

Using the Scientific Method in Agriculture

Read each of the following scenarios, and then provide the information that is asked for.

Scenario 1

You are managing a large feed lot. A pharmaceutical company wants you to try a new antibiotic to treat shipping fever in newly arrived cattle. The company claims that it is more effective at a lower cost than your current antibiotic.

1. Problem:

2. Hypothesis:

3. Experiment:

IV:

Trials:

DV:

C's:

4. Conclusion:

Scenario 2

You are concerned about the rate of death in catfish your aquaculture operation in tanks that have a high amount of algae growth. You collect some of the algae and send it to the university to have it identified. You find that it is a blue-green alga called *Anabaena*. *Anabaena* is known to be toxic to fish. You design an experiment to test how much of the algae the fish can stand before they die. You obtain 6 large aquariums (all the same size) and fill them with water taken from a healthy catfish pond at your operation. You put each aquarium on the same bench in the laboratory, where the light and temperature values are identical. You let the water stand for one day before starting the experiment. In aquarium 1, you add 2 grams of algae and no fish. In aquarium 2, you add 20 small catfish and no algae. Aquarium 3 gets 20 catfish and 2 grams of algae, #4 gets 20 catfish and 4 grams of algae, #5 gets 20 catfish and 8 grams of algae, and aquarium #6 gets 20 catfish and 16 grams of algae. The aeration rate of each aquarium is identical. You make two observations at the same time each day for two weeks. You keep track of the numbers of fish in each tank that die.

1. What is the problem?

2. What is your hypothesis?

3. What is the independent variable?

4. What is the dependent variable?

5. How many trials are there for each treatment?

6. What things are held constant?

Scenario 3

You are raising hogs for market, and your veterinarian recommends that you switch the type of feed given to the mature hogs. The vet is concerned that the present feed is too high in protein. While a high protein diet is recommended for young, growing hogs, food too high in protein can cause kidney problems in the adult animals. You switch feed and notice that the weights of your mature animals drop. You want healthy animals with maximum weight, but you do not know how to solve the problem. You design an experiment that would help you solve this problem. You think that the higher protein ration is the best way to maintain your weight gain. You have 40 hogs and you divide them into two groups. To one group, you feed the high protein feed, to the other, you feed the lower protein ration. All 40 hogs were farrowed within 10 days of each other. They are all about the same weight when you begin this experiment. Each group of 20 hogs is in the same size pen in the same barn. You weigh all hogs before the experiment, place them on feed for 3 weeks and weigh the hogs again.

1. Problem:

2. Hypothesis:

3. Independent Variable:

4. Dependent Variable:

5. Trials:

6. Constants:

Scenario 4

You have planted corn in a field with clay soil. The field is predominantly flat with a slight slope at one end where a creek borders the field. You notice that germination and growth is slowest in the flattest portion of the field. Conversely, you also notice that you received good germination and rapid growth on the slight hill which meets the creek. You wonder why there should be differences in growth and germination in different parts of the field. Is it due to the extra water near the creek? Is there something different about the soil in that portion of the field, or is it due to the difference in slope (north, south, east, and west).

- 1. What is your hypothesis for this problem?**

- 2. Design an experiment to test the hypothesis you have written (make sure you include a procedure [step by step list of what you will do], an IV, a DV, treatments, trials, and constants).**

- 7. Is the scientific method just for “Scientists?” Why is it important that a non-science student understand the scientific method?**

- 8. How do you think that this method can be used in everyday life?**

- 9. What is the difference between an independent variable and a dependent variable? How are these different from constants?**