Biosecurity Unit Lesson #1

**Title Of Lesson: *Dairy Production*Subject/Course/Grade: Ag Science**

Learning Objectives:

* Students will better understand the dairy cattle industry.
* Students will be able to recall the importance of a California mastitis test
* Students will be able to recall one thing that a large animal veterinarian can test for in dairy cattle

Main Concept:

* Students will learn more about the dairy industry and learn how to interpret a California mastitis test.

Students will understand/know…

* **Vocabulary**
	+ **nutrients**- substance that provides nourishment and maintenance of life
	+ **genetics**- characteristics that are passed down to generations such as hair color.
	+ **Milk production**- milk that is collected from the cattle that will go into the milk supply to be bought by consumers.
	+ **Milking parlor-** place on the farm where cows are taken to be milked. Usually some stalls and feed are placed in there to encourage cows to come and have a safe handling environment.
	+ **sanitation**- reducing amount of germs on the teat of the cow. Usually done through a dip process where the dip contains an iodine solution to reduce amount of germs on the udder.
	+ **infection**- when germs (or pathogenic agent) enters a suitable host and cause a disease.
	+ **bacteria**- microorganism (germ) that could potentially cause infections.
	+ **antibiotics**- medication given to kill or stop the growth of bacteria
	+ **mastitis-** inflammatory response to the udder tissue in the mammary gland due to either physical trauma or microorganism infection.
	+ **inflammation**- swelling of an area due to disease or physical injury to the area.

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| * **California mastitis test (CMT)-** a quick test that can be done on the farm that can indicate mastitis in a cow before it shows any other signs of sickness.
* **Udder quadrants-** cattle udders are separated into four separate quadrants and will be each tested separately in the test.
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| Show introduction video “Dairy.”**Background:**“As we saw in the video then the dairy industry is very large and has many different parts to it. One thing we learned that either veterinarians or farmers can do to keep cows healthy is a California mastitis test or CMT. As a veterinarian it would be your job to either perform this test or teach the farmer how to utilize it in his herd. To do this we will need to practice some so that you know how exactly what you are looking for in this test.”“As we learned in the video then we need to start by knowing what quarter of the cow the milk we are testing came from. Be sure to keep track of the cow and udder so that we can properly identify possible infections. After we run this test you guys should all be able to identify the any infections on the farm.”Distribute the “cups” and “reagents”. **Activity**Materials NeededWaterClear dish soapWhite food coloring5 oz disposable cup for each participant **(numbered 1-4 for as many students)**Corn StarchMeasuring utensils (tablespoon and ¼ teaspoon)Stirring rods (either wooden or plastic coffee straws.)Disposal container large enough to accommodate liquid from all participant cupsSafety Procedures* Do not sniff or drink solution

Before students arrive:1. Add approximately 2 tablespoons of water to ¾ of the cups that are labeled 1-4, these should be filled randomly. The cups labeled 1-4 will indicate what quarter of the udder a student will receive, a group of these cups will indicate a whole cow and you can identify the cow with either a name or number and keep these cups together around the classroom.
2. The rest of the cups should have 2 tablespoons of clear dish soap.
3. Add white food coloring to all the cups and stir to make it appear more like milk.
4. Put the cornstarch into smaller containers and put them on the desk throughout the classroom for easier distribution later in the activity.
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| ActivityHave students get into groups of 4 and you will assign this group a ‘cow.’ This group will split the cups among them. If you used a numbering system you can encourage the student to identify their cows further and name them. Once groups have identified their cow and each person has a ‘quarter of the udder with the cups’ remind students what disease we are looking for and what results we should see based on the video. If the milk is still watery and free flowing after adding the reagent the milk is fine and there is no sign of mastitis. If the milk becomes a gel consistency and clumps together then that indicates a sign of mastitis. Once you go over what students are looking for ask students to add the reagent (corn starch) to their cup. They will only need to add ¼ of a teaspoon to the mixture. Then have them stir the mixture for 10-15 seconds. The water cups should still stay free flowing and will indicate no infection, the clear dish soap will have a gel consistency that they should see when they swirl the cup around.**Following Through**Make sure students understand that each quarter could be different in a cow. This means that even though one quarter of cows udder could be infected then that does not mean that the other quarters may be infected. Ask students what they think some next steps are if a cow did have a positive test. They should hopefully talk about some treatment options for the cow. Treatment options for cows could be intramammary antibiotic infusion or systemic antibiotic, based on a veterinarian recommendation. Some next steps students could also bring up is laboratory testing to see what kind of mastitis a cow could have. This again should be talked about with a veterinarian also.You can also ask the students the importance of the labeling we did and why it is important to make sure that all cups and cows were labeled correctly during this exercise. This labeling is important so that we know which cow to treat and which udder on the cow specifically.Lastly, as we learned in the video, no milk treated with antibiotic will be put into our milk supply, ask the students if the cows treated would have their milk go into supply or if the milk would need to be destroyed. See if there is any cow in the class that can keep supplying milk.  |
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| Monitoring and Feedback:* Students will learn about common testing methods in dairy cattle.
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| Learning Activities:Introductory Practicing Biosecurity video (2:30 minutes)Introduce vocabulary, give background (10 minutes)Mastitis testing activity (10 minutes)Post activity discussion and questions (20 minutes) |

# RESOURCES

https://glazermuseum.org/nonstickslime/

https://extension.missouri.edu/publications/g3653