiment.

The 5 steps of the Scientific Method


Observe

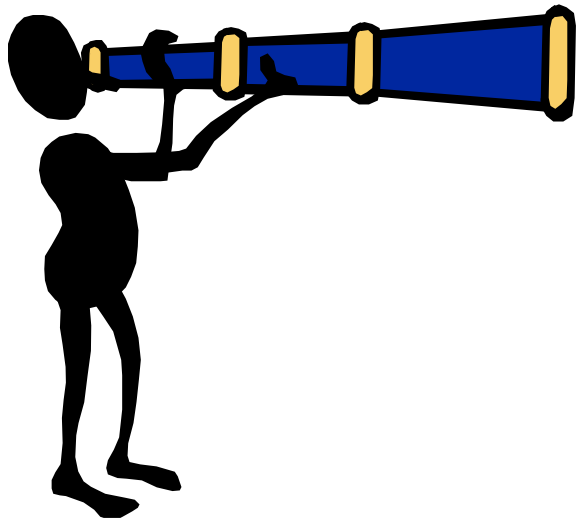

Question


Hypothesis


Experiment

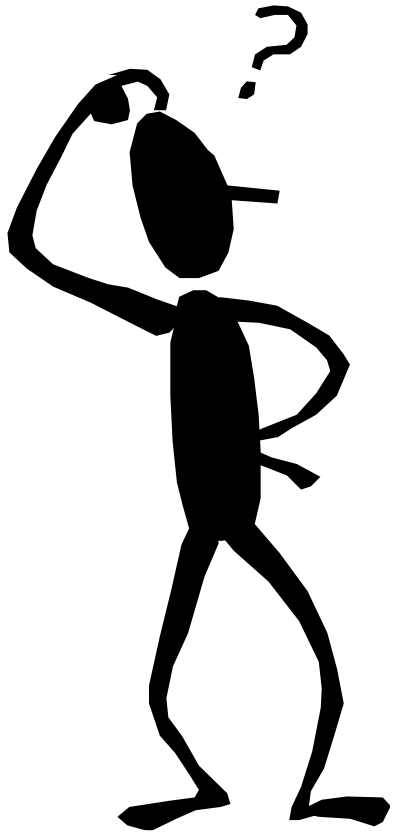

Results/Conclusion

Observe



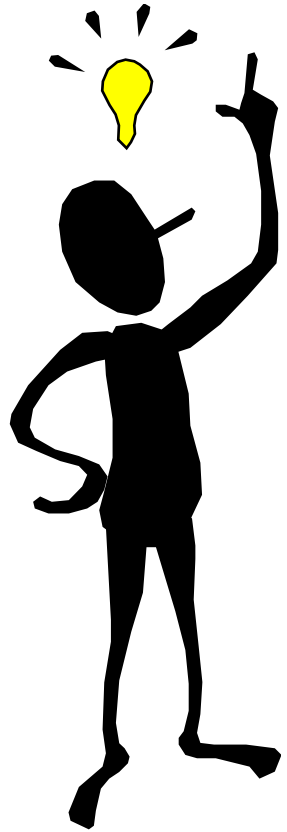
You observe a topic that can generate questions for further research.

Question



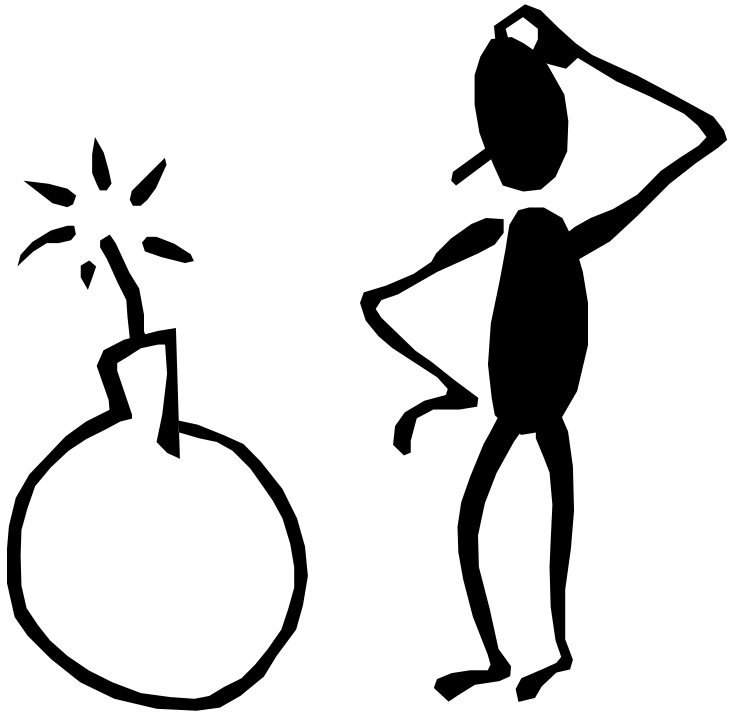
You ask a question about what is being observed. State the problem or question.

Hypothesis



You make an educated guess on what you think the outcome of the experiment, or the answer to your question will be.

Experiment



You will develop and follow a procedure to test your hypothesis. The outcome must be measureable.

Results/Conclusion

You will record the results of your experiment, and repeat the experiment if need be. You will state if your hypothesis was accepted or not and explain your results.

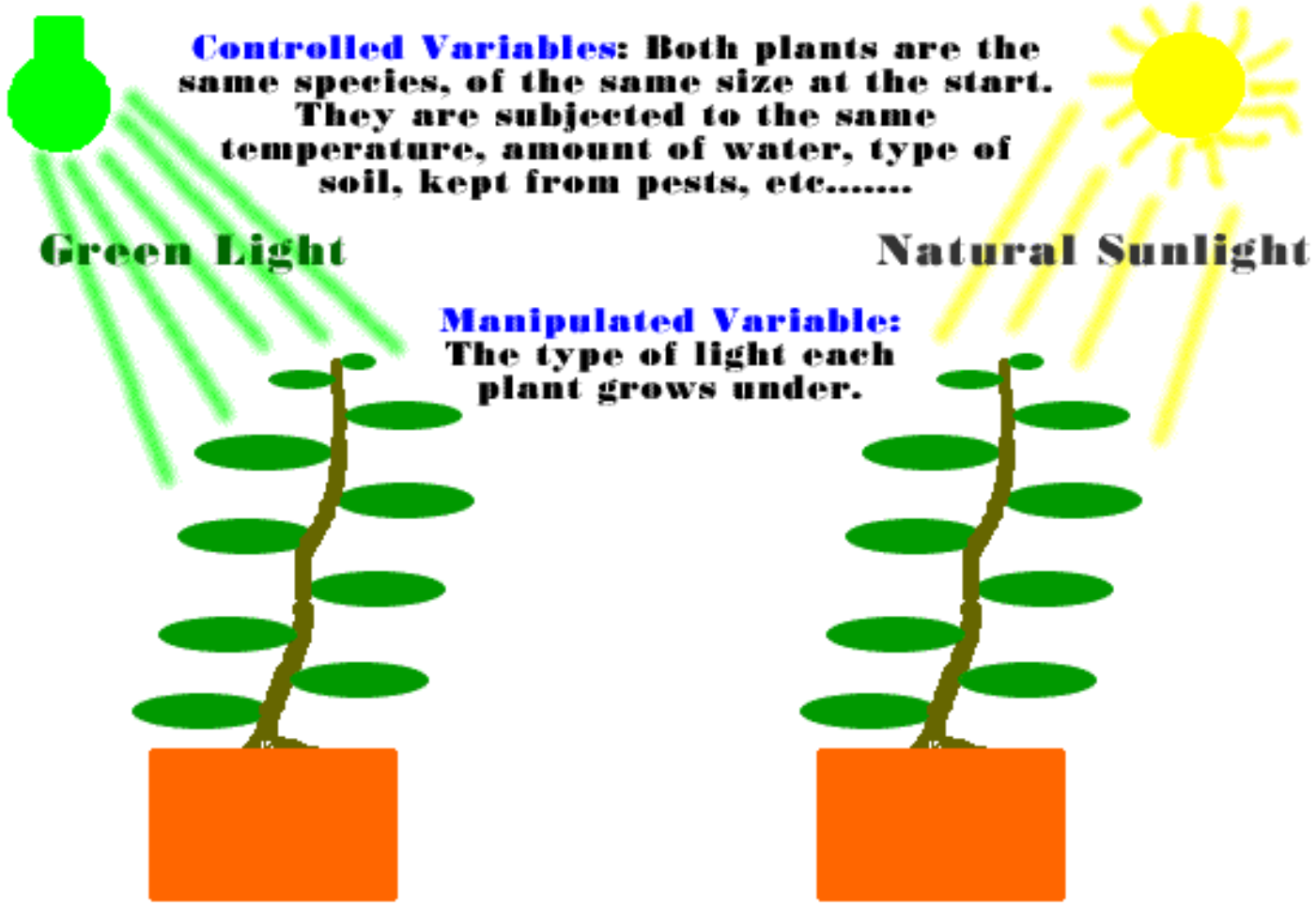
What are the variables in an experiment?

Independent Variable- the variable that is changed in an experiment.

Dependent Variable- What is observed during the experiment; changes as a result.

Controlled Experiment- Changing one factor and observing its effect on another while keeping all other factors constant.

Question: How does green light affect the growth rate (measured in mass/time) of plants?



Experimental Setup

Because you are determining the effect of green light on plant growth, this is the experimental setup.

Controlled Setup

This is the control setup because this is the type of light the plant normally grows under.

EXAMPLE

Which step in the Scientific Method is given here?

- If I water and feed the plants, then they will grow to be tall and healthy.
- My hypothesis is accepted. When I watered and fed the plants daily, they grew.
- Today while walking home, I noticed that the plants in my front yard were starting to die.
- Why is it that some plants are growing, and other plants are dying? What affects the growth of plants?
- To answer my questions, I watered and fed the plants daily and recorded my findings.

Observe

Question

Hypothesis

Experiment

Results/Conclusion

CORRECT!

An educated guess, hypothesis, is made to determine the effect water and food will have on the growth of plants.

CORRECT!

The results from the experiment were stated and a conclusion was made.

CORRECT!

A simple observation was made about flowers.

CORRECT!

Questions were formed about the flowers. These will be the questions carried out through the experiment.

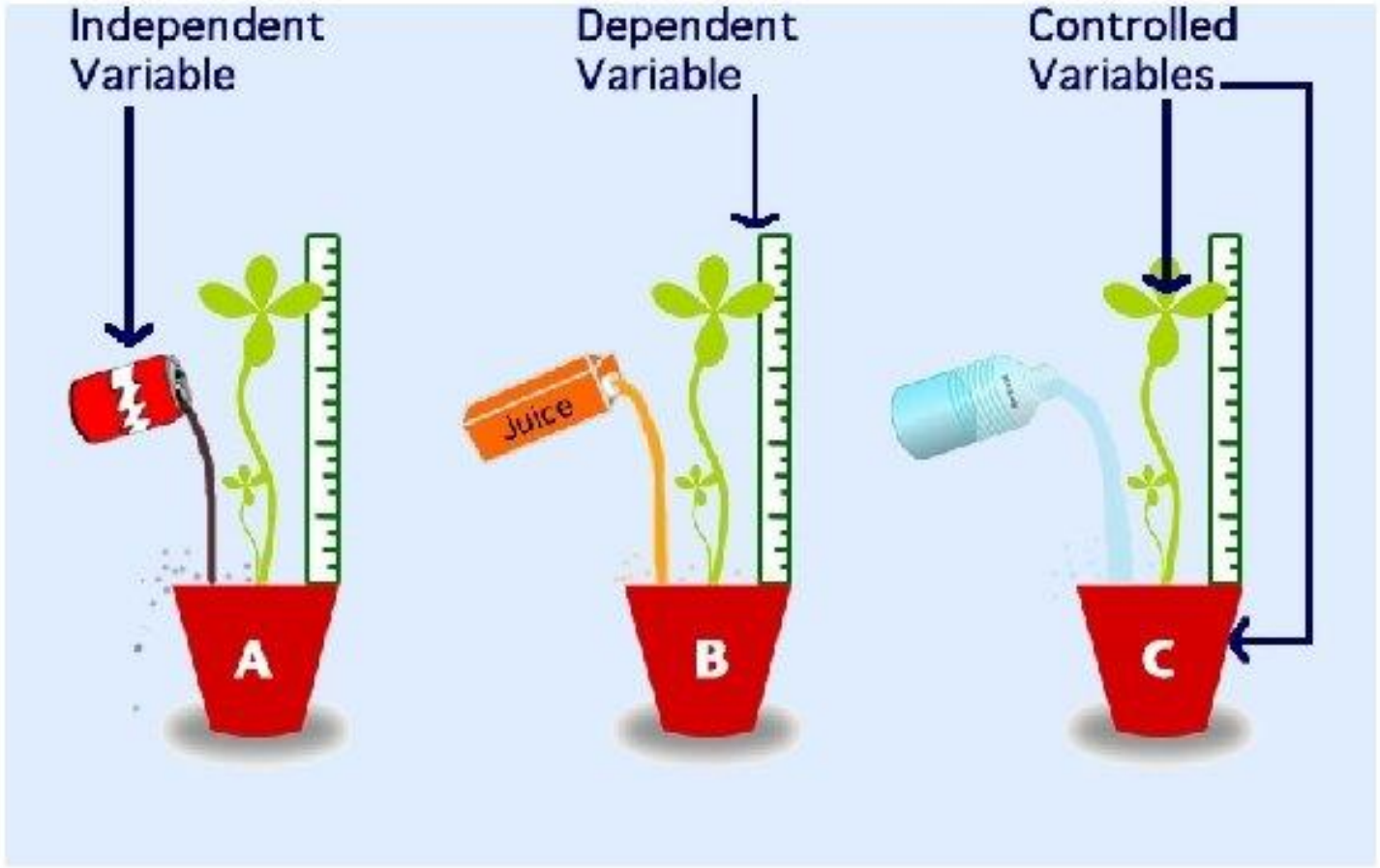
CORRECT!

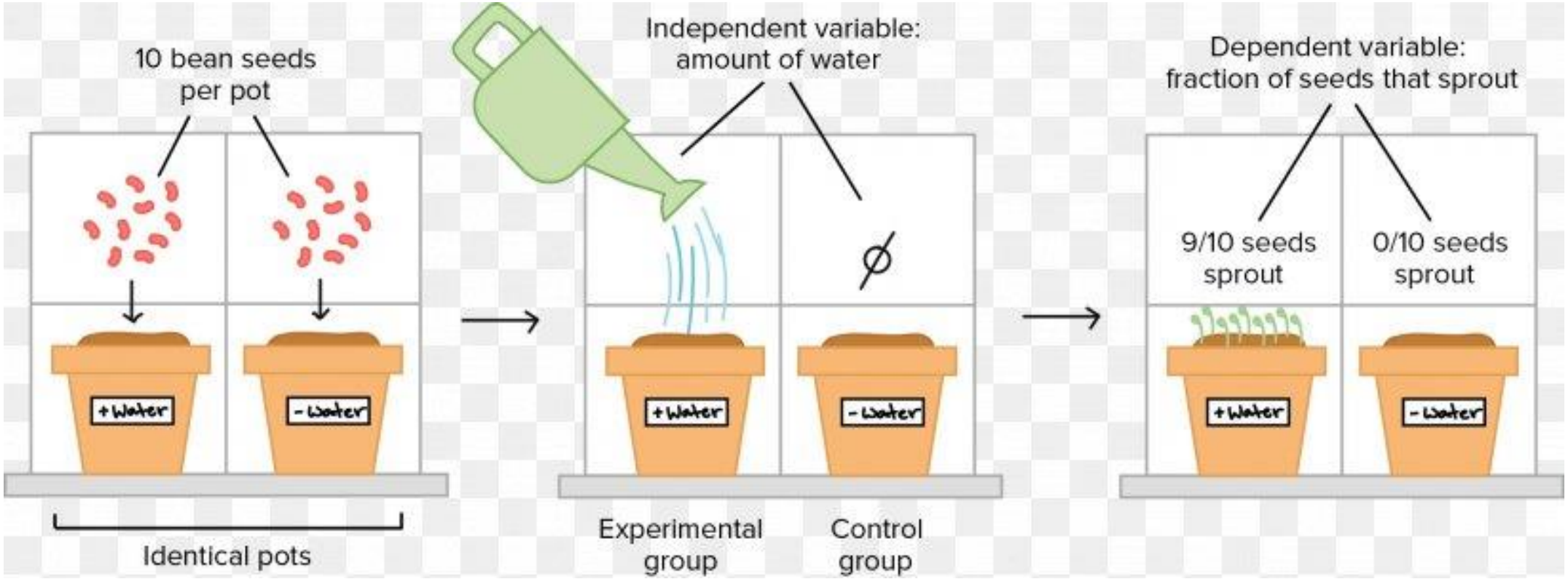
An experiment was carried out to answer the questions to my problem.

Independent
the liquid used to water each plant

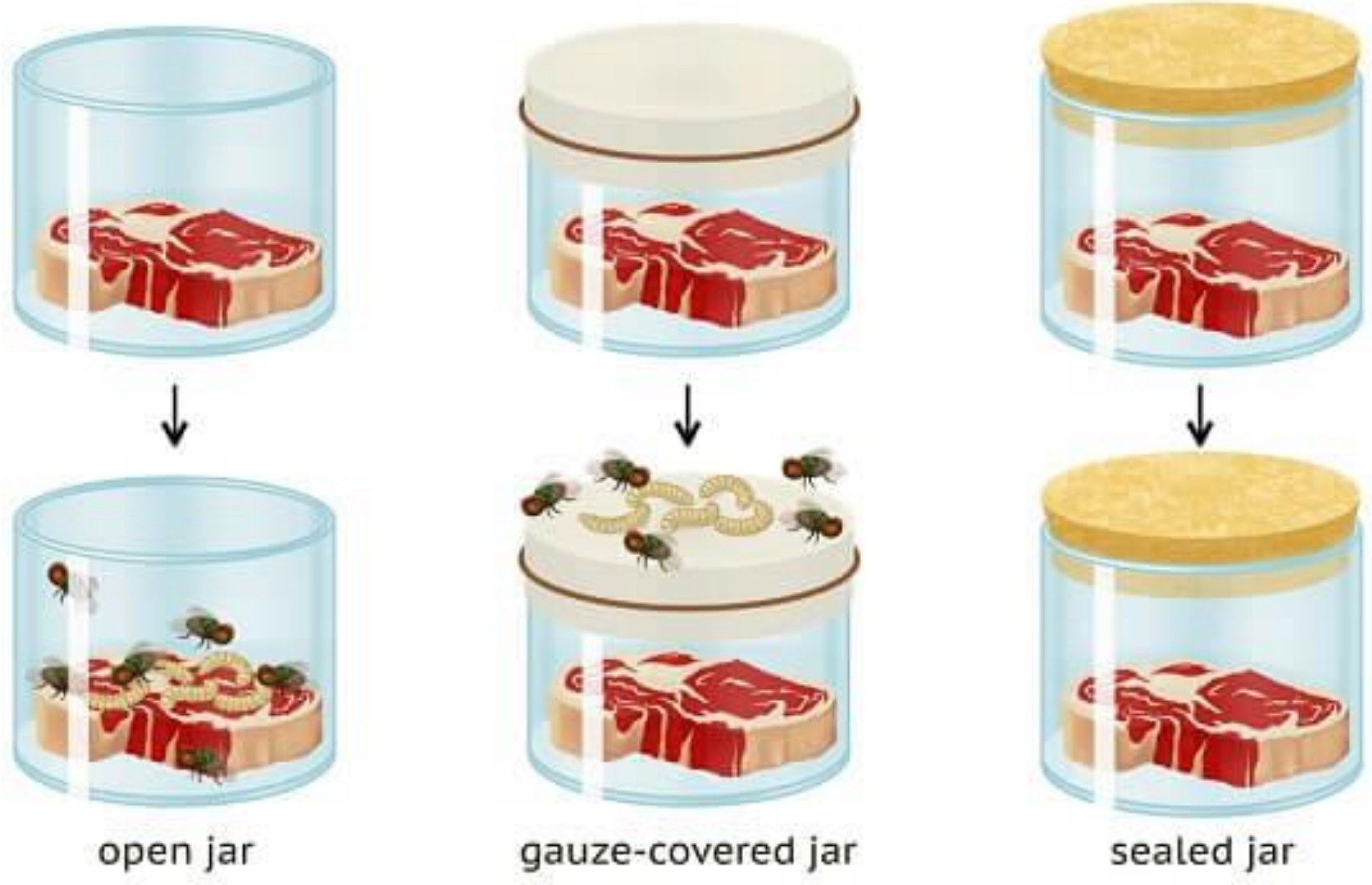
Dependent
the height or health of the plant

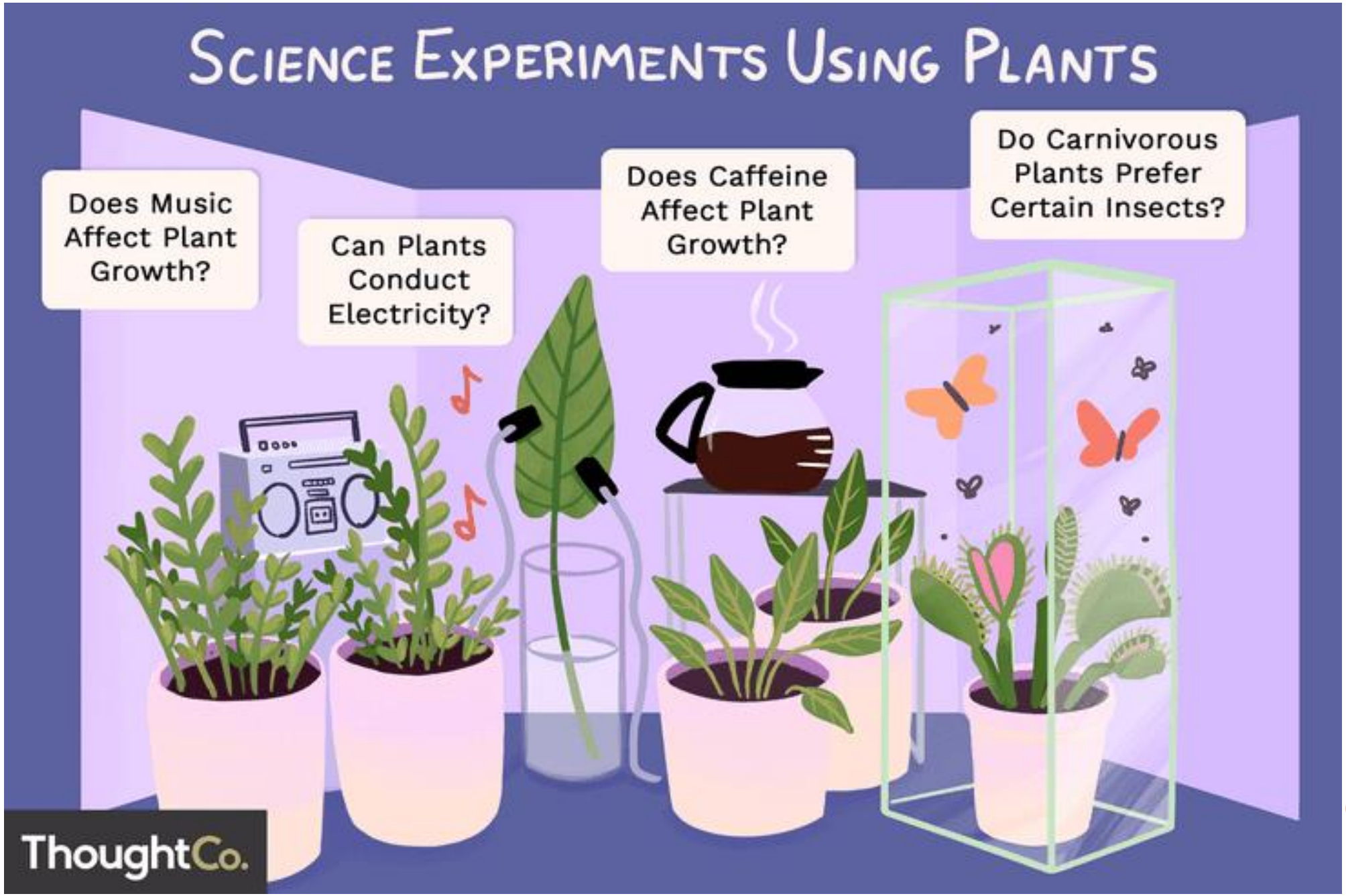
Controlled
type of plant, amount of liquid, pot size, soil type, etc.

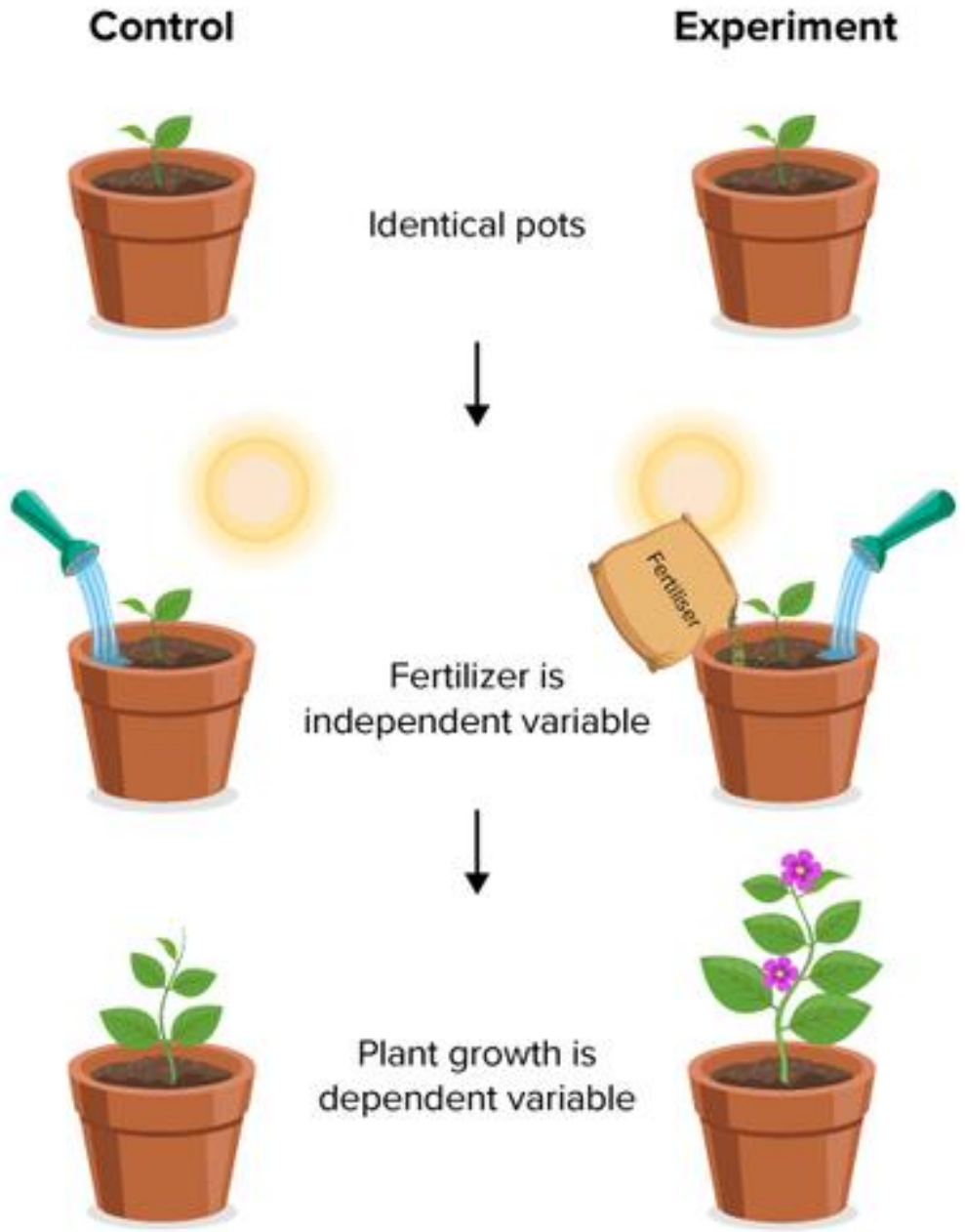



10 bean seeds per pot
+ Water
- Water
Identical pots
Independent variable: amount of water
Ø
+ Water
- Water
Experimental group
Control group
Dependent variable: fraction of seeds that sprout
9/10 seeds sprout
0/10 seeds sprout
+ Water
- Water

REDI'S EXPERIMENT




Science Experiments Using Plants
Does Music Affect Plant Growth?
Can Plants Conduct Electricity?
Does Caffeine Affect Plant Growth?
Do Carnivorous Plants Prefer Certain Insects?
ThoughtCo.


Control
Experiment
Identical pots
Fertilizer is
independent variable
Fertiliser
Plant growth is
dependent variable