Name_____ Period_____ Binder Page #_____

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. You design an experiment to see which type of antibiotic treats shipping fever the best. In your experiment you take 100 cattle that came down with shipping fever. You treat 50 cattle with the previous antibiotic and the other 50 cattle with the new antibiotic. All cattle chosen to be a part of the experiment were shipped from the same large ranch, therefore they spent the same amount of time in transit, they are similar age, and they have identical vaccination/feeding histories. At the conclusion of your experiment you find that the cattle treated with the OLD antibiotic returned to full health 2 days faster than those treated with the NEW 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. Problem:

2. Hypothesis:

3. Experiment:

IV:

Trials:

DV:

C's:

4. Conclusion:

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 are growing a crop of poinsettias to sell at Christmas. 4 weeks after transplanting the poinsettia starts, you notice that the poinsettias closest to the cooling pad (the side of the greenhouse used to cool the greenhouse when temperatures are too warm) are significantly smaller. You begin to wonder what temperature is ideal for maximum poinsettia growth. The thermostat is currently set to keep the greenhouse between 65 and 70 degrees Fahrenheit.

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).

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