



NSF GK-12 Graduate Fellows Program

Award # DGE-0139171

University of North Carolina at Wilmington

Hog Farming in North Carolina

Activity Instructions

by

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Hog Farming in North Carolina

Objectives being met:

1.04 Assess human impact on water quality.

1.05 Evaluate the effects of point and non-point sources of pollution on North Carolina water.

2.01 Evaluate data related to population growth, along with problems and solutions:

- Waste disposal.

A PowerPoint addressing the issues and concerns with hog farming (especially in NC) is available. The PowerPoint is designed to introduce some of the topics scientists as well as politicians face; by no means is the presentation comprehensive to all of the problems. Students should be encouraged to take the information provided in the presentation and further research some of the aspects that interest them.

*A handout given to students to facilitate note taking during the PowerPoint presentation is provided at the end of this document.

Question:

Hog farming is obviously a vital industry to NC. Therefore, it would be improbable to legislate the shut down of hog farms. You are a scientist hired by the NC Pork Council to mediate legislative reform and farming needs. Your job is to work with your research group to design a more efficient yet cost effective hog lagoon. Your design must meet national requirements and be more effective than those already in use. Things to consider are shape, depth, geometry, style of lagoon, additional equipment to reduce ammonia, etc., materials to eliminate leakage.

Requirements for designed lagoons:

- Lagoon must meet state and federal regulations
- A working model of the lagoon must be constructed to present your idea to the reform committee
- The committee requires a write up of materials used and the purpose of their use
- Blueprints of the design are recommended
- Ground substrate must be included in the model
- A spokesperson should be elected in the group to present the new design to the committee



-The dimensions of the lagoon must be included

Once the models have been built and presented to the reform committee, they will be tested for effectiveness.

Hog waste (colored water) should be added to the lagoon to test for leakage. The affects of natural disasters should then be tested. Consider testing the affects hurricanes and floods since those are the major natural disasters that occur in southeastern NC.

To test the affects of a hurricane, you may choose to set a small, electric fan near the model to represent wind. Water can then be poured over the model to test for affects of overspill. (Hurricane Floyd dropped 4-8 inches of rain with some areas reporting 15 inches- considering the size of the container chosen to be used, a representative amount of water should be used.)

Note: This can be extremely messy. For safety reasons, all students testing their lagoons should wear safety goggles to prevent sand getting into their eyes.

Option 1:

This is an in-depth, long-term group project. Materials needed are based upon research completed by the students. The individual groups should purchase all supplies. For this reason, a price limit may be set to entail fairness.

Students will discuss, design, and build their lagoons away from school. In depth instructions and explanations should be included. A small research paper may be included to ensure accurate information.

Testing should occur during class time.

Option 2:

This option can be completed in 2-90 min. class periods. The first class period should be devoted to presenting the PowerPoint presentation. The remaining time should be given to the students to plan how they will build their lagoons. The second class period should be broken down in a manner similar to the following:

15 minutes final planning time

30 minutes building time

The remainder of class should be spent testing the lagoons

For lagoon construction, all groups should be given the same amount of supplies. The following is a list of supplies previously used:



Clay
Plaster of Paris (concrete)
Gravel
Water
Plastic lining

Each group was given a plastic shoebox halfway filled with sand. Other substrate may be used depending on the dominant soil type of the area. However, leakage is easily seen using sand because of the change in color. For scale purposes, small plastic animals or houses may be used.

To test for effectiveness of the lagoon, 250mL of colored water was poured into the lagoon. The lagoon was allowed to sit for 5 minutes to test for leakage. Those lagoons that do not leak can be further tested for the effects of natural disasters such as hurricanes.

*A sample handout explaining the activity to be completed is included



Hog Farm Investigation

Problem:

Hog farming is obviously a vital industry to NC. Therefore, it would be economically devastating to shut down hog farms. You are a scientist hired by the NC Pork Council to mediate legislative reform and farming concerns. Your job is to work with your research group to design a more efficient, yet cost effective hog lagoon. Your design must meet national requirements and be more effective than those already in use. Things to consider are shape, depth, geometry, style of lagoon, additional equipment to reduce ammonia, etc., and materials to eliminate leakage.

There are multiple research groups being considered for this job. Each group will be given the same supplies to construct their lagoon. The following are guidelines that must be met by each research group. Failure to comply will result in your dismissal from consideration:

1. The lagoon must meet state and federal regulations
2. A working model of the lagoon must be constructed to present your idea to the reform committee
3. The committee requires a write up of materials used and the purpose of their use
4. Blueprints of the design are recommended
5. Lagoons must be able to contain 250mL of simulated animal waste

Supplies to be provided for lagoon construction are:

- Gravel
- Plastic lining
- Concrete
- Clay

Groups will be given a set amount of time to research, discuss and decide on the strategy for construction. Wednesday, October 16 research groups will be given a set amount of time to construct their lagoons prior to testing. After all prototypes have been presented, the reform committee will decide on who will be appointed to this project.



Hog Farming Questions

1. The number of hogs in NC has increased by about what percent since 1987?
2. The majority of hog farms in NC are located _____.
3. Pender Co. NC experienced an increase of _____% in animal waste from 1987-1997.
4. 3 reasons for so many hog farms are:
 1. _____
 2. _____
 3. _____
5. Where does the majority of hog feed come from?
6. What is a lagoon?
7. What is the purpose of a lagoon?
8. What are 2 regulations for hog lagoons?
 - 1.
 - 2.
9. What are 2 potential problems that the number of hog farms in NC might create?
 - 1.
 - 2.
10. Do you think hog farming in NC is a problem? Explain your answer.

