



AGsploration

The Science of Maryland Agriculture

UNIVERSITY OF
MARYLAND
EXTENSION



Down and Dirty with Biosecurity



GOAL STATEMENT:

Students will gain an understanding of biosecurity and develop a biosecurity plan for a hypothetical livestock production facility.

OBJECTIVES:

- Students will define biosecurity.
- Students will make personal connections between biosecurity practices that keep farms safe and security measures that keep them safe in their everyday lives.
- Students will research steps that producers can take to maximize biosecurity.
- Students will create a biosecurity plan for a hypothetical farm and share their ideas with the class.

REQUIRED MATERIALS:

- Healthy/unhealthy animal photographs (printed copies or projected) and teacher key
- Copies of "One Minute Mysteries" worksheet (1 per student)
- Copies of "Biosecurity for Livestock Facilities" worksheet (1 per student)
- "Hypothetical Livestock Production Facility Scenarios" printed with scenarios cut apart
- Markers, colored pencils, etc.
- Chart paper or poster board

AMOUNT OF TIME TO ALLOW:

70 minutes. Extension activities will take additional time.

Background Information



From viruses to bacteria, coccidia to fungi, diseases can be a problem. For this reason, it is important for facilities like schools and even farms to have a plan in place that details how the spread of disease will be prevented. This set of guidelines is called a biosecurity plan. **Biosecurity** is the sum all the management strategies a site practices to reduce the risk that **pathogens** — disease-causing organisms — will spread to that site.

In schools, hand sanitizer is available for use, cafeterias follow strict food safety guidelines, and janitors clean regularly. Just like schools, farms must also implement practices that prevent disease. Disease can spread to people and animals through contaminated food, water, housing, equipment, and air. Some diseases — called **zoonotic diseases** — can spread between people and animals. Modern biosecurity techniques are a key element in disease control, providing a safer and healthier environment for livestock.

Since each farm is different, there is no “one size fits all” biosecurity plan. Biosecurity is a way of thinking as well as the adoption of a set of practices. Farm owners, managers, and employees must all follow the biosecurity plan to prevent the introduction of new pathogens into a herd and limit the spread of established pathogens within a herd.

Engagement

20 minutes



Ask students to define the term “biosecurity” as it relates to people and schools. Have students brainstorm ways we keep ourselves safe from disease in school (i.e. washing hands, cooking food thoroughly) and write them on the board. Next, ask students to apply the ideas they generated to a farm setting. What biosecurity practices may be used on farms to keep livestock safe from disease? Record student ideas on the board.

Divide students into groups and discuss the picture cards showing healthy and unhealthy animals. Once students have examined the photos, ask them to discuss the following questions within their groups:

- How can you tell if an animal is healthy or unhealthy?
- How are diseases spread? List as many ways as you can think of.
- What actions can we take to prevent the spread of disease?

Make a list of student ideas; these will be useful as the students create their biosecurity plans later. You may use the true/false activity provided at the end of this lesson to prompt discussion and help students generate more ideas.

Exploration

25 minutes



1. Distribute copies of the “One Minute Mysteries” worksheet and have students complete the worksheet within their groups. If time permits, discuss each scenario as a class. Ensure that students have a basic understanding of how to diagnose biosecurity problems and generate strategies to remedy them before proceeding.
2. Provide each group with one of the hypothetical livestock production facility scenarios and distribute copies of the “Biosecurity for Livestock Facilities” worksheet. Explain that each group will create a biosecurity plan that will prevent disease from coming onto their farm and ensure that their livestock remain healthy. The questions on the worksheet are designed to help students think through their scenarios and develop their biosecurity plans.
3. Provide groups with poster board and markers or other materials to create a graphic representation of their plan. Instruct students that their illustration should show at least 5 critical points where diseases could spread and at least 5 strategies they will implement to prevent the spread of disease.
4. When students have finished illustrating their plans, have them complete the conclusion and analysis questions on the worksheet.

Explanation

20 minutes



Have each group present an overview of their plan to the class. For each presentation, ask students which parts of their plan are most important for creating a secure environment and why.

Lead a discussion of the importance of biosecurity on farms from both ethical and business perspectives. Livestock producers have an ethical responsibility to keep their animals safe, and diseased animals cost producers money. Diseased animals reduce profits because of increased mortality, reduced performance, and increased medication costs.

Extension



Contact a local large-scale livestock operation, preferably poultry or swine if available. Ask the owner or manager to share their biosecurity plan and how they developed it.

Interview a local large animal veterinarian about biosecurity practices he or she implements.

Have students brainstorm biosecurity practices they could implement to keep their pets safe from infectious diseases.



Career Connections



- **Government Animal Health Specialist** — This person works for the U.S. Department of Agriculture (USDA) or Maryland Department of Agriculture (MDA) checking animals for signs of disease and dealing with disease outbreaks.
- **Farm Manager** — This person oversees the management of a farm and makes decisions about when, where, and how to house, feed, breed, harvest, treat, and otherwise care for the animals.
- **Large Animal Veterinarian or Vet Technician** — This person diagnoses, treats, and helps prevent disease in livestock animals.

Evaluation



Student understanding can be evaluated through class discussion or assessment of completed activity data sheets. The following questions may also be used to evaluate student learning.

1. List three biosecurity practices a farm might use to protect the health of its animals.
2. Imagine you are a farmer speaking to a group of customers who have never heard of biosecurity. Explain why you practice biosecurity on your farm.
3. List the steps a farm owner or manager would take to diagnose and correct a biosecurity problem.

References



“Poultry Facility Biosecurity.” John B. Carey, J. Fred Prochaska, Joan S. Jeffrey. Texas Agricultural Extension Service, The Texas A&M University System. <<http://posc.tamu.edu/wp-content/uploads/sites/20/2012/08/l-51821.pdf>>.

“Security Guide for Pork Producers.” National Biosecurity Center for Animal Health Emergencies. <<http://old.pork.org/filelibrary/biosecurity/securitybook.pdf>>.

United States Department of Agriculture, Animal and Plant Health Inspection Service, <<https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information>>. [Choose species in the right-hand menu; each species page has a link for biosecurity information.]

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True/False Activity

Have students stand in a central part of the room. Assign one area of the room as the “true” area and another of the room as the “false” area. Read each statement and have students move to the area of the room that reflects their answer. Ask students to share why they chose the answer they did.

- **It is a good idea to wash your hands after you pet your friend’s cat before you pet your own.**
(True – Your friend’s cat could have an unknown illness that you would not want to transfer from cat to cat. It is a good health practice to wash your hands anytime after you pet an animal.)
- **When you bring a new dog home, it is okay for it to drink out of the same water bowl as your other dog.**
(False – The new dog may have an illness that you are not yet aware of, and the water bowl could transmit the pathogen.)
- **If you notice your dog has been acting like it might be sick, it is still okay to take him to the dog park.**
(False – Your dog could spread disease (even if it is only showing beginning signs of a disease) through the air or by coming in contact with an object or another dog.)
- **If a new animal looks healthy, and its previous owner said it was healthy, there’s no need to quarantine it (keep it separate from other animals for a period of time).**
(False – Infected/diseased animals can look perfectly healthy before signs of illness are present. It is ALWAYS a good idea to keep new animals away from other animals for a period of time.)
- **When introducing a new animal into a herd, it is important to separate that animal from other animals (quarantine) on the farm.**
(True – A quarantine period is a good opportunity to make sure the animal does not have any conditions that you were unaware of before you introduce the animal to the rest of the herd.)
- **Because bottle jaw (the hard swelling under the jaw of goats) is not contagious, it is not important to separate animals who have it from animals that do not.**
(False – Bottle jaw is caused by internal parasites or worms, which are contagious. The goat’s caretaker should deworm all of the goats that may have come in contact with the parasite and separate the affected goats until they are no longer ill).
- **Sore mouth is a disease that only affects a sheep’s mouth.**
(False – Sore mouth can be transmitted to other body parts that come in contact with the sores and can even be transmitted to humans.)





One Minute Mysteries

Read the following scenarios and determine what went wrong and how it could have been prevented. (HINT: more than one thing may be wrong.) Make some notes about each scenario, and discuss with your group.

1. Max owns a large horse barn and often hosts shows. Although Max requires all visiting horses to be up to date on their shots, he normally does not check their paperwork. In fact, Max knows some of his friends' horses aren't up to date, but he trusts that his friends make sure their horses are healthy before they take them anywhere. Max also loans out his horse trailer to whoever needs it. They don't even need to clean it when they're done using it! He notices that his horses seem to be getting sick more often than they did before he hosted shows.
2. Lexi likes to walk her neighbors' dogs on the weekends to earn some extra money. To save time, she often walks more than one at a time. She carries one portable water bowl for them on hot days, and since they all get along well, they drink out of the same bowl. One of the dogs she walked had a runny nose, but she assumed that it was just allergies and walked the dog as usual. A few days later, all of the dogs she walks are sick.
3. Taylor owns two horses that live in a pasture by her house. They are the only horses in the area, and they never travel. However, Taylor takes lessons on horses at a different barn and often rides her friends' horses. She wears the same boots wherever she rides. She has one set of brushes and tack that she uses on whichever horse she is riding. She only cleans the brushes when they are really dirty. Out of the blue, her normally healthy horses are coughing and have runny eyes.



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Hypothetical Livestock Production Facility Scenarios

Cut apart these scenarios to distribute to student groups.

You operate a poultry farm that contracts with a large-scale integrated chicken processing company. (The chicken company pays you to grow their birds in chicken houses on your farm.) Your farm has three chicken houses and receives regular health inspections from the company.

You have a small alpaca farm that focuses on selling fiber for crafts and breeding stock. You have frequent visitors to the farm who come to buy your fiber products and tour the farm.

You have a small pig operation with around 80 breeding sows (females). Your facility is in a very rural area and is more than 30 years old.

You operate a dairy farm, milking approximately 200 cows daily. There are not many outside visitors, except for daily visits from the milk hauler, your 5 employees, and occasional visits from the veterinarian, hoof trimmer, milk inspector, and salespeople.

You own and operate a beef farm of about 200 cattle. The cattle are in a rotational grazing pattern where they spend most of their time outside. You sell animals for breeding and also buy calves every spring that you feed through the summer and resell in the fall.

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Name: _____

Date: _____ Period: _____

Biosecurity for Livestock Facilities

1. List at least 5 ways diseases could be brought onto your farm. Be specific.

2. What strategies will you implement to prevent disease from coming onto your farm? Be sure to address each point that you listed in question 1.

3. What is the most important part of your biosecurity plan? Why?

4. What does "biosecurity" mean?

5. Why do livestock producers need to keep their animals healthy?

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