

## Steps of the Scientific Method

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2
3
4
5
6
7

### Match the Step with the Correct Description

	1. Problem	A. Uses one variable that is necessary for comparison to the tested variable
	2. Background Research	B. Refers to the results of trials, or tests, completed during the experiment. Can be organized into charts, graphs and tables
	3. Hypothesis	C. Involves the ability to look at relationships between the predicted result in the hypothesis and the actual result
	4. Controlled Experiment	D. Typically phrased as a question and serves as the starting point for any experiment
	5. Collect Data	E. Consideration of how well the predicted result and the actual result of experiment correspond
	6. Analyze Results	F. Performed so that the researcher has a thorough understanding of the major concepts being investigated and any similar investigations
	7. Draw Conclusions	G. An educated guess that should be phrased as a statement



## Review Questions

6. A drug company tested a new medication before putting it on the commercial market. Pills without medication were given to 500 test subjects in group A, and pills with medication were given to 500 subjects in group B. In this experiment, the individuals in group A served as the (1) host group (2) dependent variable (3) control (4) hypothesis
7. In order to find the percentage of organic matter in soil from several different locations, a student collected the samples, weighed them immediately, roasted them for several minutes in the flame of a Bunsen burner to burn off organic matter, and weighed them again. The student concluded that the difference between the first and second weights represented the weight of the organic matter in the soil. The most serious mistake that the student made in this experiment was in (1) taking large samples (2) weighing the samples before roasting them (3) failing to dry the samples before first weighing them (4) assuming that roasting could remove the organic matter
8. In an investigation to determine the effects of environmental pH on the germination of dandelion seeds, 25 dandelion seeds were added to each of five petri dishes. Each dish contained a solution that differed from the others only in its pH, as shown below. All other environmental conditions were the same. The dishes were covered and observed for 10 days. The data table the student designed is shown below.

Using one or more complete sentences, state the independent variable in this investigation.

Petri Dish	pH of Solution	Number of Seeds Germinated
1	9	
2	8	
3	7	
4	6	
5	5	

Base your answers to questions 9–11 on the information below.

A student placed five geranium plants of equal size in five environmental chambers. Growing conditions were the same for each plant except that each chamber was illuminated by a different color of light of the same intensity. At the end of 20 days, plant growth was measured.

9. State a possible hypothesis for this experiment.
10. What control should be used in this experiment?
11. Describe one modification you would make in the design of this experiment to make the results more reliable.

12. A student wants to shorten the ripening time for tomatoes. He predicts that the more water the seedlings receive, the faster their tomatoes will ripen. To test this prediction, he grows 20 tomato plants in a garden in full sunlight that has dry soil and 20 in a garden in a shadier location where there is greater moisture content in the soil. He then records the time it takes for fruit to develop and ripen on the plants in each garden location. State a serious error the student made with the design of this experiment.

13. In attempting to demonstrate the effectiveness of a new vaccine, a scientist performed these experimental procedures:

- One hundred genetically similar rats were divided into two groups of 50 rats each (group A and group B).
- Each rat in group A was given an injection of the vaccine in a glucose-and-water solution.
- Each rat in group B was given an injection of the glucose-and-water solution containing no vaccine.
- After several weeks, all rats in both groups were exposed to the disease for which the vaccine was developed.

What dependent variable was studied in this experiment?

14. A new drug for the treatment of asthma is tested on 100 people. The people are evenly divided into two groups. One group is given the drug, and the other group is given a glucose pill. The group that is given the glucose pill serves as the (1) experimental group (2) limiting factor (3) control (4) indicator