W 1176

3-5 YEARS IN PROJECT

Dairy Project Area Guide
Intermediate



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Dairy Project

Click on each activity number below to be taken to where it appears in the document. We recommend reading over Dairy Project 1-2 years before continuing.

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Dairy Project

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Dairy
Unit 1: Breed

Project Outcomes Addressed:
- Describe the origins of the seven main breeds of dairy cattle.
- Identify three commonly used dairy species and explain why they are commonly used.
- Identify and describe two minor dairy cattle breeds.

You will need:
- Pencil
- Access to the internet

Activities in this unit:
1. Name That Breed!
2. Pin the Breed on the Map
3. Dairy Species
4. What's in a Breed?

Breed Overview

The United States of America recognizes seven different dairy cattle breeds. Can you name them all below? Each breed has different genetic traits, characteristics and origins. In this unit, you will name the seven different breeds, locate their origins, describe breed characteristics and even name three different dairy species.

Activity 1.1

Name That Breed!
Can you name all seven dairy cattle breeds?

1. _____



2. _____



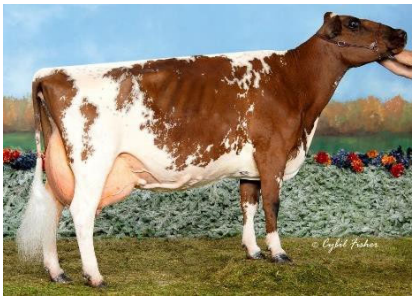
3. _____



4. _____



5. _____



6. _____





7. _____

Activity 1.2

Pin the Breed on the Map
Draw a line from each breed to the location of its origin. Some breeds may originate from the same location.



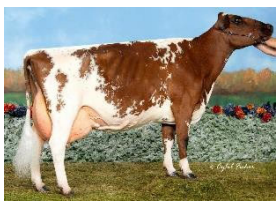














Scotland



Europe



Isle of Guernsey



Isle of Jersey



Switzerland



United States and Canada

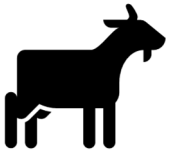
Activity 1.3

Dairy Species

Name three species that provide dairy products.

1. _____ 2. _____ 3. _____

Each of the three species are known to produce certain dairy products. List a product that each species is known to produce. Do not repeat a product.



a. _____



b. _____



c. _____

Activity 1.4

What's in a Breed?

Below are some characteristics and genetic traits specific to six minor breeds. The objective is to identify and describe two minor dairy breeds. After reading choose two minor breeds and make an infographic to describe them.

Danish Red	Fleckvieh	Dexter Cattle
Major dairy cattle breed in northern Europe Solid red color When crossbred with Holstein Friesian, they produce yielding milk with high butterfat and protein	Originated in central Europe in the 19th century Considered a dual breed • Can be used for both dairy and beef Can be solid red or red pied and can be polled or horned Bulls have a faster growth rate allowing for slaughter at earlier times	Small frame (roughly 600 to 700 pounds) Can be red, black, or dun (brown) colored Originated in Ireland Similar to a jersey, milk is rich and high in butterfat Very maternal
Montbéliarde	**Lakenvelder**	**Norwegian Red**
Originated in eastern France Large dairy frame cattle (roughly 1,300 to 1,500 pounds) Milk protein is well suited for cheesemaking Known for better longevity, fertility, and lower cell counts	Originated in the Netherlands Derives from Gurtenvieh or belted Braunvieh cattle Also known as Dutch Belted Become endangered during the last century	Known for selective broad breeding with increasing emphasis on functional traits like health and fertility Developed in 1935 in Norway Large frame (1,410 to 1,500 pounds) Can be red or black and white

Extra Sources

Breed Characteristics and Origins:

- More information:

Link: https://utdairy.tennessee.edu/wp-content/uploads/sites/104/2020/11/DairySkillathonStudyguide2020.pdf

- Games:

Link: https://www.purposegames.com/game/dairy-breeds
Link: https://www.purposegames.com/game/dairy-cattle-breeds-quiz-game
Link: https://www.purposegames.com/game/dairy-breeds-and-their-characteristics

Dairy Species:

- More information:

Link: https://www.fao.org/dairy-production-products/production/dairy-animals/en/
Link: https://animalsmart.org/feeding-the-world/products-from-animals#:~:text=Dairy%20cows%20are%20another%20type,cream%20cheese%20and%20condensed%20milk.

Answer Key
Unit 1: Breed

Activity 1.1

1. Guernsey
2. Jersey
3. Shorthorn
4. Holstein
5. Ayrshire
6. Brown Swiss
7. Red and White

Activity 1.2

	**Europe**
	**Isle of Jersey**
	**Europe**
	**Isle of Guernsey**
	**United States and Canada**
	**Switzerland**
	**Scotland**

Activity 1.3

*Any order is correct

1. Goat*
2. Sheep*
3. Cattle*

a. Goat: Milk, cheese, soap/lotion, others might apply
b. Sheep: Soap/lotion, cheese, others might apply
c. Cattle: Milk, cheese, ice cream, yogart, others might apply

Dairy
Unit 2: External and Skeletal Parts, Confirmation and Structure

Project Outcomes Addressed:
- Name and locate 20 body parts.
- Identify the following three udder structures and describe their importance:
    - Median suspensory ligament
    - Fore-udder attachment
    - Rear-udder attachment

You will need:
- Pencil
- Access to the internet

Activities in this unit:
1. Label the Dairy Cow
2. Udder Fun!

Confirmation and Parts of the Body Overview

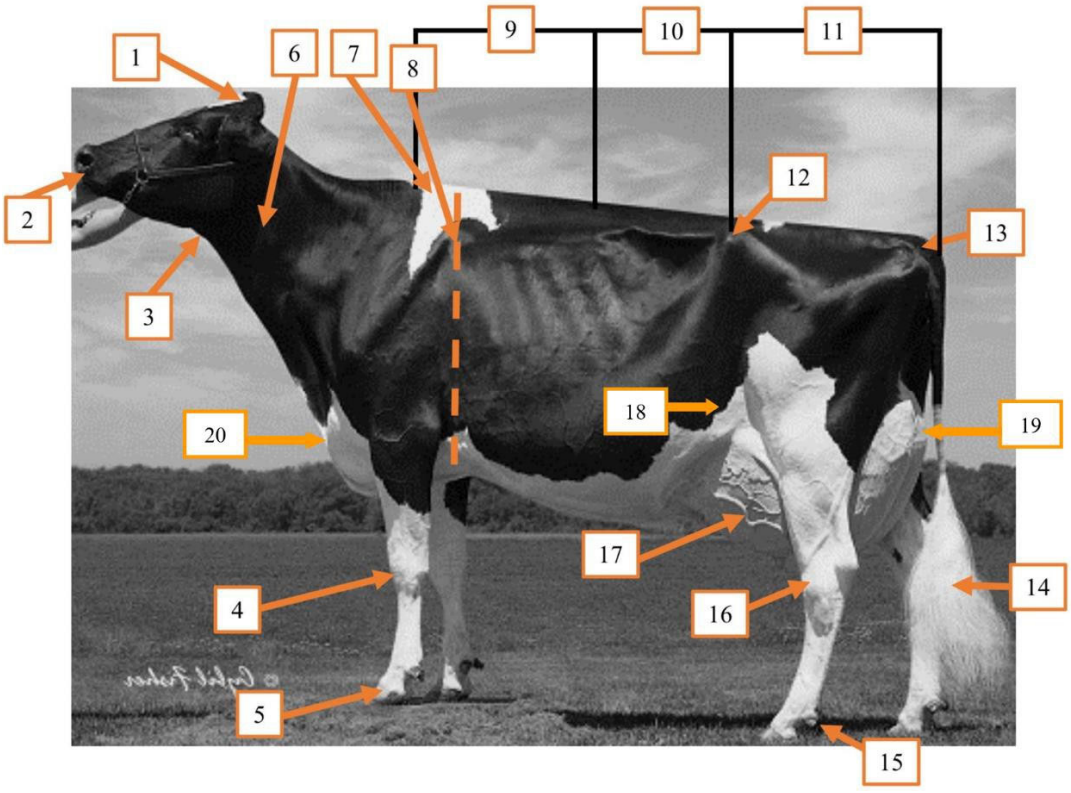
Anatomy is a complex way of saying the structure and internal workings of the dairy cow that help keep it functioning and healthy. There are over 40 body parts of a dairy cow, but for this activity we are going to focus on 20 of them. There are 5 parts of the external udder, but for this activity, we are going to focus on 3 of them.

Activity 2.1

Label the Dairy Cow
Do you think you could label the basic body parts of the cow? Using the image and word bank below, label the body parts correctly.

Word Bank

Flank	Poll	Throat	Neck	Switch
Rear udder	Heart girth	Brisket	Knee	Chine
Loin	Rump	Udder	Tail head	Hoof
Hip	Dewclaw	Hock	Withers	Muzzle



Activity 2.1: Place answers here.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____

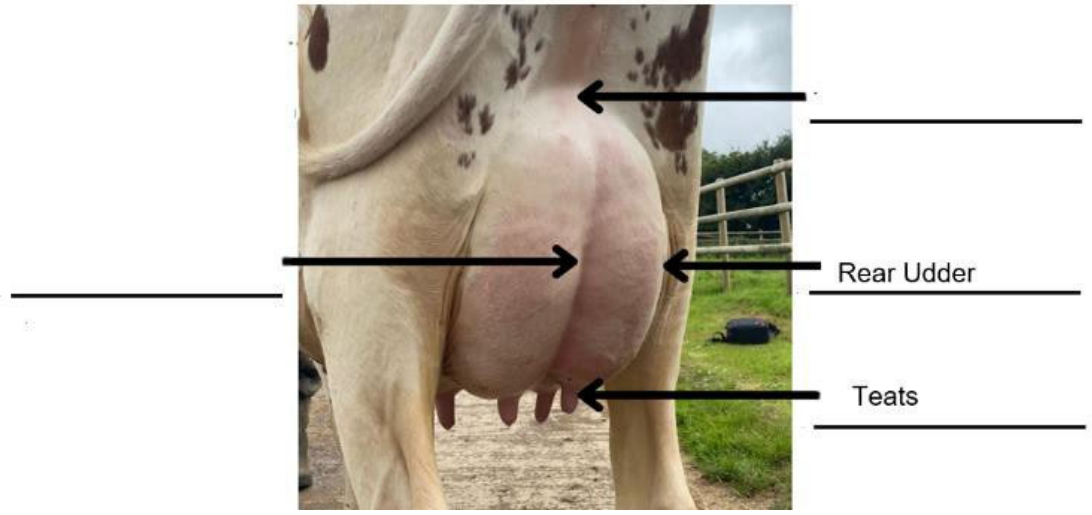
Activity 2.2

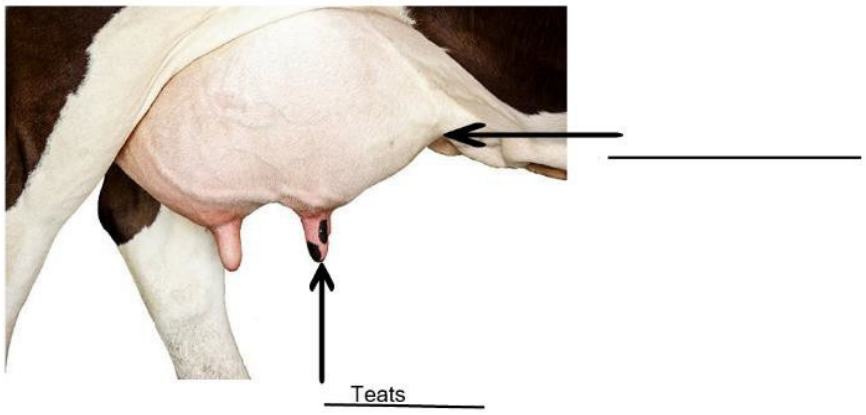
Udder Fun!

Do you think you could label the parts of the udder? First, draw a line from the part of the udder to the correct description. Using the image and word bank below, label the udder parts correctly.

Rear-udder attachment	Fore-udder attachment	Median suspensory ligament

The higher the attachment the greater the strength, which will lead to increased udder capacity	Supports the entire udder	Defines the strength of the lateral suspensory ligament





Extra Sources

Parts of the Cow:

- More information:

  Link: https://afs.ca.uky.edu/livestock/dairy/parts
  Link: https://animalcorner.org/cow-anatomy/
  Link: https://www.gov.mb.ca/agriculture/industry-leadership/4h/pubs/judge-dairy- factsheet.pdf

- Games:

  Link: https://www.purposegames.com/game/dairy-cattle-parts-game
  Link: https://www.purposegames.com/game/parts-of-a-dairy-cow-quiz
  Link: https://4h.extension.wisc.edu/4h-resources/dairy-parts-quiz-answer-key/

Parts of the Udder:

- More information:

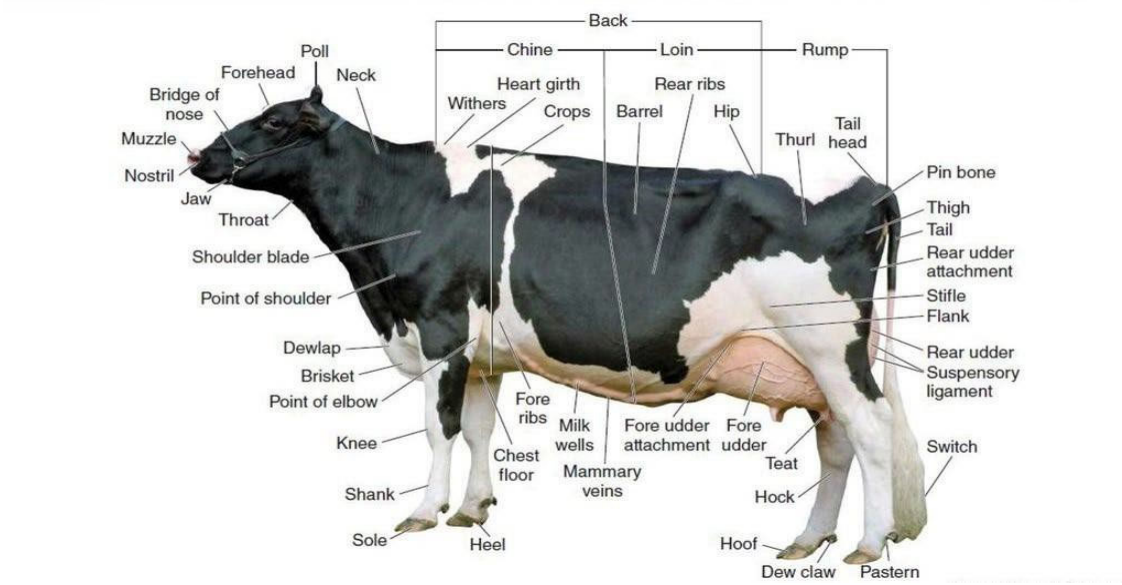
  Link: https://www.gov.mb.ca/agriculture/industry-leadership/4h/pubs/judge-dairy-factsheet.pdf
  Link: https://uwmril.wisc.edu/wp-content/uploads/sites/306/2021/08/1_TECH_1_CowIntroUdderAnatomy.pdf

- Games:

  Link: https://www.purposegames.com/game/dairy-cow-udder

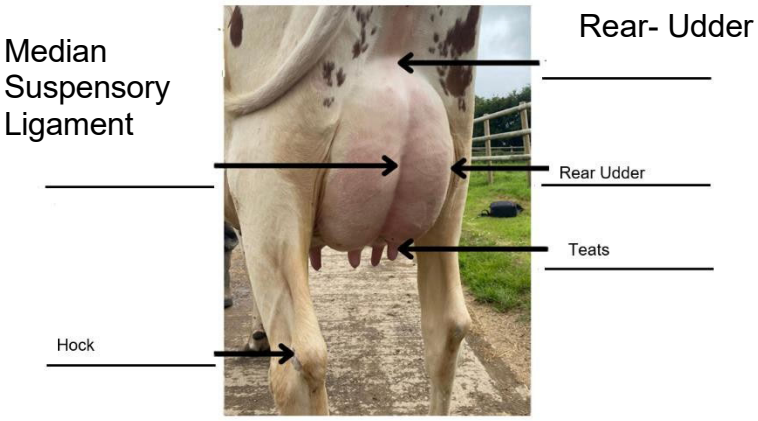
Answer Key
Unit 2: External and Skeletal Parts, Confirmation and Structure

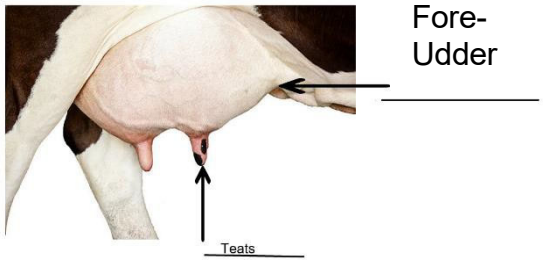
Activity 2.1



Activity 2.2

Rear-udder attachment	Fore-udder attachment	Median suspensory ligament
The higher the attachment the greater the strength, which will lead to increased udder capacity	Supports the entire udder	Defines the strength of the lateral suspensory ligament





Dairy
Unit 3: Health and Disease

Project Outcomes Addressed:

- Explain how animals develop immunity from vaccination.
- Demonstrate how to give an intramuscular and a subcutaneous injection.
- Identify all 10 parts of a medication insert.
- Define the following terms: resistance, susceptible, pathogens, scours, dehydration, dewormer, electrolyte, heat stress, necropsy, persistently infected, prevention, temperature-humidity index, and treatment.
- Demonstrate the proper method of administering a drench.
- Understand quality assurance regarding injection sites, withdrawal times, residues and using a medication label.
- Differentiate between modified-live and killed vaccines.
- Explain the difference between a medication label and a medication insert.
- Identify terminology associated with biosecurity for a livestock operation or livestock project.
- Define the following: coccidiosis, acidosis, metritis, ketosis, milk fever, lameness, pneumonia, pinkeye, bloat and mastitis.
- Identify internal and external parasites in dairy cattle.
- Label the cross-section of the claw and anatomical structure of the hoof.

You will need:

- Pencil
- Scissors

Activities in this unit:

1. Vaccinations Save Lives!
2. How do you Give a Shot? & Medication Label Versus Medication Insert
3. Health Terms Crossword
4. How Do You Drench Cattle?
5. Basics of Biosecurity
6. Disease Scrabble
7. Gross Parasites!
8. Let's Hoof It!

Activity 3.1

Vaccinations Save Lives!

Why give vaccines?

Vaccines are given to lower the risk of disease. Vaccines provide added insurance for cattle producers to protect their herds from many different diseases.

What is the goal of vaccination?

The purpose of vaccinating is to protect the herd from harmful diseases for health, economic and welfare reasons. To provide protection, the immune system must develop memory. With each vaccination and booster, the goal is to provide the protection needed by triggering the immune system to recognize the disease.

Are vaccines 100 percent effective?

Most vaccines do not prevent infection; instead, they prevent clinical disease. It is important to note that vaccines are not absolute protection. The immune system can be overwhelmed even if a vaccine is in place. If cattle become immune-compromised or exposed to an extremely high number of pathogens (disease-causing organisms), the vaccine may fail to protect from clinical disease.

Types of vaccines:

Modified-live vaccine (MLV)
- Non-disease-causing version of the virus or bacteria
- The live virus or bacteria replicates in the animal similar to how the actual disease would, but it does not cause the disease itself.
- They help the immune system develop a full response and create immunity.

Killed vaccines
- Killed vaccines do not contain a live virus or bacteria
- They contain a dead organism or specific piece of an organism that is critical to the function of the disease-causing virus or bacteria.
- Boosters or second vaccinations are needed more often with killed vaccines.

Combined vaccines
- Contain both modified-live and killed products

There are six pairs of cards on the next page. Cut out the cards and shuffle them. Match each card to the correct term. Can you do it?

Do not contain a live virus or bacteria	Killed Vaccine	Non-disease-causing version of the virus or bacteria
Modified-Live Vaccine	Contain both modified live and killed products	Killed Vaccine
Boosters or second vaccinations are needed more often	Modified-Live Vaccine	Killed Vaccine
It helps the immune system develop a full response and create immunity	Combined Vaccine	Contain a dead organism or specific piece of an organism that is critical to the function of the disease-causing virus or bacteria

BLANK PAGE FOR CUT OUTS

Activity 3.2

How do you give a shot?
Medication Label VS Medication Insert

Types of injections:

- Intravenous (IV)
  - Injected into the blood stream directly through veins
- Intramuscular (IM)
  - Injected into the muscle
- Subcutaneous (SC)
  - Injected under the skin
- Intradermal (ID)
  - Injected between layers of the skin

Watch this video on how to give a shot:

Link: https://www.youtube.com/watch?v=hdCfGgsp4tQ

Medication Label Versus Medication Insert

Medication label:

- A written, printed or graphic matter upon or any of its container or accompanying such as a drug
- Seeks to identify drug contents and to state specific instructions or warnings for administration, storage, and disposal

Medication insert:

- Provides information about the drug and its use.
- For prescription medications, the insert is technical, providing information for medical professionals about how to prescribe the drug.

Quality Assurance:

Injection sites

- Located the injection site detail under the route of administration

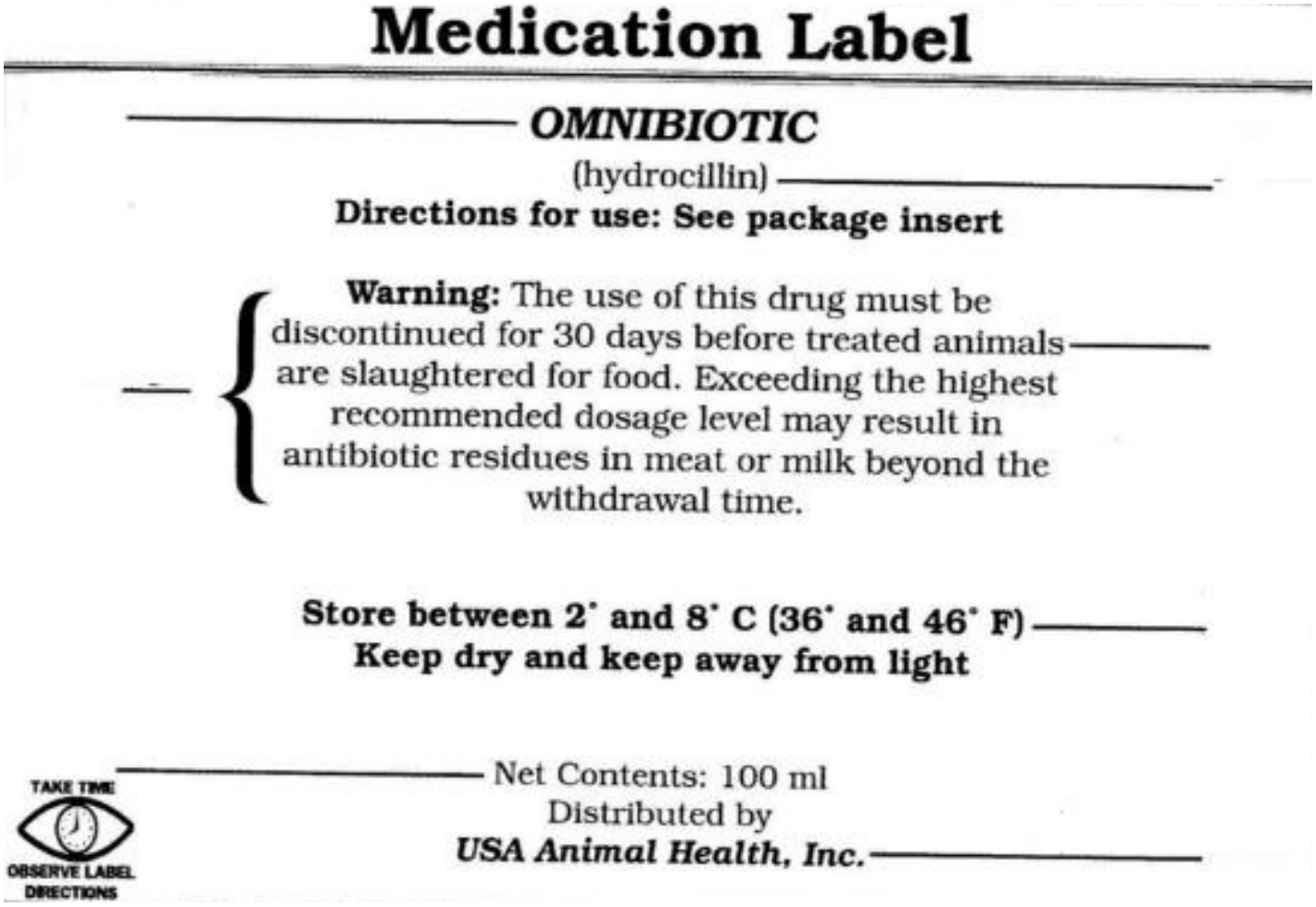
Withdrawal times

- The time between the last drug treatment and the sale of milk or slaughter. It is the time required for the drug residue to be reduced to safe levels for human consumption.

Residues

- Watch the video below:
- Link: https://www.youtube.com/watch?v=nrLDsfGMX9s

Can you fill in the blanks and label the medication label and medication insert?



Medication Label

_____ ***OMNIBIOTIC***

(hydrocillin) _____

Directions for use: See package insert

_____ **Warning:** The use of this drug must be discontinued for 30 days before treated animals _____ are slaughtered for food. Exceeding the highest recommended dosage level may result in antibiotic residues in meat or milk beyond the withdrawal time.

Store between 2° and 8° C (36° and 46° F) _____
Keep dry and keep away from light

TAKE TIME
OBSERVE LABEL DIRECTIONS

_____ Net Contents: 100 ml
Distributed by
USA Animal Health, Inc. _____

Word Bank for Label

Storage	Quantity of Contents	Cautions and Warnings	Active Ingredients
Name of Drug	Withholding Times	Name of Distributor	

Medication Insert

OMNIBIOTIC

(Hydrocillin in Aqueous Suspension)

For use in Beef Cattle, Lactating and Non-Lactating Dairy Cattle, Swine and Sheep

Read Entire Brochure Carefully Before Using This Product

For Intramuscular Use Only

Active Ingredients: Omnibiotic is an effective antimicrobial preparation containing hydrocillin hydrochloride. Each ml of this suspension contains 200,000 units of hydrocillin hydrochloride in an aqueous base.

Indications: Cattle - bronchitis, foot rot, leptospirosis, mastitis, metritis, pneumonia, wound infections. **Swine** - erysipelas, pneumonia. **Sheep** - foot rot, pneumonia, mastitis: and other infections in these species caused by or associated with hydrocillin-susceptible organisms.

Recommended Daily Dosage

The usual dose is 2 ml per 100 lb of body weight given once daily. Maximum dose is 15 ml/day.

Body Weight	*Dosage*
100 lb	2 ml
300 lb	6 ml
500 lb	10 ml
750 lb or more	15 ml

Continue treatment for 1 to 2 days after symptoms disappear.

Caution: 1. Omnibiotic should be injected deep within the fleshy muscle of the neck or thigh. Do not inject this material in the hip or rump, subcutaneously, into a blood vessel, or near a major nerve because it may cause tissue damage. 2. If improvement does not occur within 48 hours, the diagnosis should be reconsidered and appropriate treatment initiated. 3. Treated animals should be closely observed for at least 30 minutes. Should a reaction occur, discontinue treatment and immediately administer epinephrine and antihistamines. 4. Omnibiotic must be stored between 2° and 8° C (36° to 46° F). Warm to room temperature and shake well before using. Keep refrigerated when not in use.

Warning: Milk that has been taken from animals during treatment and for 48 hours (4 milkings) after the last treatment must not be used for food. The use of this drug must be discontinued for 30 days before treated animals are slaughtered for food.

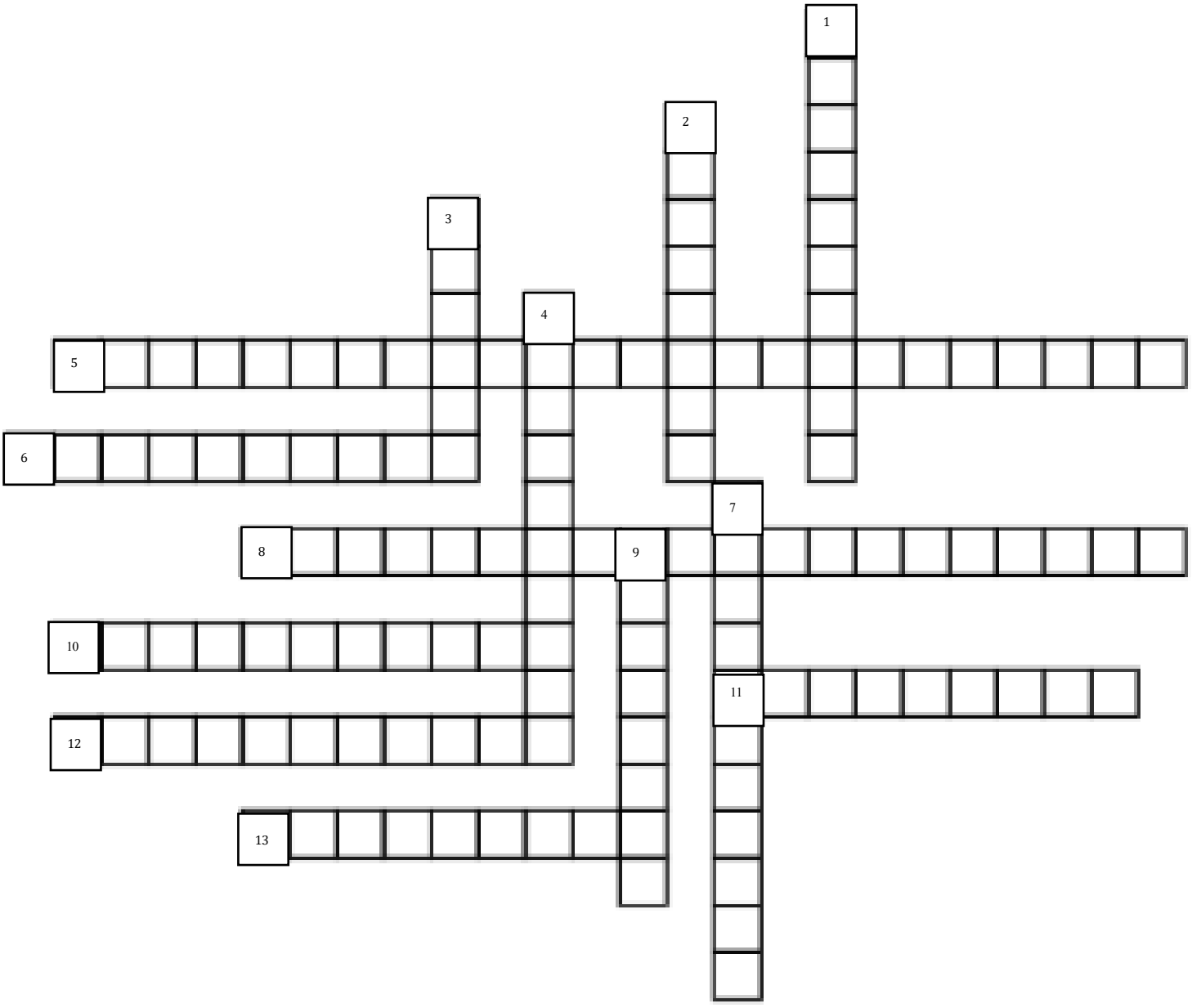


How Supplied: Omnibiotic is available in vials of 100 ml.

Activity 3.3

Health Terms Crossword

Fill in the crossword with the appropriate word for each definition using the word bank on the next page.



Word Bank for Crossword

Heat stress	Necropsy	Susceptible	Electrolyte	Resistance
Persistently infected	Pathogens	Temperature -humidity index	Treatment	Dehydration
Dewormer	Scours	Prevention		

Down:

1. Action taken to decrease the chance of getting a disease or condition

2. An anthelmintic drug given to animals to rid them of parasite

3. Diarrhea in horses and cattle caused by intestinal infection

4. Lack of sensitivity to a drug especially as a result of continued exposure or genetic change

7. A substance that breaks up into ions (particles with electrical charge) when it is dissolved in water or body fluids

9. The examination of an animal after death

Across:

5. A single value representing the combined effects of air temperature and humidity associated with the level of thermal stress

6. Occurs when the body cannot get rid of excess heat

8. The continued presence of infectious virus following the primary infection

10. A condition that occurs when the body loses too much water and other fluids that it need to work normally

11. Medical care given to a patient for an illness or injury

12. Easily affected by a disease; is more likely to get a disease; or lacks resistance to get a disease

13. An organism causing disease to its host

Activity 3.4

How Do You Drench Cattle?

What is drenching?

Drenching is used to balance the diet of dairy cows and to provide protection against metabolic and other illnesses. Products commonly administered include bloat preventatives, magnesium, zinc to support metabolic processes and trace elements including cobalt and selenium.

Watch the following video on how to drench cattle:

Link: https://www.youtube.com/watch?v=PrgjRFp10nQ

Write three to five sentences on how to drench cattle.

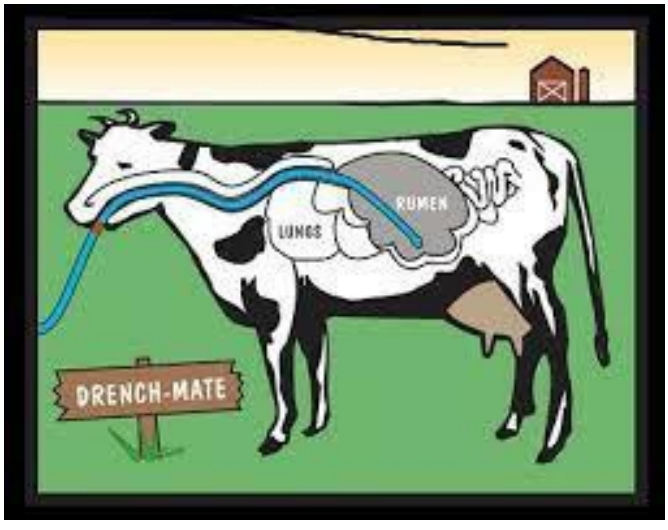
_____

_____

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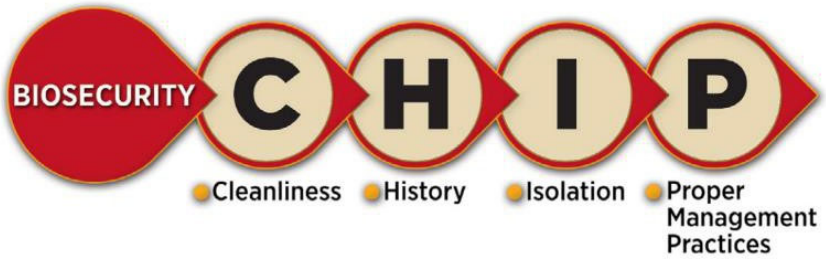
_____



Activity 3.5

Basics of Biosecurity

Biosecurity is defined as procedures intended to protect humans and animals against disease or harmful biological agents.



Complete this activity booklet with adult supervision:
Link:https://www.canr.msu.edu/animal_science/uploads/files/4H1661_AnimalScienceAnywhere-Biosecurity_NEW.pdf



Activity 3.6

Disease Scrabble

Some information about a disease is on the left side of the page. Determine which disease is being described and write out your answer in the blanks. Only put one letter per blank. At the end use the numbered letters to decode the message at the bottom.
The word bank is on the last page of the activity.

○ One of the most common diseases in dairy calves ○ Fever (rectal temperature over 103°F, rapid respiratory rate, coughing, nasal discharge ○ Prevention: colostrum management, ventilation, vaccination and nutrition	_ _ _ _ _ _ _ _ _ 6 11 16
○ Metabolic disease caused by a low blood calcium level ○ Symptoms: dry muzzle, cold legs and ears, constipation, drowsiness ○ Treatment: replenish cow with calcium solution ○ Prevention: adequate feeding practices; feeding lower amounts of calcium during the dry period; feeding a negative anion diet (DCAD diet) during the dry period	_ _ _ _ _ _ _ _ _ 16 12 18 4
○ Inflammation of the uterus ○ Caused by a bacterial infection ○ Usually occurs after calving complicated by dystocia, retained fetal membranes, twins or stillbirths ○ Symptoms: fever, vaginal discharge, uterus contains extra fluid, cow goes off feed	_ _ _ _ _ _ _ _ 7 9 13
○ Caused by infection with a single-celled parasite ○ Symptoms: diarrhea (watery and loose), colic, depression, loss of appetite and weight loss ○ Treatment: none; fluid therapy and nutritional support ○ Prevention: separate infected calves from healthy calves, good sanitation practices	_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ 17 8
○ Metabolic disease ○ pH of rumen falls to less than 5.5 (normal is 6.5 to 7.0) ○ When pH falls: rumen stops moving (depresses appetite and production) and acid-producing bacteria take over the rumen ○ Causes: feeding a high level of rapidly digestible carbohydrate (feeding increased concentrates compared to forage) ○ Symptoms: reduced feed intake, diarrhea, lethargy ○ Prevention: reduce amount of readily fermentable carbohydrate consumed at each meal	_ _ _ _ _ _ _ _ _ 3

Activity 3.6

Disease Scrabble Continued

○ Inflammation of clear outer layer of eye (cornea) and the pink membrane lining the eyelids ○ Highest during the summer ○ Symptoms: sensitivity to light, redness of eye, reduced feed intake ○ Prevention: fly control, providing shade, reduce overcrowding	_ _ _ _ _ _ _ 5
○ Inflammation or infection of the mammary gland ○ Symptoms: udder is swollen, hot, hard, red and painful. Milk is watery and has flakes or clots present. Reduced milk yield, increase in body temperature, lack of appetite ○ Prevention: good housing management, effective teat preparation and disinfection, regular testing and maintenance of milking machine, vaccination for environmental mastitis ○ Most costly disease in the dairy industry	_ _ _ _ _ _ _ _ 1
○ Increase in the gas pressure within the rumen ○ Cause: consumption of lush legume pasture species in the spring ○ Symptoms: off feed, reluctant to move, appear distressed, rapid breathing ○ Prevention: pasture management	_ _ _ _ _ 19
○ Metabolic disorder that occurs when energy demands exceed energy intake and result in negative energy balance ○ Low blood glucose concentrations ○ Most common in first few weeks of lactation ○ Symptoms: reduced milk yield, weight loss, reduced appetite, acetone smell on breath ○ Prevention: adequate feeding practices	_ _ _ _ _ _ _
○ Commonly a disease of young cattle (1-2 months to 1 year) ○ Usually sporadic during the wet seasons of the year ○ Most characteristic sign is watery feces ○ Infected calves should be removed from the rest	_ _ _ _ _ _ _ _ _ _ _ 2 15
○ Due to injury or disease in the foot or leg (laminitis, claw disease, digital dermatitis, and foot rot) ○ Symptoms: pain and discomfort, lowered milk yields ○ Prevention: hoof trimming, nutrition, housing and environment	_ _ _ _ _ _ _ 14

Word Bank for Scrabble

Coccidiosis	Cryptosporidiosis	Acidosis	Metritis	Ketosis
Milk fever	Lameness	Pneumonia	Pinkeye	Bloat
Mastitis				

Joke 1: _ _ _ w _ _ _ _ _ _ _ _ h q _ _ _ _ _ _ _ _

Activity 3.7

Gross Parasites!

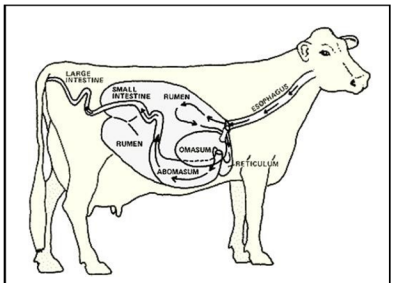
Match the parasite to the location in which it can be found. Some locations can be used more than once.



Roundworms



Lice



Small Intestines



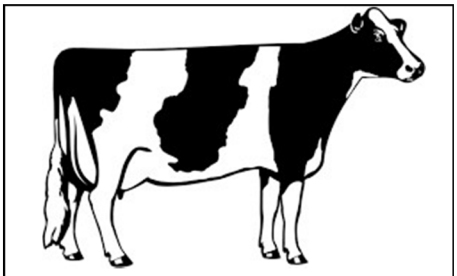
Fly



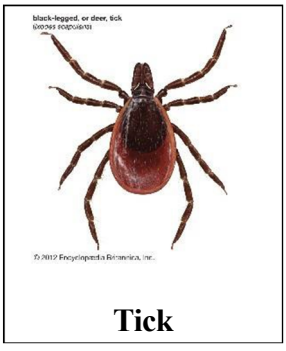
Head and Neck



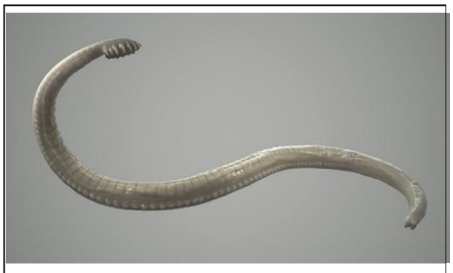
Mite



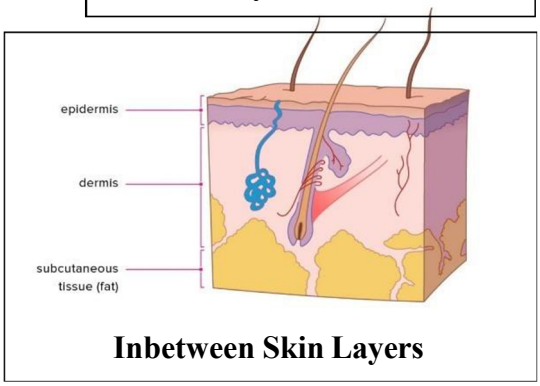
Body of the Cow



Tick



Tapeworm

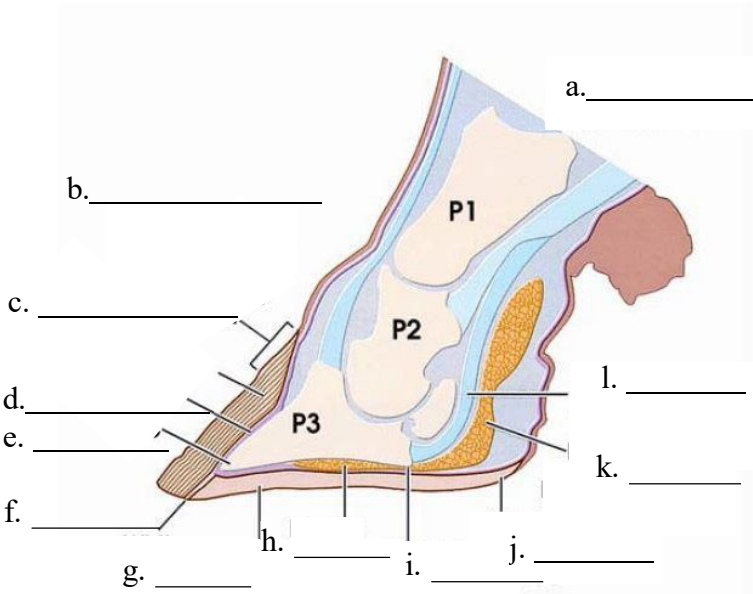


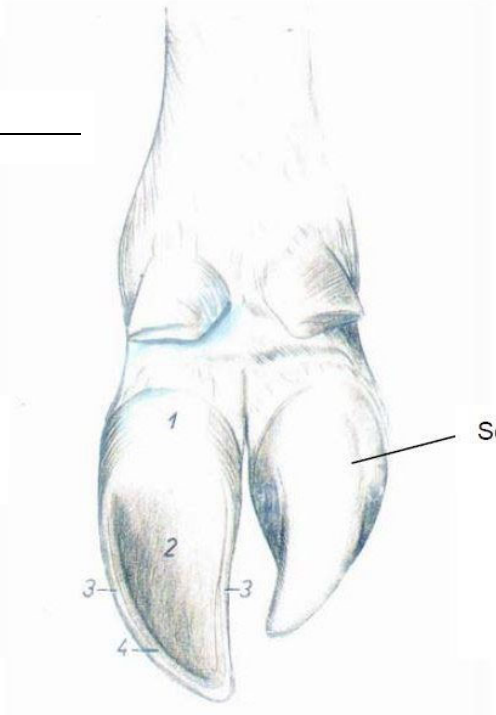
Inbetween Skin Layers

Activity 3.8

Let's Hoof It!

Label the interior and exterior of a dairy cow's hoof.





Solar corium (claw without horn)

1. _____
2. _____
3. _____
4. _____
5. _____

Word Bank for Interior Hoof

Heel	White line	Superficial flexor tendon
Flexor tuberosity of P3	Sole	Deep flexor tendon
Navicular bone	Dorsal Hoof Wall Corium	Coronary region
Extensor tendon	P3	Digital cushion

Word Bank for Interior Hoof

Heel bulb	White line	Abaxial (inner) wall
Abaxial (outer) wall	Sole	

Extra Sources

Vaccinations and how to give a shot:

- More information:

  Link: https://hereford.org/wp-content/uploads/2019/08/0819_HowToInjections.pdf Link: https://extension.umn.edu/beef-cow-calf/cattle-vaccine-basics

Drenching:

- More information:
  Link: https://learn.tearfund.org/en/resources/footsteps/footsteps-31-40/footsteps-34/drenching#:~:text=Drenching%20is%20the%20forced%20pouring%20of%20liquid%20preparations%20down%20the,does%20not%20enter%20the%20lungs.

Biosecurity:

- More information:
  Link: https://datcp.wi.gov/Documents/BiosecurityDairyFarms.pdf
  Link:https://www.aphis.usda.gov/animal_health/nahms/dairy/downloads/bamn/BA MN01_BiosecurityDairies.pdf
  Link: https://extension.psu.edu/4-h-livestock-biosecurity-tips-fact-sheet

Diseases:

- More information:
  Link: https://utdairy.tennessee.edu/wp-content/uploads/sites/104/2020/11/DairySkillathonStudyguide2020.pdf
  Link: https://dairy-cattle.extension.org/dairy-cattle-health-and-diseases/

Parasites:

- More information:
  Link: https://animal.ifas.ufl.edu/media/animalifasufledu/dairy-website/docs/Cattle- Parasites-Fact-Sheet.pdf
  Link: https://dairy-cattle.extension.org/internal-parasites-in-beef-and-dairy-cattle/

Hoof Anatomy:

- More information:
  Link: https://ahdb.org.uk/knowledge-library/the-anatomy-of-a-healthy-cow-s-foot
  Link: https://www.extension.purdue.edu/extmedia/id/id-321-w.pdf

- Games:
  Link: https://www.purposegames.com/game/anatomy-of-a-cow-hoof

Answers
Unit 3: Health and Disease

Activity 3.1

- Modified-Live Vaccine:
  - Non-disease-causing version of the virus or bacteria
  - It helps the immune system develop a full response and create immunity
- Killed Vaccine
  - Contain a dead organism or specific piece of an organism that is critical to the function of the disease-causing virus or bacteria
  - Do not contain a live virus or bacteria
  - Boosters or second vaccinations are needed more often
- Combined Vaccine
  - Contain both modified-live and killed products

Activity 3.2

Medication Insert

Name of Drug

OMNIBIOTIC

(Hydrocillin in Aqueous Suspension) — *Active Ingredients*

For use in Beef Cattle, Lactating and Non-Lactating Dairy Cattle, Swine and Sheep — *Species and Animal Class*

Read Entire Brochure Carefully Before Using This Product

For Intramuscular Use Only

Active Ingredients: Omnibiotic is an effective antimicrobial preparation containing hydrocillin hydrochloride. Each ml of this suspension contains 200,000 units of hydrocillin hydrochloride in an aqueous base.

Approved Uses

Indications: Cattle - bronchitis, foot rot, leptospirosis, mastitis, metritis, pneumonia, wound infections. **Swine** - erysipelas, pneumonia. **Sheep** - foot rot, pneumonia, mastitis: and other infections in these species caused by or associated with hydrocillin-susceptible organisms.

Recommended Daily Dosage

The usual dose is 2 ml per 100 lb of body weight given once daily. Maximum dose is 15 ml/day.

Dosage

Body Weight	*Dosage*
100 lb	2 ml
300 lb	6 ml
500 lb	10 ml
750 lb or more	15 ml

Continue treatment for 1 to 2 days after symptoms disappear.

Route of Administration

Cautions and Warnings

Caution: 1. Omnibiotic should be injected deep within the fleshy muscle of the neck or thigh. Do not inject this material in the hip or rump, subcutaneously, into a blood vessel, or near a major nerve because it may cause tissue damage. 2. If improvement does not occur within 48 hours, the diagnosis should be reconsidered and appropriate treatment initiated. 3. Treated animals should be closely observed for at least 30 minutes. Should a reaction occur, discontinue treatment and immediately administer epinephrine and antihistamines. 4. Omnibiotic must be stored between 2° and 8° C (36° to 46° F). Warm to room temperature and shake well before using. Keep refrigerated when not in use.

Storage Requirements

Warning: Milk that has been taken from animals during treatment and for 48 hours (4 milkings) after the last treatment must not be used for food. The use of this drug must be discontinued for 30 days before treated animals are slaughtered for food.

Withholding Times

Sizes Available

How Supplied: Omnibiotic is available in vials of 100 ml.



Medication Label

Name of Drug — **OMNIBIOTIC**

(hydrocillin) — *Active Ingredients*

Directions for use: See package insert

Cautions and Warnings — **Warning:** The use of this drug must be discontinued for 30 days before treated animals are slaughtered for food. Exceeding the highest recommended dosage level may result in antibiotic residues in meat or milk beyond the withdrawal time. — *Withholding Times*

Store between 2° and 8° C (36° and 46° F) — *Storage*

Keep dry and keep away from light

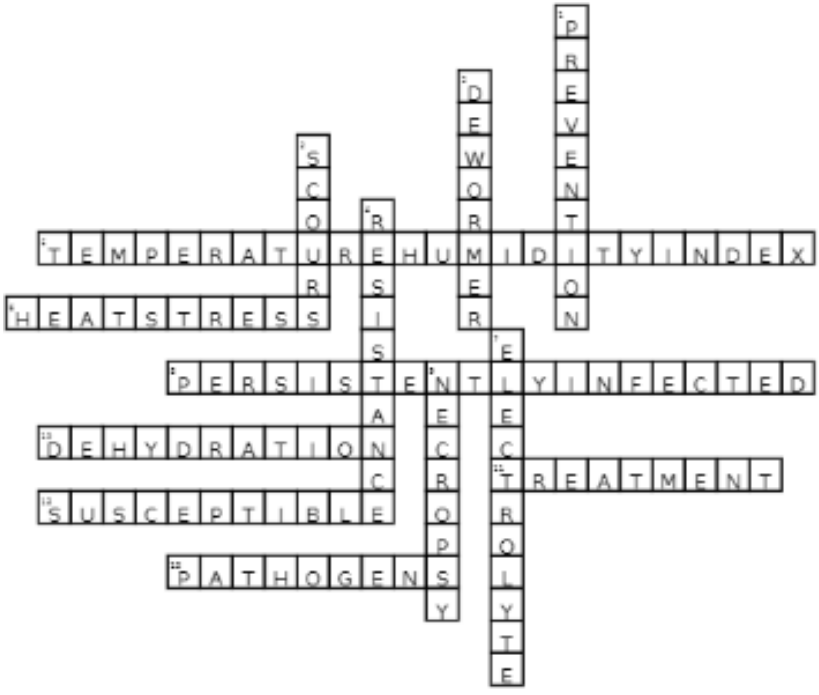
Quantity of Contents — Net Contents: 100 ml

Distributed by

USA Animal Health, Inc. — *Name of Distributor*

TAKE TIME
OBSERVE LABEL DIRECTIONS

Activity 3.3



Activity 3.6

1. Pneumonia
2. Milk fever
3. Metritis
4. Cryptosporidiosis
5. Acidosis
6. Pinkeye
7. Mastitis
8. Bloat
9. Ketosis
10. Coccidiosis
11. Lameness

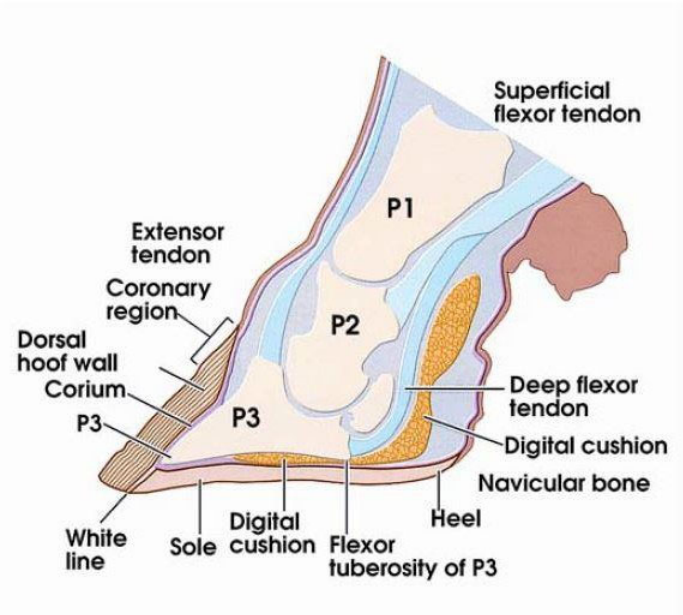
Joke 1: A cow in an earthquake is called a milkshake.

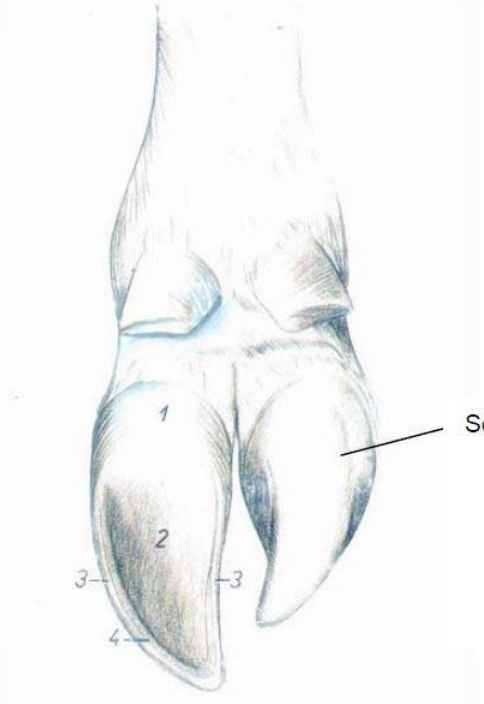
Joke 2: Why do cows have hooves instead of toes? Because they lactose.

Activity 3.7

1. Roundworm -> Small Intestine
2. Lice -> Head and Neck
3. Fly -> All over the Body of a Cow
4. Mite -> Between Skin Layers
5. Tick -> Head and Neck
6. Tapeworm -> Small Intestine

Activity 3.8


Superficial flexor tendon
P1
Extensor tendon
Coronary region
P2
Dorsal hoof wall
Corium
P3
P3
Deep flexor tendon
Digital cushion
Navicular bone
White line
Sole
Digital cushion
Flexor tuberosity of P3
Heel


1
2
3
3
4
Solar corium (claw without horn)
1. Heel bulb
2. Sole
3. Abaxial (outer) wall
4. White line
5. Abaxial (inner) wall

Dairy
Unit 4: Equipment and Records

Project Outcomes Addressed:

- Identify 20 pieces of equipment used for dairy cattle.
- Demonstrate the uses of 20 pieces of dairy cattle equipment.
- Understand how to calculate average daily gain and rolling herd average.
- Understand how to interpret and keep health records.
- Discuss the importance of animal identification for traceability.

You will need:

- Pencil
- Access to the internet

Activities in this unit:

1. Equipment Matching
2. Average Daily Gain and Rolling Herd Average
3. Understanding Records
4. Cow Identification

Equipment and Records

Knowing and understanding equipment used on dairy farms and recordkeeping are critical for a successful operation. If you do not know how to use an item or which piece of equipment to use, then how will you run your business? Without records, how can you tell which cow is which? Learn more how both can benefit your dairy in this unit.

Activity 4.1

Equipment Matching

Match the pictures to the definitions and word bank below. Each word and definition will be used only once.

Definitions

1. Used in mastitis detection; milk is placed into each section and a reagent is added that helps identify cases of mastitis
2. Used with semen straws; places semen inside cow during artificial insemination
3. Protects the insemination rod and keeps it clean
4. Measures the vacuum level of milking system
5. Ridged shell surrounding teat cup inflation
6. Controls when vacuum pressure is applied inside the shell
7. Made from flexible materials; attaches to cow's teat milking; normally surrounded by a rigid shell
8. Teat dip fills the top compartment; teat dip is applied to teat by inserting it into top compartment
9. Attaches tags to ear of cattle
10. Collects milk from individual teats, then milk moves through tubing into main pipeline; attaches to shell/inflation and air tubes
11. Used for disbudding calves BEFORE horn emergence
12. Used to give injections to cattle
13. Given to cattle to collect any metal (screws, nails, etc.) that may by eaten and could puncture the rumen (hardware disease)
14. Supports milk/vacuum tubing while the milking unit is attached to the cow
15. Used to castrate bull calf
16. Used to assist cows when having difficulty birthing their calf
17. Maintains vacuum levels in milking system
18. Used for disbudding calves Before or Directly After horn emergence
19. Distributes water/cleaning solution to milking unit during CIP cleaning
20. Used to give injections to cattle

Word Bank

Cow Magnet	Vacuum Gauge	Syringe	Multiuse Syringe	Inflations
Teat Cup Shell	Jetter Distributor	Teat Dip Cup	Pulsator	Elastrator
Vacuum Regulator	CMT Paddle	Support Arm	Milking Claw	OB Chain
Insemination Tubes	Electric Dehorner	Insemination Rod	Caustic Paste	Ear Tagger

Match the corresponding equipment to its picture.



_____



_____



_____



_____



_____



_____



_____



_____




D C
B A





















Activity 4.2

Average Daily Gain and Rolling Herd Average

Average Daily Gain (ADG) can be defined as the average amount of weight a market animal will gain each day during the feeding period.

ADG can be calculated by taking the amount of weight an animal has gained since the last weight and dividing the weight by the number of days since the last weight.

$$\text{Weight gain during the preweaning period} = \frac{\text{weaning weight} - \text{birth weight}}{\text{age (in days) at weaning}}$$

For this activity complete the scenario calculation below:

This activity will have you calculate your own average dairy gain. Take your own weight (or a pet's) on day 1. This can be any day of the week. In seven days, re-weight yourself or your pet. Subtract your day 7 weight from your day 1 weight and then divide it by 7 (number of days in between weight ins) to calculate your ADG.

Answer: _____

Rolling Herd Average represents how much milk, milk fat, or milk protein were produced by the average cow in a herd for the previous year.

For this activity complete the scenario calculations using the table below:

This activity will have you calculate rolling herd average for milk fat on a 5-cow dairy for one year. Find the average for each cow and month and fill in the blank space in the table. Use the averages to find the rolling herd average of milk fat for one year.

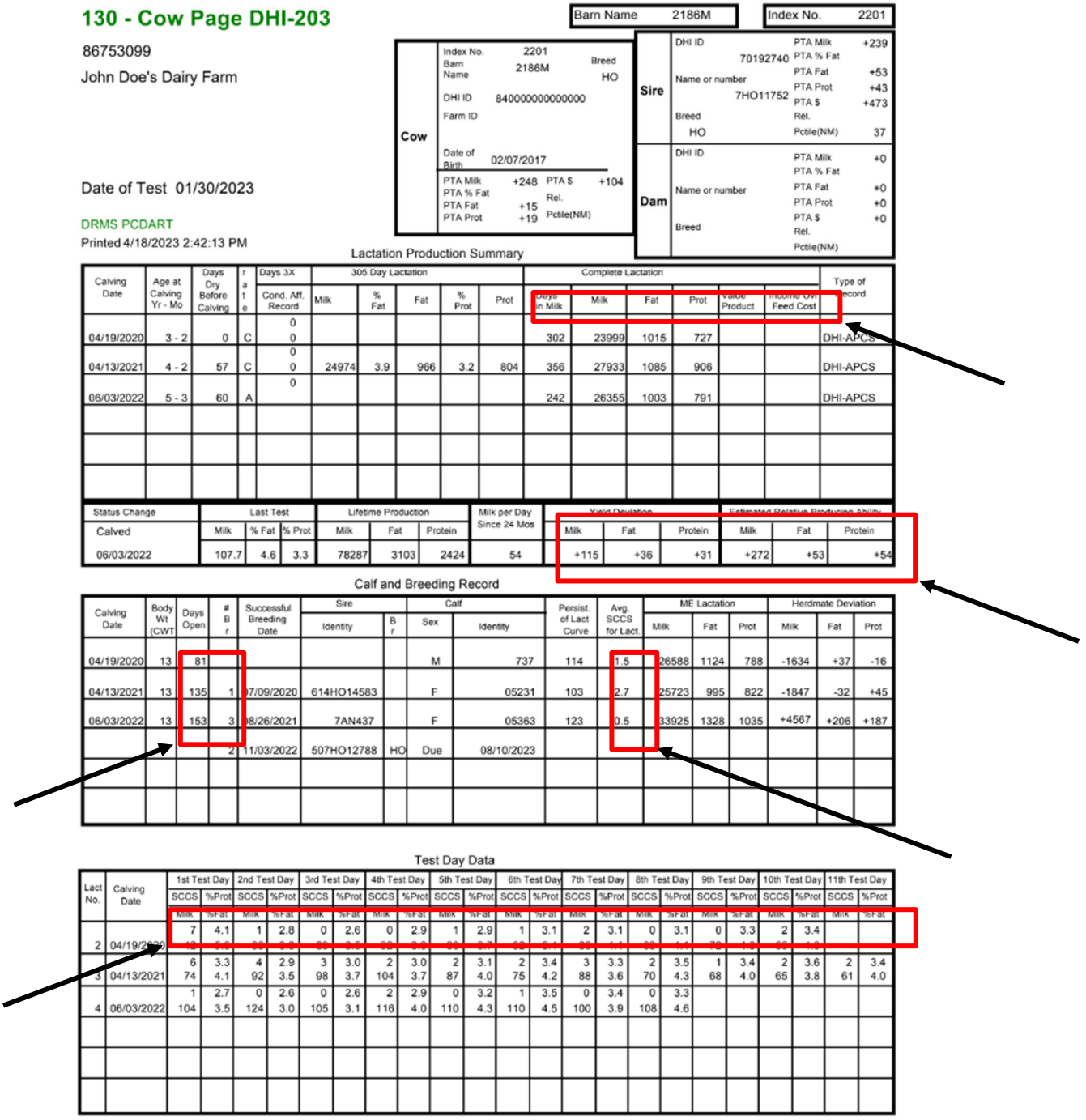
	Cow 1004			Cow 2247			Cow 3979			Cow 4832			Cow 5678		
	MF	PR	MP	MF	PR	MP	MF	PR	MP	MF	PR	MP	MF	PR	MP
January	3.6	24,000	3.1	3.2	25,000	3.2	4.0	24,300	3.2	3.4	21,000	3.0	3.8	24,000	3.4
February	3.8	24,100	3.2	3.1	25,100	3.3	3.8	24,200	3.2	3.6	21,100	3.2	3.7	24,200	3.5
March	4.0	24,000	3.2	3.4	25,000	3.3	4.0	24,200	3.1	3.8	21,200	3.3	3.8	24,100	3.2
April	3.6	24,100	3.1	3.1	25,000	3.4	4.0	24,200	3.0	3.6	21,300	3.1	3.8	24,200	3.1
May	3.2	23,900	3.0	3.2	24,900	3.4	4.3	24,200	3.1	3.4	21,100	3.1	3.8	24,200	3.2
June	2.8	23,900	3.2	3.0	24,800	3.2	4.2	24,200	3.2	3.2	21,200	3.2	3.7	24,500	3.2
July	3.6	23,800	3.2	2.8	24,700	3.1	4.3	24,100	3.3	2.8	21,000	3.0	3.9	24,600	3.3
August	3.6	23,900	3.1	3.3	24,700	3.0	4.2	24,100	3.2	3.0	20,000	3.2	3.8	24,700	3.3
September	3.8	24,000	3.0	2.6	24,600	3.1	4.0	24,100	3.0	3.2	21,000	3.3	3.7	24.600	3.4
October	4.0	23,900	2.9	2.8	24,500	3.1	3.9	24,100	2.9	3.4	21,100	3.1	3.9	24,500	3.4
November	3.7	23,900	3.0	3.0	24,400	3.1	4.0	24,200	2.7	3.6	21,200	3.1	4.0	24,500	3.5
December	3.5	23,800	2.9	3.2	24,400	3.1	4.2	24,300	3.1	3.8	21,200	3.2	3.8	24,500	3.4

Fill in the averages for each month for milk fat% (MF), milk production (PR), and milk protein% (MP) and calculate the total averages for each of the three.

	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total:
MF													
PR													
MP													

Activity 4.3
Understanding Records

Fill in the blanks regarding the DHIA Report below. Each term is only used once from the word bank.



130 - Cow Page DHI-203

86753099

John Doe's Dairy Farm

Date of Test 01/30/2023

DRMS PCDART

Printed 4/18/2023 2:42:13 PM

Barn Name 2186M | Index No. 2201

Cow: Index No. 2201; Barn Name 2186M; Breed HO; DHI ID 840000000000000; Farm ID; Date of Birth 02/07/2017; PTA Milk +248; PTA % Fat; PTA Fat +15; PTA Prot +19; PTA $ +104; Rel.; Pctile(NM)

Sire: DHI ID 70192740; Name or number 7HO11752; Breed HO; PTA Milk +239; PTA % Fat; PTA Fat +53; PTA Prot +43; PTA $ +473; Rel.; Pctile(NM) 37

Dam: DHI ID; Name or number; Breed; PTA Milk +0; PTA % Fat; PTA Fat +0; PTA Prot +0; PTA $ +0; Rel.; Pctile(NM)

Lactation Production Summary

Calving Date	Age at Calving Yr - Mo	Days Dry Before Calving	r a t e	Days 3X Cond. Aff. Record	305 Day Lactation Milk	% Fat	Fat	% Prot	Prot	Complete Lactation Days in Milk	Milk	Fat	Prot	Value Product	Income Over Feed Cost	Type of Record
04/19/2020	3 - 2	0	C	0 0						302	23999	1015	727			DHI-APCS
04/13/2021	4 - 2	57	C	0 0	24974	3.9	966	3.2	804	356	27933	1085	906			DHI-APCS
06/03/2022	5 - 3	60	A	0						242	26355	1003	791			DHI-APCS

Status Change	Last Test			Lifetime Production			Milk per Day Since 24 Mos	Yield Deviation			Estimated Relative Producing Ability		
Calved	Milk	% Fat	% Prot	Milk	Fat	Protein		Milk	Fat	Protein	Milk	Fat	Protein
06/03/2022	107.7	4.6	3.3	78287	3103	2424	54	+115	+36	+31	+272	+53	+54

Calf and Breeding Record

Calving Date	Body Wt (CWT	Days Open	# B r	Successful Breeding Date	Sire Identity	B r	Calf Sex	Calf Identity	Persist. of Lact Curve	Avg. SCCS for Lact.	ME Lactation Milk	Fat	Prot	Herdmate Deviation Milk	Fat	Prot
04/19/2020	13	81	1				M	737	114	1.5	26588	1124	788	-1634	+37	-16
04/13/2021	13	135	1	07/09/2020	614HO14583		F	05231	103	2.7	25723	995	822	-1847	-32	+45
06/03/2022	13	153	3	08/26/2021	7AN437		F	05363	123	0.5	33925	1328	1035	+4567	+206	+187
			2	11/03/2022	507HO12788	HO	Due	08/10/2023								

Test Day Data

Lact No.	Calving Date	1st Test Day SCCS	1st Test Day %Prot	2nd Test Day SCCS	2nd Test Day %Prot	3rd Test Day SCCS	3rd Test Day %Prot	4th Test Day SCCS	4th Test Day %Prot	5th Test Day SCCS	5th Test Day %Prot	6th Test Day SCCS	6th Test Day %Prot	7th Test Day SCCS	7th Test Day %Prot	8th Test Day SCCS	8th Test Day %Prot	9th Test Day SCCS	9th Test Day %Prot	10th Test Day SCCS	10th Test Day %Prot	11th Test Day SCCS	11th Test Day %Prot
		Milk	%Fat	Milk	%Fat	Milk	%Fat	Milk	%Fat	Milk	%Fat	Milk	%Fat	Milk	%Fat	Milk	%Fat	Milk	%Fat	Milk	%Fat	Milk	%Fat
2	04/19/2020	7 42	4.1 5.6	1 60	2.8 3.8	0 60	2.6 3.5	0 60	2.9 3.9	1 60	2.9 3.7	1 60	3.1 4.1	2 60	3.1 4.1	0 60	3.1 4.1	0 70	3.3 4.3	2 60	3.4 4.6		
3	04/13/2021	6 74	3.3 4.1	4 92	2.9 3.5	3 98	3.0 3.7	2 104	3.0 3.7	2 87	3.1 4.0	2 75	3.4 4.2	3 88	3.3 3.6	2 70	3.5 4.3	1 68	3.4 4.0	2 65	3.6 3.8	2 61	3.4 4.0
4	06/03/2022	1 104	2.7 3.5	0 124	2.6 3.0	0 105	2.6 3.1	2 116	2.9 4.0	0 110	3.2 4.3	1 110	3.5 4.5	0 100	3.4 3.9	0 108	3.3 4.6						

Word Bank for DHIA Report

Days in Milk Weight Fat content % Protein content %	Days Open (days since calved to bred) # Br – breedings per pregnancy	Average Somatic Cell Score for Lactation	Somatic Cell Score Milk Weight % Protein %Fat For previous test days	Yield and production compared to herd mates

Activity 4.4

Cow Identification

Name three methods of cow identification. Use the link below to help:

Link: https://www.extension.purdue.edu/extmedia/as/as-556-w.pdf

1. _____ 2. _____ 3. _____

Why is cow identification important?

_____

_____

_____

_____

_____

Extra Sources

Equipment:

- More information:
  Link: https://utdairy.tennessee.edu/wp-content/uploads/sites/104/2020/11/DairySkillathonStudyguide2020.pdf

Average Daily Gain and Rolling Herd Average:

- More information:
  Link: https://animalrangeextension.montana.edu/beef/articles/dailygain.html
  Link: https://cdn.agclassroom.org/ok/lessons/upper/ag_algebra_average.pdf

Understanding Records:

- More information:
  Link: https://www.canr.msu.edu/uploads/234/40263/Dairy_Notebook_2017_Intermed_12-14.pdf
  Link: https://extension.tennessee.edu/publications/Documents/W969.pdf

Cow Identification:

- More Information:
  Link: https://extension.missouri.edu/news/proper-cattle-identification-systems-4492#:~:text=Identification%20is%20important%20in%20tracking,health%20status%20of%20the%20cattle.

Answer Key
Unit 4: Equipment and Records

Activity 4.1
Answers found here: https://utdairy.tennessee.edu/wp-content/uploads/sites/104/2020/11/DairySkillathonStudyguide2020.pdf

Activity 4.2

ADG: example

day one weight 120

day seven weight 122

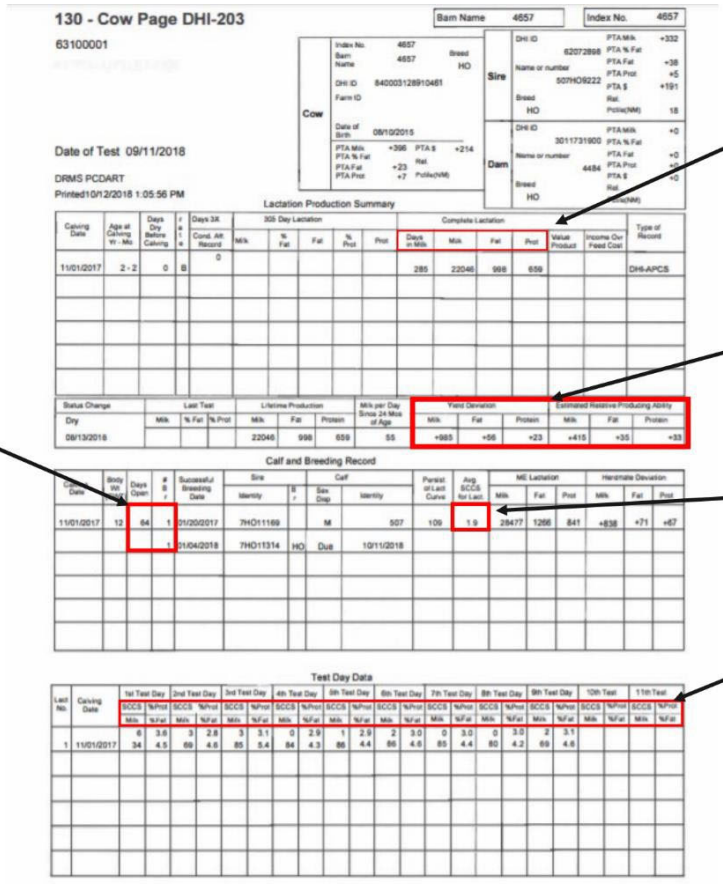
122 – 120 / 7 = 0.29

RHA:

	Jan	Feb	March	April	May	June
MF	3.6	3.6	3.8	3.62	3.58	3.38
PR	23,660	23,740	23,700	23,760	23,660	23,720
MP	3.18	3.28	3.22	3.14	3.22	3.2

July	Aug	Sep	Oct	Nov	Dec	Total:
3.48	3.58	3.46	3.6	3.66	3.7	**3.59**
23,640	23,480	23,660	23,620	23,640	23,640	**23,660**
3.18	3.16	3.16	3.08	3.08	3.14	**2.91**

Activity 4.3



Days Open (days since calved to bred)
Br – breedings per pregnancy

Activity 4.4

1. Branding
2. Tattoo
3. Ear tag
   *any order

Why?

Identification is important in tracking cattle performance. It is used to make management decisions that will improve productivity of the cattle operation. Identification also helps in tracking health and treatment of those issues that will lead to optimum health status of the cattle. Identification can also be important in the ownership and sale of cattle.

Dairy
Unit 5: Nutrition and Feeding

Project Outcomes Addressed:

- Understand the function of each part of a ruminant stomach and label the digestive tract of a dairy cow
- Identify and distinguish amoung the following forages and feedstuffs: soybean meal, whole soybeans, trace mineral salt, whole grain wheat, alfalfa, dried whey, fish meal, whole kernel corn, cracked corn, corn silage and haylage
- Describe the importance of colostrum for calf health
- Describe the following nutrients or nutrient analyses: carbohydrates, fat, fiber, nonprotein nitrogen, nonstarch polysaccharides, relative feed value, relative forage quality, starch, total digestible nutrients, net energy for lactation, and water-soluble or nonfibrous carbohydrates
- Describe the following processes: creating a total mixed ration, top dressing, bottle feeding, rotational grazing and weaning
- Identify the amount of grain a calf should be consuming at weaning
- Describe the ideal weaning weight and height for a given dairy breed
- Analyze a feed tag to determine if it contains a medication
- Analyze a feed tag to determine the relative proportions of individual feed ingredients that make up the feed

You will need:

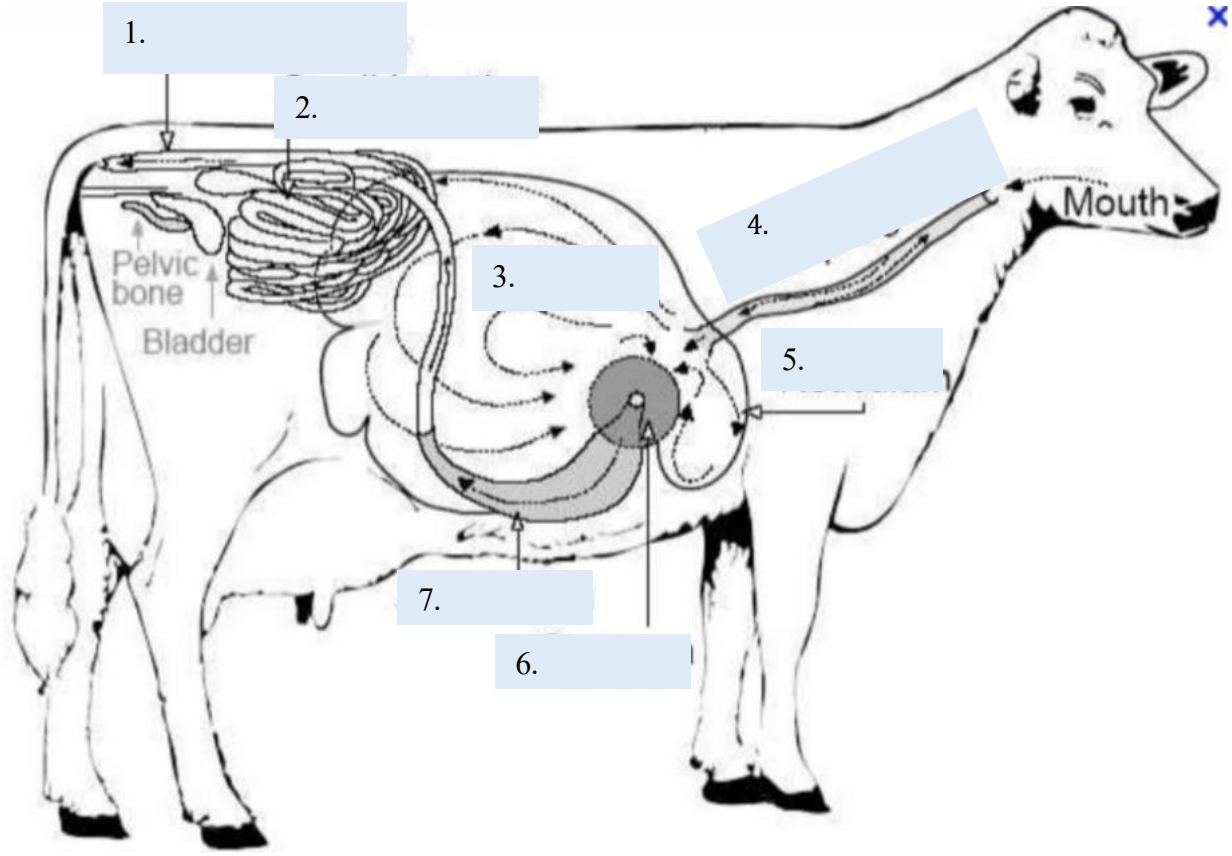
- Pencil
- Access to the internet

Activities in this unit:

1. Label the Digestion Tract
2. Nutrition Wordsearch
3. Understanding Colostrum
4. Nutrition Crossword
5. Nutrition Scramble
6. What's for Dinner?

Activity 5.1

Label the Digestive Tract
Use the link for help: [The ruminant digestive system (umn.edu)]

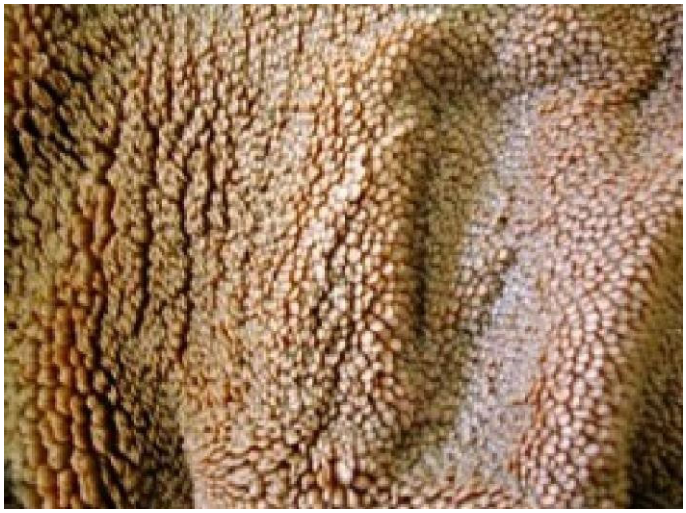


1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

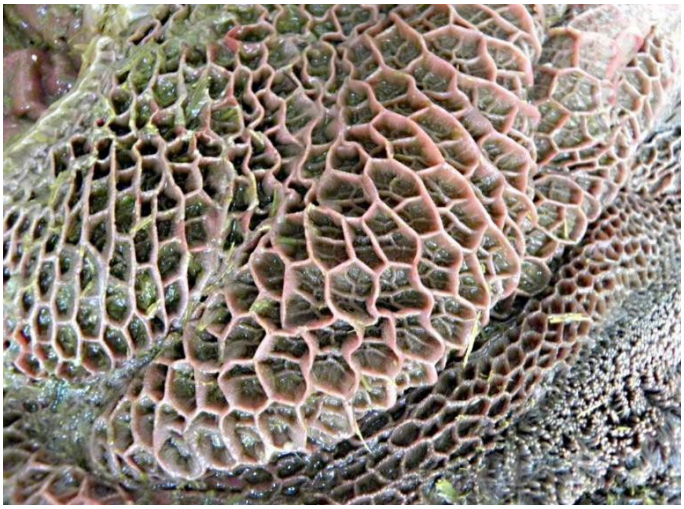
Label the parts of the ruminant stomach. Use the link to help:

extension.msstate.edu/publications/understanding-the-ruminant-animal-digestive-system

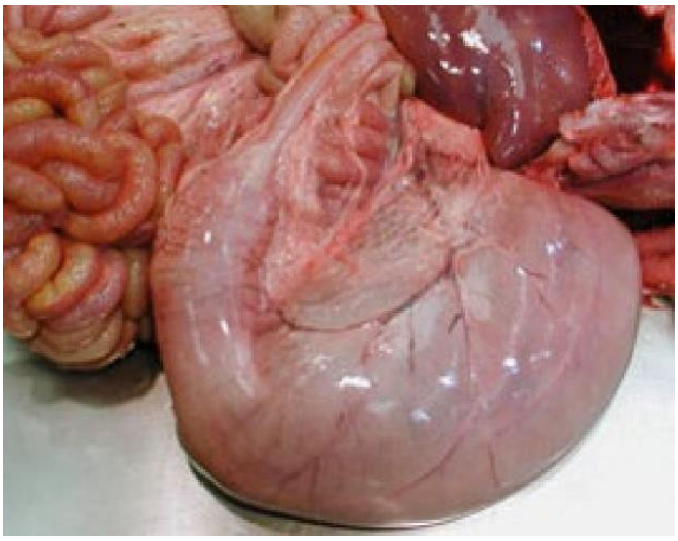
1.



2.



3.



4.



1. _____

2. _____

3. _____

4. _____

Activity 5.2

Nutrition Word Search

Look at the pictures on the next page and find the nutrition words in the word search. Use the link for help:
Link: https://utdairy.tennessee.edu/wp-content/uploads/sites/104/2020/11/DairySkillathonStudyguide2020.pdf

Y Q O N U W N A F H A X T E N I O C H C S O K T J L G P R T
M F Q J B H M I F K L K O I Q R C E Q M G N Q H M W U W Y O
S D C J B G G E O T I A Y Q L M N A X B F Q D M H Y E L O T
D A Q F F I S H M E A L Y W U P X N T Y Y O Q X X Z F L W S
K S G G D M I H P D S B W E L W T O U J G F C H X Q I D J W
F D R C H C B U A J M W W J W W M S C B B I R X H Y E G G R
O K V N J X E I E Z G Y W I Q A N P R L W I A B I B V U B R
F J R V P Y O D Q S I S E O L Z J A P E P K C E S B G W K B
G Y G U B Z V B K A P Q N H C C L T H A D N K B H Z I S K R
P V F U P W V V Q V L Q Z S T T A P F Q M X E G M D T M G V
V Q D Q S Z N G W V Z Q K O K V W J Z X L H D S T T H B S X
F D G I Y K Q L V J Y X Y Y O J I D I W H L C K X O C D L K
P I G T H P M Y W J A Y E B O O R M M Q Q O O J P V M D J M
Y H E A L K U Y M O S W C E C W H O L E K E R N E L C O R N
A P S H J T X Z H W V S U A G L D Y A P Q W N F G W M X C L
Y G P L K S L D U H V X Y N J W T R Z G O C T K J R X W L R
W R F A O M P B U O T A T M H N X V I X V M S V P X R K N Z
L W P E T V F R X L D D C E F R U E H E K L O P K S A H U H
L F A W K N F M Q E M T A A U P D S L Y D N P P X Q H H E R
V Y J H R P T S X G R V D L V W K H A D W W Y X H R A X Y M
O A S Z Z U V K M R H D X B W F I H G R R O H N G A E D G N
H E K A U X N E O A K F A W T S L W Z T X Y L E N C U C S X
L H K E E H E V P I W H O L E S O Y B E A N S G Y T H A H D
T A A I F R M Q T N D I Y C W G V T J J R O F E U S A X T N
S Y M T V T R K Y W I I P C Z B L W B P H I W P I U P F J R
A L G N S K R U A H E T R A C E M I N E R A L S A L T C J A
O A D H R O E W S E T R M X Z M U C O R N S I L A G E M A O
I G H Y H F H E G A N L I B G E P H V D Q D L M N I I H X I
A E A H P N K C B T R P K R U M Z J S A E E A L F A L F A Y
K W F I E J B S Z O K B W L H O K M N E R U G R I V X X V I























Activity 5.3

Understanding Colostrum

Colostrum instruments

Colostrometer

- Measures specific gravity
- Placed in a cylinder containing colostrum and floats freely
- Green= >50 mg/mL of immunoglobulins
- Yellow= 20 to 50 mg/mL of immunoglobulins
- Red= <20 mg/mL of immunoglobulins

Refractometer

- Few drops of colostrum placed on prism and sample covered lowered
- Hold up to light source
- Value is read at the line between the light and dark areas that appear on the scale

- Colostrometer



- Refractometer

A BRIX value of 22% is the best quality of colostrum

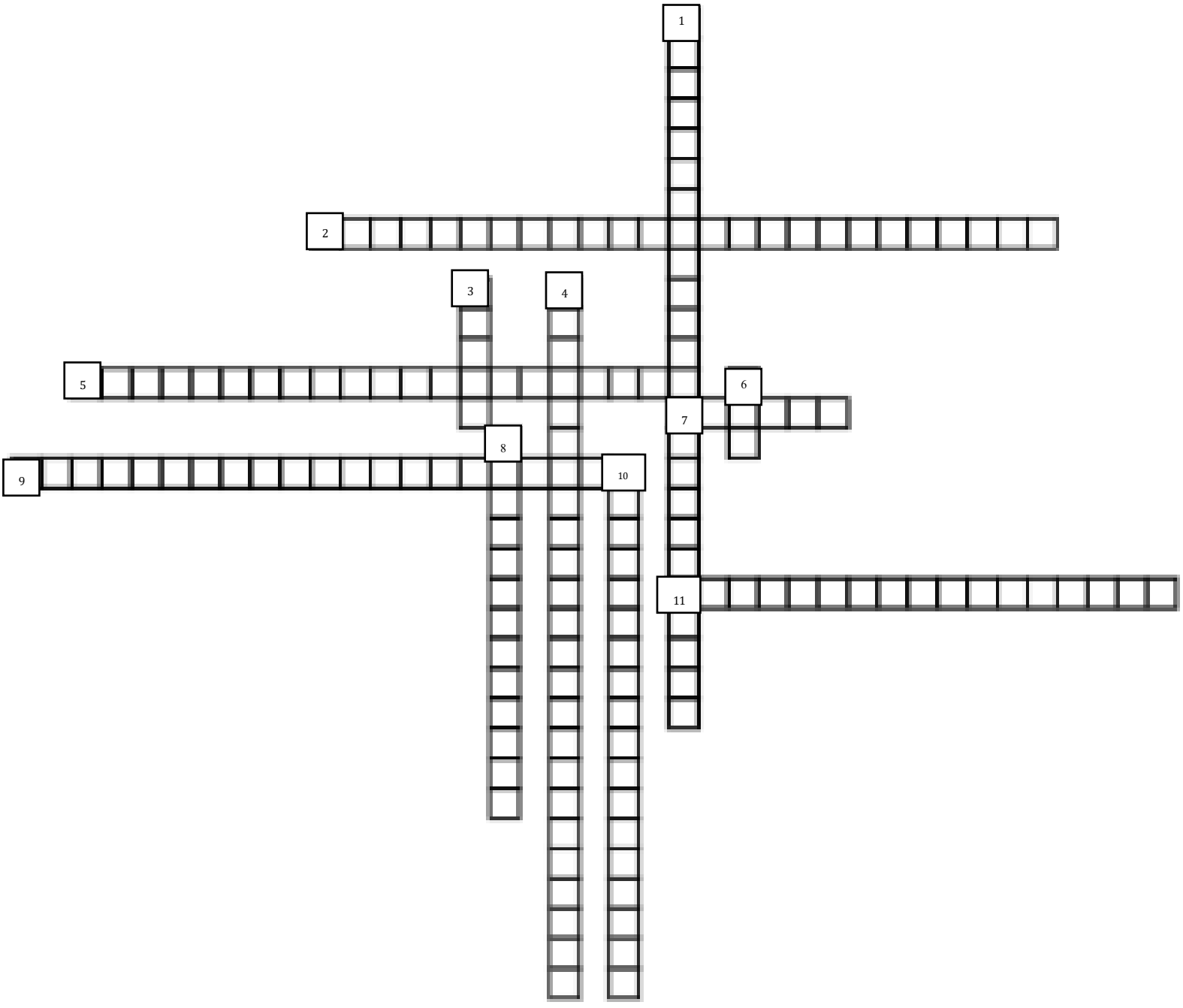


Watch the how to videos below:

- Colostrometer: https://www.youtube.com/watch?v=bL59AxJP_fA
- Refractometer: https://www.youtube.com/watch?v=uMZ5hsl6qws

Activity 5.4

Nutrition Crossword



Word Bank for Crossword

carbohydrates	fat	fiber	nonprotein nitrogen	nonstarch polysaccharides
relative feed value	relative forage quality	starch	total digestible nutrients	net energy for lactation
water-soluble carbohydrates				

Down:

1. Carbohydrate fractions excluding starch and free sugars

3. Type of carbohydrates that the body cannot digest

4. An estimate of energy content of a feed and is based on the digestible portion of the nutrients that can supply energy, carbohydrates, protein, ad fat

6. Comprises that most energy dense nutrient with 2.25 times as energy than carbohydrates or protein

8. nutrient based on carbon, hydrogen, and oxygen

10. Refers to components such as urea that are not proteins but can be converted to proteins by microbes in the ruminant stomach

Across:

2. The non-cell wall fraction consists of the highly digestible cell contents (starch and sugars)

5. An estimate of how much availability energy a non-lactating animal will obtain daily from a particular forage if it is all that is fed

7. A polymeric carbohydrate consisting of numerous glucose units joined by glycosidic bonds

9. The amount of energy in a feed which is available for milk production and body maintenance

11. Index used to compared the quality of forages relative to the feed value of full bloom alfalfa

Activity 5.5

Nutrition Scramble

Using the definitions below, unscramble to words and match them to the definition.

1. TLATO XMEID NRIOAT _____
2. POT ENIDGRSS _____
3. LOTBTE GEIDNEF _____
4. OTLNIRATAO IAZNGRG _____
5. NWENGAI _____

1. Definition: That contains all the feeds and nutrients the cow needs are an effective, efficient and profitable way to feed dairy cows
   Activity Link: https://agunited.org/files/4614/4650/2070/TMR.pdf

2. Definition: Adding needed nutrients that might be lacking in the overall TMR
   Example Link:
   https://www.admanimalnutrition.com/webcenter/portal/ADMAnimalNutrition/pages_feed/ showfeeds/showdairy/top-dresses

3. Definition: The action of feeding a calf with milk from a bottle
   How to: http://extension.msstate.edu/publications/publications/caring-for-newborn- beef-calves-separated-their-dams

4. Definition: The practice of containing and moving animals through pasture to improve soil, plant, and animal health
   How to: https://rodaleinstitute.org/why-organic/organic-farming-practices/rotational- grazing/

5. Definition: The removal of a suckling calf from the cow
   How to: https://extension.psu.edu/the-delicate-art-of-weaning-calves

Activity 5.6

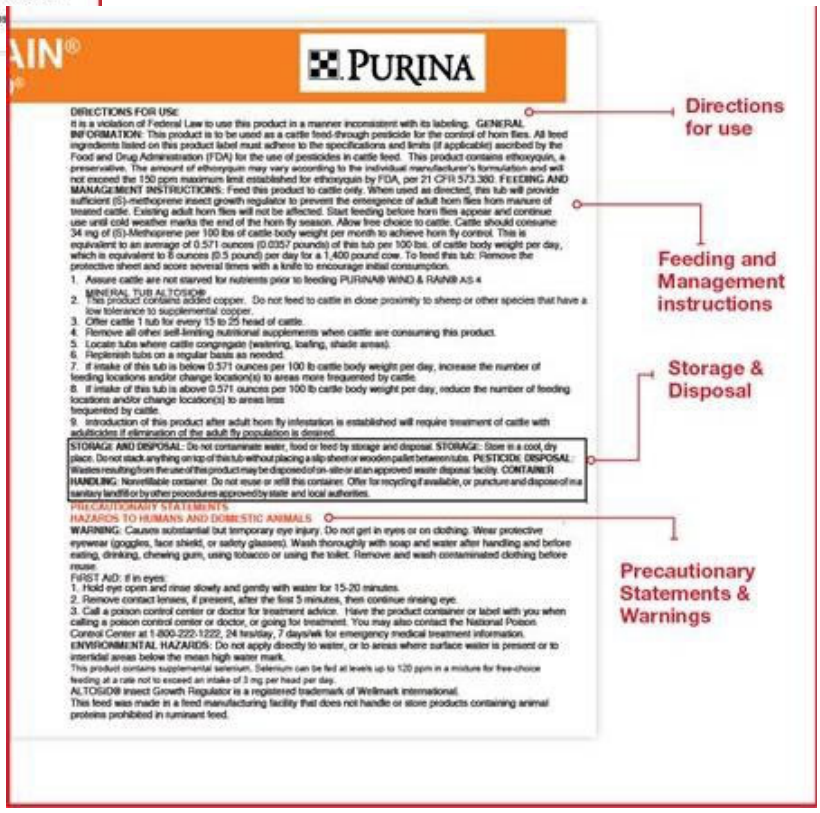
What's for Dinner?
Using the information below and the picture on the next page, complete the activity.
Activity: https://aec.ifas.ufl.edu/media/aecifasufledu/teacher-repository/Feed-Label- Activity-Sheet.docx

The following are key components of a cattle feed tag:

- **Product Name:** An obvious but important piece of information. If a product is medicated, the word "medicated" will follow the product name.
- **Brand Name:** The brand of the product is listed.
- **Purpose Statement:** Information about the species and animal class the feed is indicated for. It's critical to check that your feed has been specifically formulated for your class of cattle. For example, you would not want to feed a product designed for "mature cows at maintenance" to "young, growing heifers."
- **Medicated Use Statement:** If the cattle feed is approved for use with an active ingredient, the Environmental Protection Agency or Food and Drug Administration indication for use statement will be included. If a Veterinary Feed Directive-regulated ingredient is used, a VFD statement will also be listed.
- **Active Ingredient(s):** Lists any active ingredients in the cattle feed and their associated level.
- **Guaranteed Analysis:** Lists required nutrients, dependent upon the intended use of the feed and species/animal class. It also lists the nutrient level the government regulates. Any nutrient guaranteed on the tag is potentially subject to testing by regulatory agencies to determine whether the tag guarantees are accurate.
- **Feed Ingredients:** Lists ingredients in the product beyond what's listed in the guaranteed analysis section. Feed ingredients will tell you the source of an ingredient. For example, "calcium" is listed under the guaranteed analysis, but you can see that "calcium carbonate" is its source.
- **Manufacturer/Distributor Information:** The name appearing on the label is responsible for the cattle feed product and regulatory compliance. Typically, a mailing address will be included. Distributors use a statement "manufactured for" or "distributed by" to differentiate themselves from manufacturers.
- **Net Weight/Quantity:** Weight and quantity of cattle feed, as packaged.
- **Directions for Use:** Explains the safe and effective use of the cattle feed.
- **Feeding and Management Instructions:** A detailed listing of how the product should be fed and how many animals it will feed. Manufacturers formulate cattle feeds to be fed at a specific range of feeding rates. When a product is not fed according to directions, the full nutritional benefits of the feed may not be realized, and the feed may not perform as intended. The instructions should also outline other management factors to help ensure optimal product use.
- **Storage and Disposal:** Instructions for storage, disposal and container handling.
- **Precautionary Statements and Warnings:** Describes potential hazards for humans and domestic animals.

Anatomy of a feed tag





Extra Sources

Digestive Tract:

- More information:
  Link: https://utdairy.tennessee.edu/wp-content/uploads/sites/104/2020/11/DairySkillathonStudyguide2020.pdf
  Link: https://extension.umn.edu/dairy-nutrition/ruminant-digestive-system
  Link: https://extension.purdue.edu/news/county/crawford/2020/11/_docs/The-Digestive-Tract-of-the-Cow.pdf

- Games:
  Link: https://www.purposegames.com/game/digestive-system-cow-game
  Link: https://www.purposegames.com/game/dairy-cow-digestive-system

Feed Stuff:

- More Information:
  Link: https://utdairy.tennessee.edu/wp-content/uploads/sites/104/2020/11/DairySkillathonStudyguide2020.pdf
  Link: https://www.purinamills.com/horse-feed/education/detail/horses-don-t-eat-feed-tags

Colostrum:

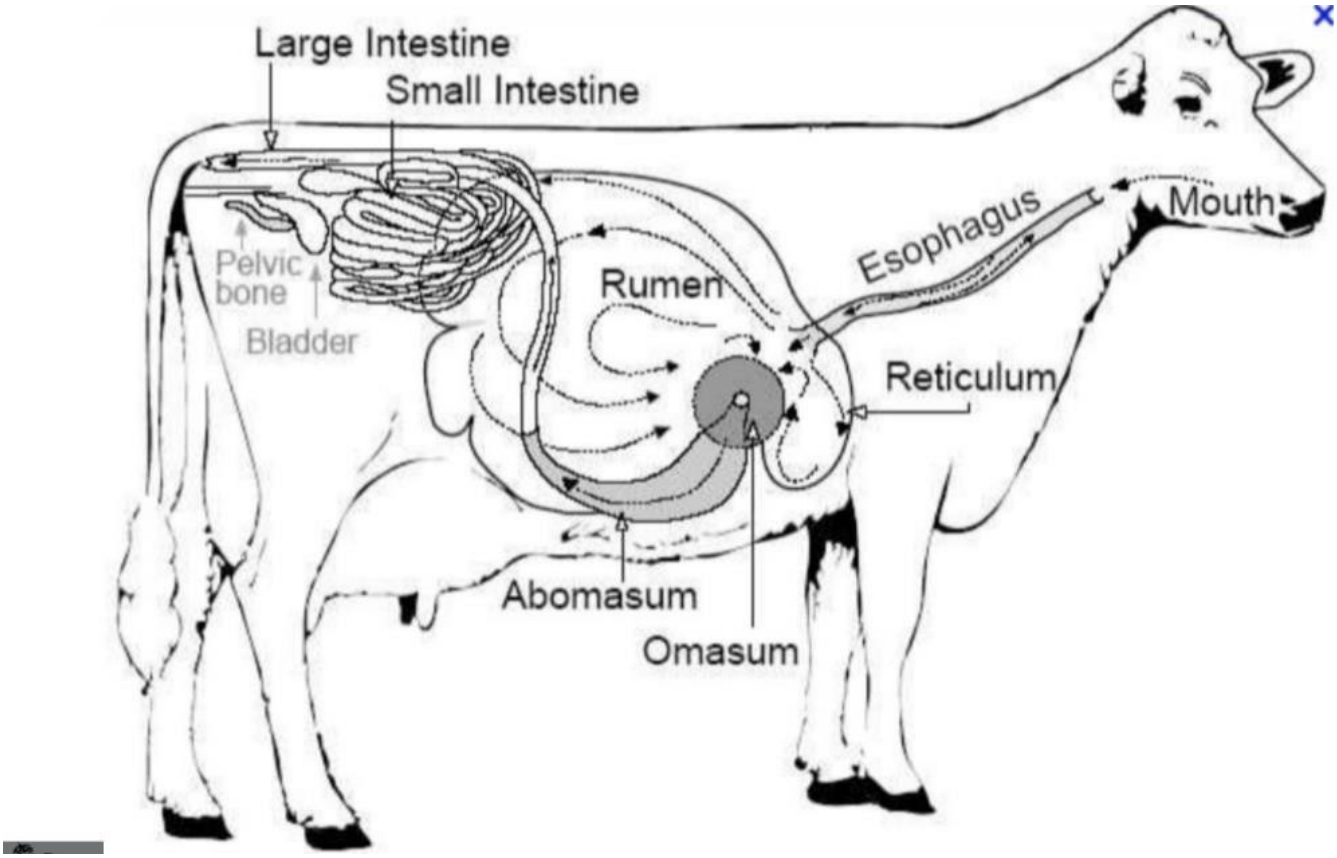
- More information:
  Link: https://www.extension.iastate.edu/dairyteam/files/page/files/FINAL_Newborn%20calves%20%26%20Colostrum%20management.pdf
  Link: https://extension.tennessee.edu/publications/Documents/W660-B.pdf

Weaning:

- More information:
  Link: https://extension.psu.edu/early-weaning-strategies

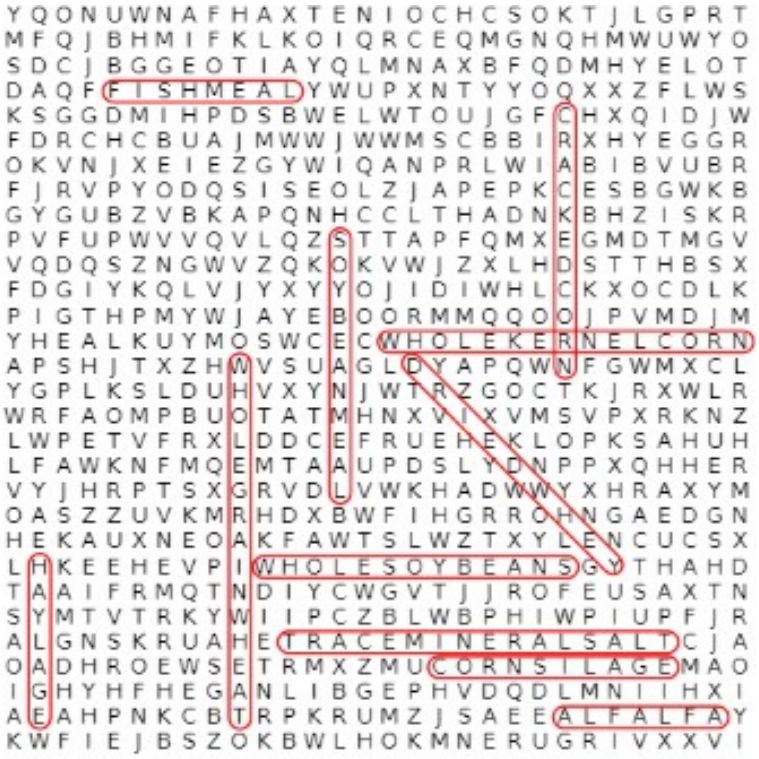
Answer Key
Unit 5: Nutrition and Feeding

Activity 5.1



1. Rumen
2. Reticulum
3. Omasum
4. Abomasum

Activity 5.2



trace mineral salt	whole grain wheat	
whole kernel corn	whole soybeans	soybean meal
cracked corn	corn silage	dried whey
fish meal	alfalfa	haylage.

Answers for pictures can be found here:

Link - https://utdairy.tennessee.edu/wp-content/uploads/sites/104/2020/11/DairySkillathonStudyguide2020.pdf

W 1176

3-5 YEARS IN PROJECT



Soybean meal



Cracked corn



Dried Whey



Whole kernel corn



Corn silage



Fish meal



Alfalfa



Whole soybeans



Trace mineral salt

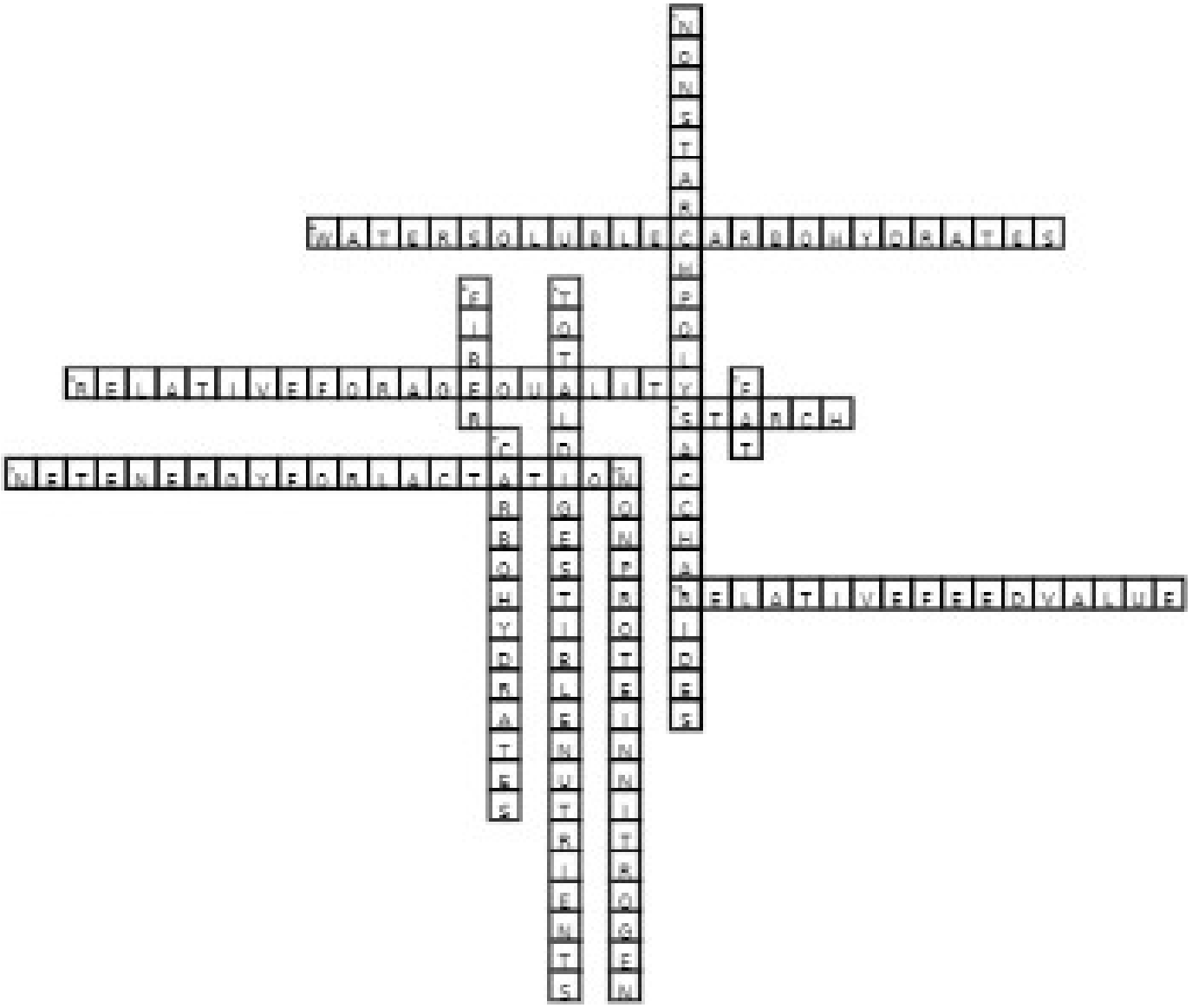


Whole grain wheat



Haylage

Activity 5.4



Activity 5.5

TLATO XMEID NRIOAT	TOTAL MIXED RATION
POT ENIDGRSS	TOP DRESSING
LOTBTE GEIDNEF	BOTTLE FEEDING
OTLNIRATAO IAZNGRG	ROTATIONAL GRAZING
NWENGAI	WEANING

Dairy
Unit 6: Genetics and Reproduction

Project Outcomes Addressed:
- Define the following terms: genomics, anestrus, dystocia, estrus, estrous cycle, gestation, anestrous, prepartum and postpartum.
- Label the reproductive tract of both a male and female dairy cow.
- Describe the concept of a freemartin and explain why it occurs.
- Outline the basic processes and benefits of estrus synchronization, artificial insemination, embryo transfer and in vitro fertilization.
- Identify three sampling techniques for genomic testing.
- Read and interpret a sire summary.

You will need:
- Pencil
- Access to the internet

Activities in this unit:
1. Genetic Scramble
2. Label the Reproduction Tract
3. Reproduction Rescue
4. Guessing Genomics

Genetics and Reproduction Overview

Reproduction is a fundamental feature of all living organisms. It is a biological process through which living organisms produce offspring similar to them. Improvement of dairy herd **genetics** can affect herd health, longevity, reproductive traits and many other vital aspects of dairy cattle production.

Activity 6.1

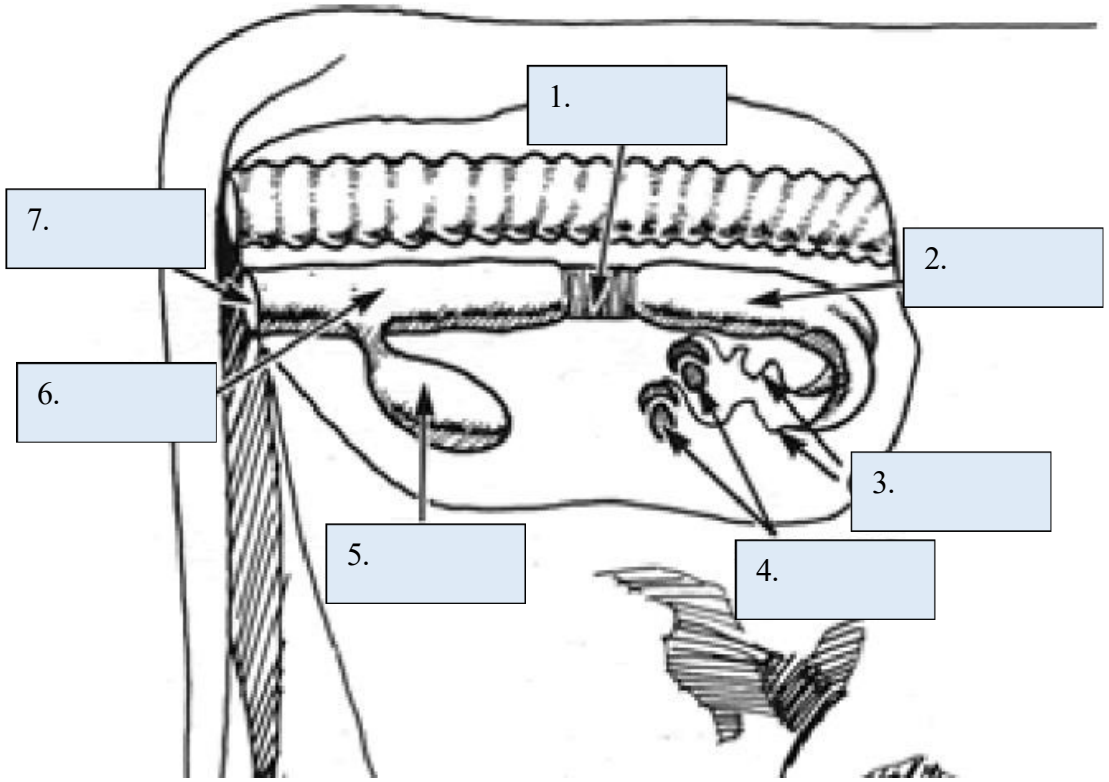
Genetic Scramble
Using the definitions below, unscramble to words and match them to the definition.

1. MPSPORUTAT _____
2. NRSESATU _____
3. ASDIOYCT _____
4. OTESTGAIN _____
5. OESTRSU LCECY _____
6. GIENCMSO _____
7. SRUETS _____
8. APUEMPRTR _____

1. Following calving or the time after the birth of young calves
2. Showing no heat activity because the process of follicle development does not lead to ovulation
3. Difficult birth
4. The process or period of developing inside the womb between conception and birth
5. The recurring reproductive cycle in many female mammals, including estrus, ovulation and changes in the uterine lining.
6. The branch of molecular biology concerned with the structure, function, evolution and mapping of genomes
7. A recurring period of sexual receptivity and fertility in many female mammals; heat.
8. Before giving birth; prenatal

Activity 6.2

Female



Label the Reproductive Tract

1. _____ 4. _____ 7. _____

2. _____ 5. _____

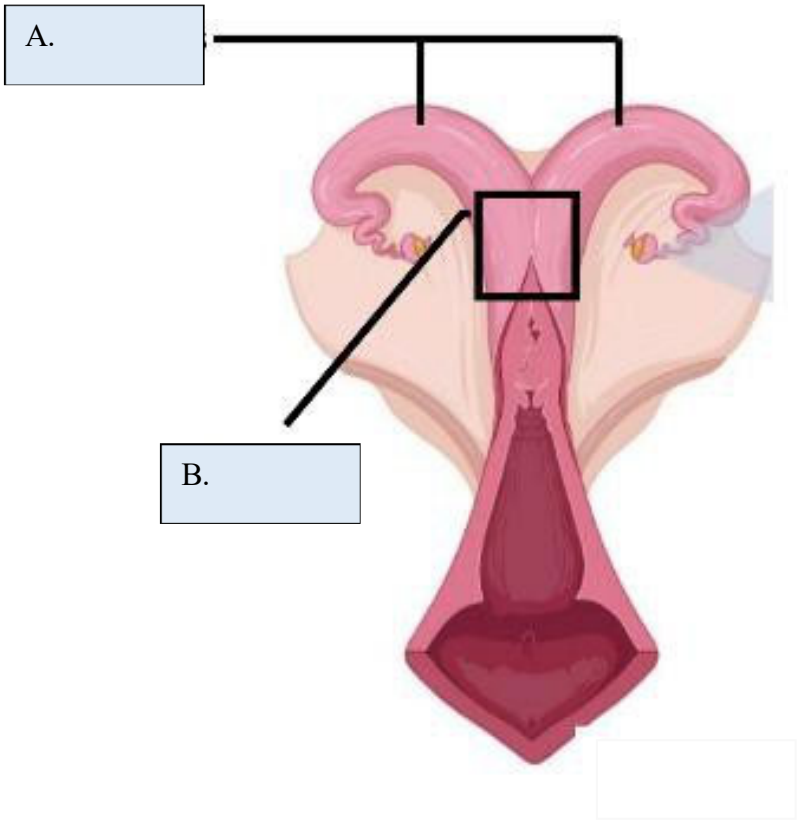
3. _____ 6. _____

Vulva: Eternal opening to vagina and breeding begins here

Vagina: Sperm is deposited here in natural breeding

Cervix: Guardian of the uterus; thick-walled structure with annular rings and is the resting area for sperm traveling to uterus.

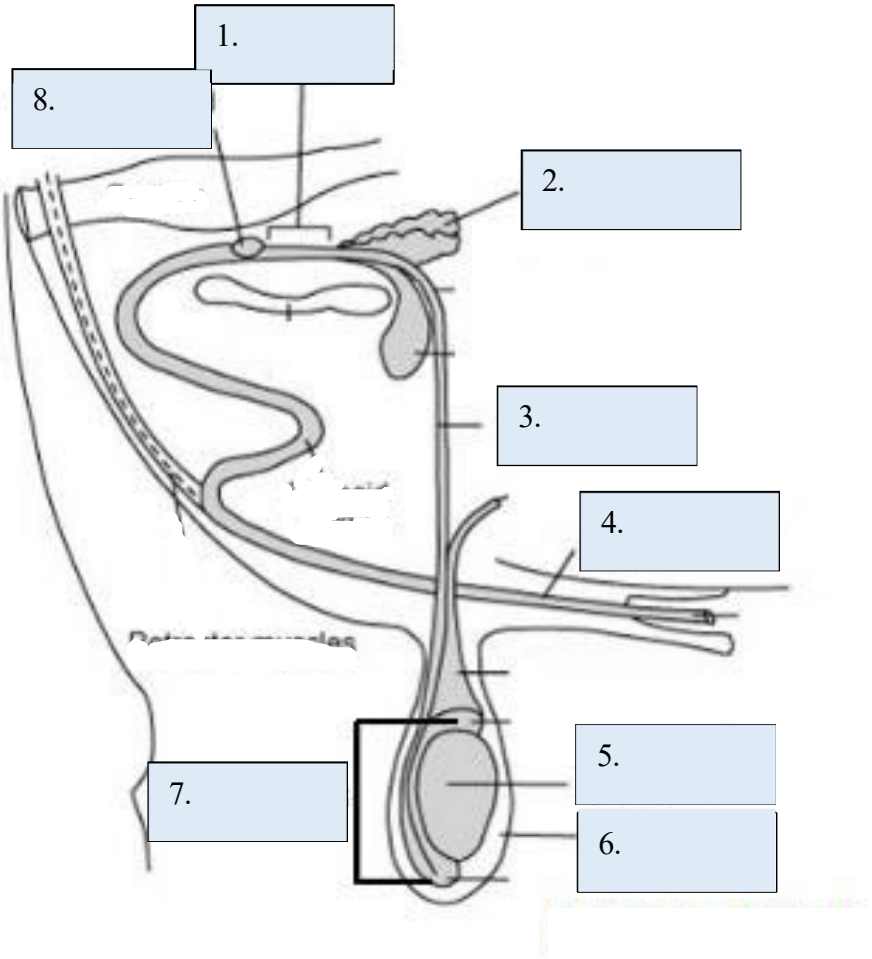
Female



A. B. _____

Uterus: Two parts
Uterine body: semen deposited in artificial breeding
Uterine horns: Calf will develop in one of the horns for 9 months
Oviduct: Site of fertilization between egg and sperm
Ovary: produces estrogen and progesterone and the eggs development location

Male



1. _____ 4. _____ 7. _____

2. _____ 5. _____

3. _____ 6. _____

8. _____

Testicles: Located outside the body in the scrotum and produces spermatozoa and testosterone
Epididymis: Attached to one side of the testicle and site of spermatozoa maturation
Vas deferens: Pathway for sperm to the penis
Accessory sex glands: Add fluid that support and nourish sperm
Penis: Deposits semen in vagina during natural breeding

Activity 6.3

Reproduction Rescue
Can you answer the following questions about reproduction?
Use the internet to help you find the answers.

What is a freemartin, and why is it a concern?

How does estrus synchronization work?

Explain the process of artificial insemination. Why might it be helpful?

What is embryo transfer, and how does it work?

What is in vitro fertilization?

Activity 6.4

Guessing Genomics

Name three types of samples from a cow that can be used in genomic testing.

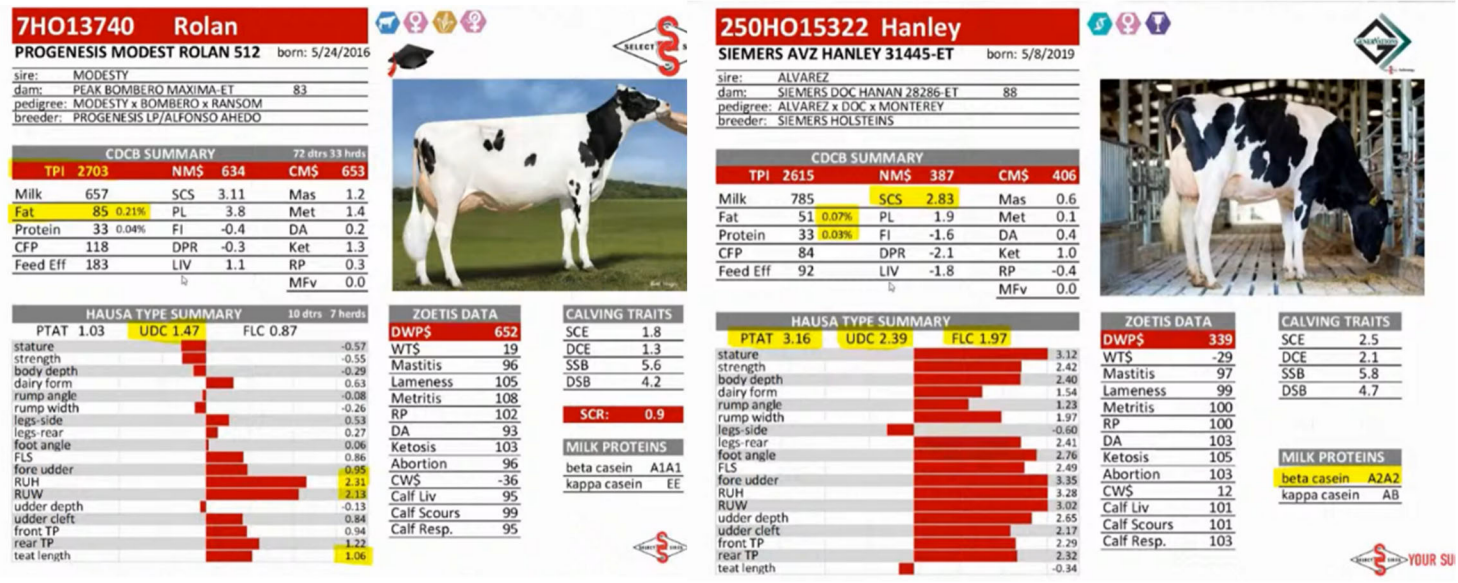
1. _____

2. _____

3._____

How to Label a Sire Summary:
For a full explanation of sire summaries, visit this resource:
https://shawano.extension.wisc.edu/files/2010/12/UnderstandingGenetics-the-Sire-Summaries- Workbook.pdf

Use the two sire summary examples below to determine which cow is better for which farmer.



1. Farmer A is looking to lower his somatic cell count.

Which of the two cows should he purchase? _____

2. Farmer B owns a value-added cheese business and is hoping to add one of the two cows into his herd.

Which cow should he choose? _____

3. Farmer C is looking to increase his milk production.

Which cow should he buy? _____

4. Farmer D wants to add a new cow to his show cows.

Which cow would place better in a show? _____

Extra Sources

Reproduction Tract:

- More information:
  Link: https://utdairy.tennessee.edu/wp-content/uploads/sites/104/2020/11/DairySkillathonStudyguide2020.pdf
  Link: https://www.youtube.com/watch?v=LaXu-FoU7Cw&list=PLNXP12SwUle1lA0HKpoj1kY5koq_IZE0s&index=5

- Games:
  Link: https://www.purposegames.com/game/cow-reproductive-tract Link: https://www.purposegames.com/game/bull-reproductive-tract
  Link: https://www.realityworks.com/wp-content/uploads/2020/04/Animal-Anatomy- Handouts.pdf

Sire Summary:

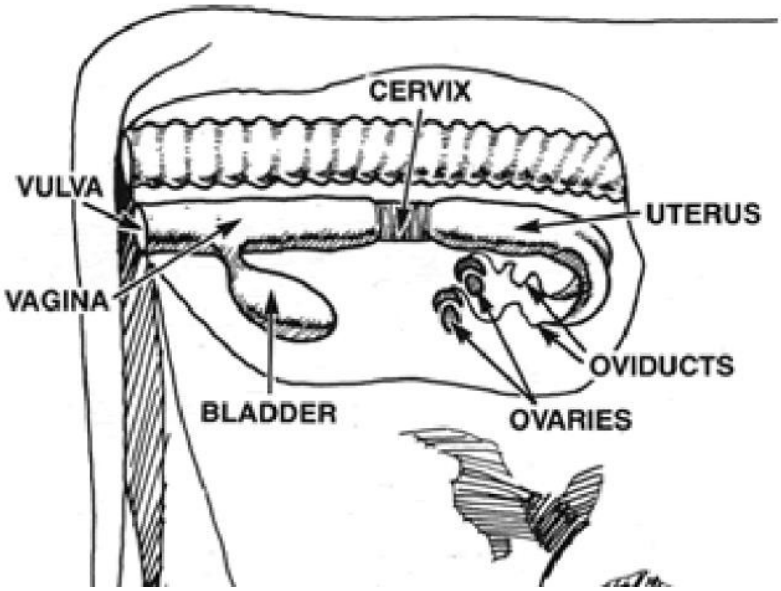
- More information:
  Link: https://extension.missouri.edu/publications/g2032

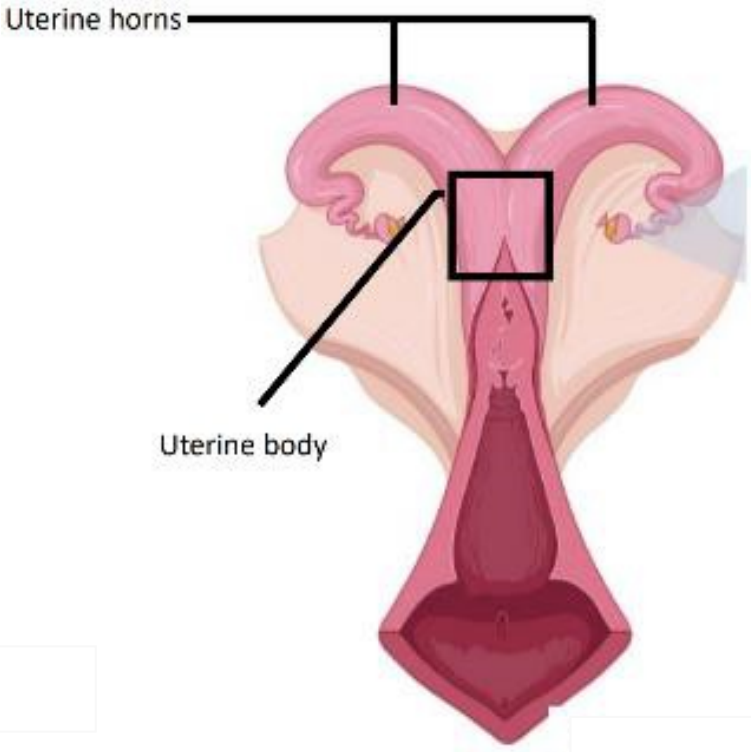
Answer Key
Unit 6: Genetics and Reproduction

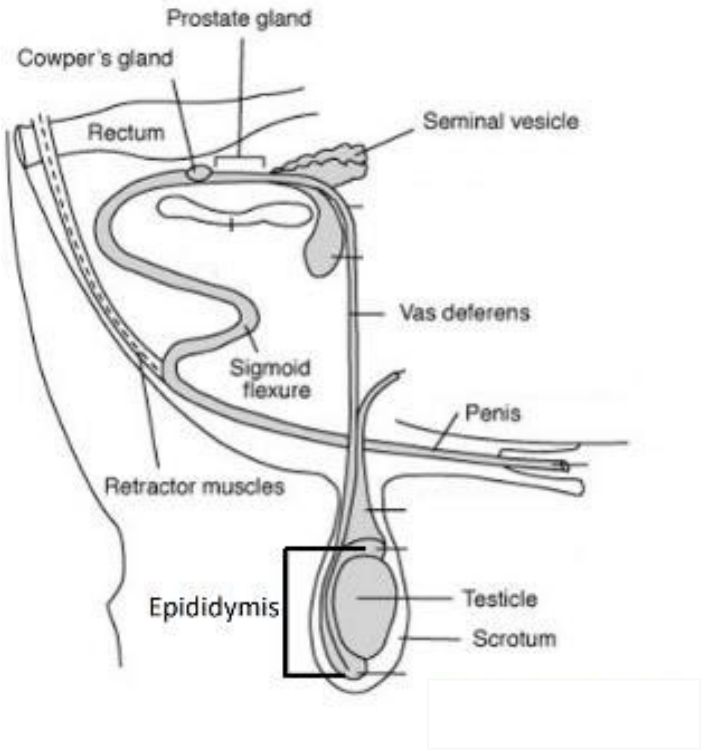
Activity 6.1

MPSPORUTAT	POSTPARTUM
NRSESATU	ANESTRUS
ASDIOYCT	DYSTOCIA
OTESTGAIN	GESTATION
OESTRSU LCECY	ESTROUS CYCLE
GIENCMSO	GENOMICS
SRUETS	ESTRUS
APUEMPRTR	PREPARTUM

Activity 6.2







Activity 6.3

What is a freemartin, and why is it a concern?

- A freemartin is a bull and heifer combination of calves carried at the same time. The male hormones in the uterus of the pregnant cow prevents the heifer's reproductive tract from forming.

How does estrus synchronization work?

- Administering a series of hormones to induce a group of cows or heifers to be fertile at a chosen time period, which makes it easier to determine when the cows are in heat.

Explain the process of artificial insemination and why might it be helpful?

- A vial containing a sample of healthy sperm is put into the AI rod and into the vagina, through the cervical opening and into the uterus. Then, the person pushes the sperm sample through the tube into the uterus. AI places the sperm closer to the oviduct and allows for an increase of genetic diversity into the herd due to the ability t ship sperm from anywhere.

What is embryo transfer and how does it work?

- The embryo transfer process begins with cows receiving a hormone treatment to produce more than one ovulation (egg) at a time. The cows are then artificially inseminated with bulls also possessing desirable genetics. Seven days later, a veterinarian recovers the embryos by using a catheter and recovery fluid. Any fertilized embryos captured in the process can be transferred into a surrogate cow, called a recipient, that will carry the pregnancy to term, or the embryos can be frozen to be used later.

What is in vitro fertilization?

- The process of harvesting oocytes (unfertilized eggs) from a cow and fertilizing them in a petri dish

Activity 6.4

1. Blood
2. Saliva
3. Hair

*any order

1. Hanley

2. Rolan

3. Hanley

4. Hanley

Dairy
Unit 7: Dairy Products and Processing

Project Outcomes Addressed:
- Define pasteurization and explain why it is important.
- Describe three types of pasteurization and the benefits of each.
- Describe the equipment used in processing the following dairy products: butter, milk, ice cream, and cheese.
- List 10 retail nondairy products produced from dairy cattle.

You will need:
- Pencil
- Access to the internet

Activities in this unit:
1. Pasteurization Party
2. What Equipment is Used Where?
3. There is a Cow in My Marshmallow!

Activity 7.1

Pasteurization Party

Answer the following questions. Use the link for help:
https://www.idfa.org/pasteurization

Watch the Video:
https://www.youtube.com/watch?v=nBjOi_bO0w

What is pasteurization, and why is it important?

Describe three types of pasteurization and the benefits of each.

Activity 7.2

What Equipment is Used Where?
Name three pieces of equipment used in making the following dairy products: butter, milk, ice cream, and cheese.



1. _____
2. _____
3. _____



1. _____
2. _____
3. _____



1. _____
2. _____
3. _____



1. _____
2. _____
3. _____

Activity 7.3

There is a Cow in My Marshmallow!

List ten retail nondairy products produced from dairy cattle:

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____



Extra Sources

Pasteurization:

- More information:
  Link: https://www.vdh.virginia.gov/environmental-health/food-safety-in- virginia/milk-safety/pasteurization/#:~:text=Pasteurization%20involves%20heating%20liquids%20at,%3D%20all%20bacteria%20are%20destroyed)
  Link: http://veterinarysciencehub.com/7-various-methods-of-pasteurization/

Equipment Used in Dairy Products Production:

- More information:
  Link: https://www.ancoequipment.com/post/different-types-of-dairy-processing- machinery-used-in-dairy-farms
  Link: https://www.youtube.com/watch?v=1N5UgUZDnpI&list=PLNXP12SwUle3sWedJnl4N7QntcWI-kaA8&index=26

Nondairy By-Products from Dairy Cattle:

- More information:
  Link: http://www.buzzardsbeat.com/2017/12/what-by-products-do-we-get-from- cattle.html/

- Games:
  Link: https://www.nmfarmandranchmuseum.org/wp- content/uploads/2020/12/Beef-and-Dairy-Byproducts-3-5-reduced.pdf

Answer Key
Unit 7: Dairy Products and Processing

Activity 7.1
What is pasteurization and why is it important?

- Pasteurization is a process by which milk is heated to a specific temperature for a set period of time to kills harmful bacteria that can lead to diseases like as listeriosis, typhoid fever, tuberculosis, diphtheria and brucellosis

Describe three types of pasteurization and the benefits of each.

- Batch Pasteurization / low temperature long term pasteurization
    - Every particle of milk is subjected to a temperature of 63°C or 145°F for 30 min followed by prompt cooling to 5°C or below.
    - Benefits:
        - It is useful for handling small quantity of milk.
        - It does not involve sophisticated equipment.
        - Milk is not wasted during this process.
- High Temperature Short Time
    - Heating of milk – 72°C or 161.6°F for 15 sec. – cooling to 5°C or 41°F or below.
    - Benefits
        - This is useful for handling large quantity of milk.
- Ultra-High Temperature treatment
    - Every particle of milk is subjected to a temperature time combination of 135°C – 150°C or 275°F - 302°F without holding for 2 seconds.
- Ultra-Pasteurized
    - In this process milk is heated with a direct steam up to 150°C or 275°F for a fraction of a second.

Activity 7.2

- Butter: Butter churn, pasteurizer, and separator
- Milk: Holding tank, pasteurizer, separator, clean in place system, and homogenizer
- Ice cream: Pasteurizer, continuous freezer, separator, refrigerated mix tank, aging tank, and blast freezer
- Cheese: pasteurizer (fresh cheese), cheese vat, cheese mold, drain table, cheese press, storage racks (aging cheese)

Activity 7.3

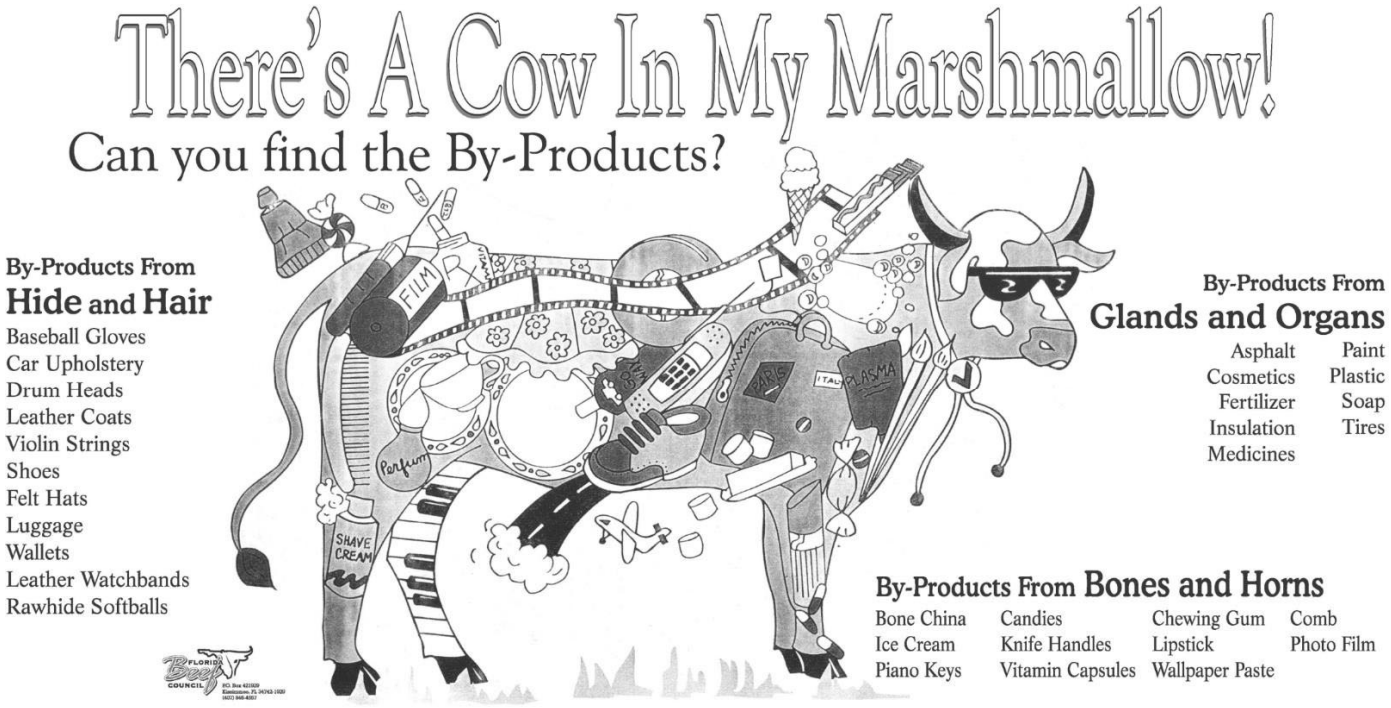


Image courtesy Florida Beef Council

Dairy
Unit 8: Performance Measurements

Project Outcomes Addressed:
- Distinguish between voluntary and involuntary culls.
- Calculate the following: pregnancy rate, conception rate, heat detection rate, days to first service, calving interval, death-loss percentage, somatic cell score and stocking density.
- Define and apply the following scoring systems: body condition, hygiene score, lameness score and teat end score.

You will need:
- Pencil
- Calculator
- Access to the internet

Activities in this unit:
1. Too Cull, or Not To Cull?
2. Cattle Calculations
3. Score!

Activity 8.1

Too Cull, or Not To Cull?
Place the scenarios in the appropriate box.

Word Bank

Illness	Surplus of Cows	Lameness
Low Milk Production	Injury	Unforeseen Death

Involuntary Culling	Voluntary Culling

Activity 8.2

- 100 cows currently in the herd
- 110 cow spaces on property
- 10 cows are eligible to be bred
- 4 cows are detected in Heat (AI)
- 2 cows become pregnant
- Cow A calved on April 4th, 2017
- Cow A was inseminated on June 6th, 2017
- Cow A calved March 15th, 2018
- 2 cows died
- Somatic cell count is 200,000

Heat Detection rate = $\frac{\text{Number of Cows Detected to be Bred}}{\text{Number of Cows Eligible to be Bred}}$ X 100

Conception Rate = $\frac{\text{Pregnant Cows}}{\text{Number of Cows Inseminated}}$ X 1000

Pregnancy Rate = Heat Detection Rate X Conception Rate ÷ 100

Days of First Service = Day of calving – Day of First Insemination

Calving Interval = Days During Pregnancy A - Day of Conception for Pregnancy B

$$\textbf{Deaths Loss Percentage} = \frac{\text{Number of Deaths}}{\text{Number of Cattle in the Herd Number of Cows Currently on Property}} 100$$

$$\textbf{Stocking Density} = \frac{}{\text{Total Number of Cow Spaces on Property}} 100$$

$$\textbf{Somatic Cell Score} = \log_2 \left(\frac{\text{Somatic Cell Count}}{100{,}000} \right) + 3$$

Questions:

What is the heat detection rate? _____

What is the conception rate? _____

What is the pregnancy rate? _____

What is the days of first service? _____

What is the calving interval for pregnancy A? _____

What is the death loss percentage? _____

What is the stocking density? _____

What is the somatic cell score? _____

Activity 8.3

Score!
Looking at the body condition score, hygiene score, lameness score, and teat end score, determine the correct scoring for each picture.

The **Body Condition Score** is a 5-point scale with increments of .25. Ideal locations to look for excess fat or noticeable skinniness is the backbone, hips, shoulder bone, ribs, and tail-head. The ideal score is a 3 for mid lactation cows and a 3.25 to 3.75 for late lactation cows. Video link: https://www.youtube.com/watch?v=wASXNn_CTCU

Determine the score for the following pictures:



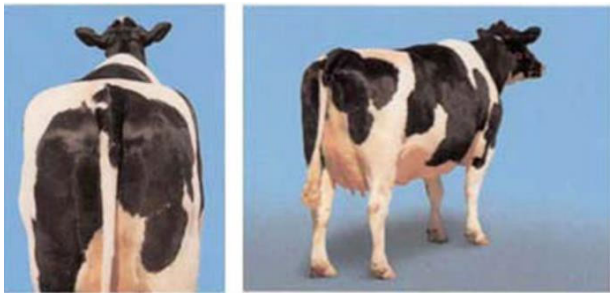
A. _____



B. _____



C. _____



D. _____



E. _____

The **Hygiene Score** is a 4-point scale with increments of 1. Ideal locations to look for dirt or manure are the lower legs, udder and flank and upper legs. The ideal score would be a 1 or 2.

Video link:
https://media.ed.ac.uk/media/10A+Hygiene+in+the+shedF+Let+the+cows+tell+you%21+Scoring+system/1_dqrb4jrx

Determine the score for the following pictures:



F._____



G. _____



H. _____



I. _____

The **Lameness Score** is a 3-point scale with increments of 1. Ideal locations to look for lameness are while the animal is walking, their ability to get up and if they look sickly (losing weight). The ground should be flat with no obstacles. The ideal score would be a one.

Video link: https://www.youtube.com/watch?v=WVqFeLZcZ48

Determine the score for the following clinical descriptions:

Severely lame; trying to avoid bearing weight on limb

J. _____

Favors a limb when walking

K. _____

Sound with a healthy gait

L. _____

The **Teat End Score** is a 4-point scale with increments of 1. Ideal locations to look are the teat ends before milking. The ideal score would be a 1.

Video link: https://www.youtube.com/watch?v=9Je9fzEW1lE

Determine the score for the following clinical descriptions:



M. _____



N. _____



O. _____



P. _____

Extra Sources:

Calculations:

- More information:
  Link: https://extension.tennessee.edu/publications/Documents/W872.pdf

Scoring:

- More information:
  Link: https://www.youtube.com/watch?v=WVqFeLZcZ48
  Link:https://utdairy.tennessee.edu/wp-content/uploads/sites/104/2020/11/DairySkillathonStudyguide2020.pdf
  Link: https://www.vetmed.wisc.edu/fapm/wp-content/uploads/2020/01/hygiene.pdf
  Link: https://dairylandvet.net/storage/app/media/Archivefile/DVS/newslettermarch-2017-teat-end-scoring.pdf
  Link: https://www.youtube.com/watch?v=FZJat_LIB6c

Answer Key
Unit 8: Performance Measurements

Activity 8.1

Involuntary Culling	Voluntary Culling
• Illness • Lameness • Injury • Unforeseen death	• Surplus of Cows • Low Milk Production

Activity 8.2

What is the heat detection rate? 40%

What is the conception rate? 50%

What is the pregnancy rate? 20%

What is the days of first service? 63

What is the calving interval for pregnancy A? 345 days

What is the death loss percentage? 2%

What is the stocking density? 90.9%

What is the somatic cell score? 3.3

Activity 8.3

A. 1
B. 2
C. 4
D. 5
E. 3

F. 2
G. 3
H. 1
I. 4

J. 3
K. 2
L. 1

M. 3
N. 2
O. 1
P. 4

Dairy
Unit 9: Economics and Marketing

Project Outcomes Addressed:

- Describe the Federal Milk Marketing Orders and its effect on milk prices.
- Describe the four classes of milk utilization and how it effects milk prices in your area.
- Identify three non-milk sources of dairy farmer income.
- Create a list of the incoming revenue and outgoing expenses on an average dairy farm.

You will need:

- Pencil
- Access to the internet

Activities in this unit:

1. FMMO: Federal Milk Marketing Order
2. Money In; Money Out

Activity 9.1

FMMO: Federal Milk Marketing Orders What are the Federal Milk Marketing Orders?

How do the Federal Milk Marketing Order effect milk prices?

Can you determine the four classes of milk and what dairy product fits into each category?

Class I	Class II	Class III	Class IV

Word Bank

Butter	Whey	Ice Cream	Cottage Cheese	Milk Powder
Cream Cheese	Fluid Milk	Yogurt	Hard Cheese	

Activity 9.2

Money In Money Out

Identify three non-milk sources of dairy farmer income:

1. _____

2. _____

3. _____

Can you create a lists of incoming revenue and outgoing expenses on an average dairy farm?

Think of five incoming revenues and 5 outgoing expenses:

Revenue:	Expenses:
1. _____	1. _____
2. _____	2. _____
3. _____	3. _____
4. _____	4. _____
5. _____	5. _____

Extra Sources

FMMO:

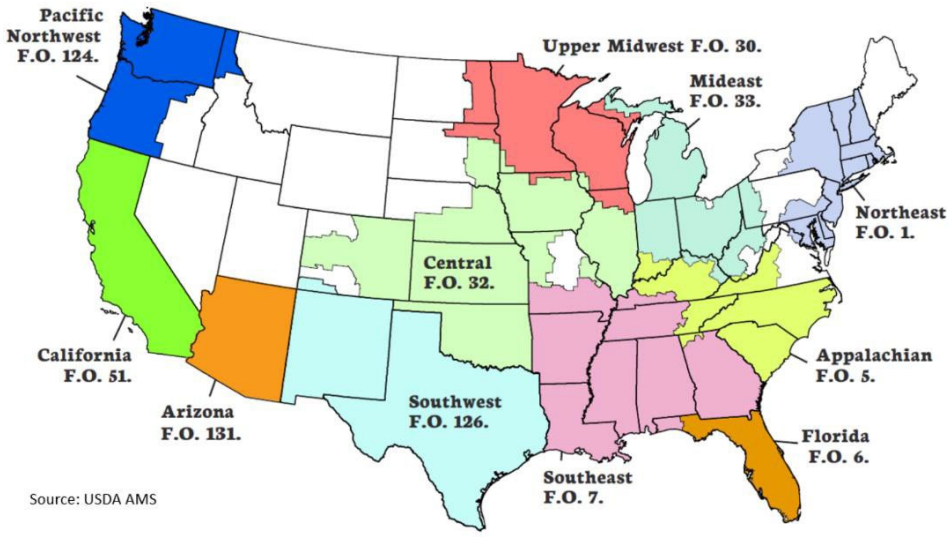
- More information:
  Link: https://www.fb.org/files/2019FMMO/How_Milk_is_Priced.pdf
  Link: https://www.fb.org/issue/farm-policy/federal-milk-marketing-order-reform#:~:text=Milk%20prices%20regulated%20by%20Federal,milk%20into%20finished%20dairy%20commodities.

Answer Key
Unit 9: Economics and Marketing

Activity 9.1
What is the Federal Milk Marketing Order?

Federal Milk Marketing Orders establish certain provisions under which dairy processors purchase fresh milk from dairy farmers supplying a marketing area. A marketing area is generally defined as a geographic area where handlers compete for packaged fluid milk sales, although other factors may be taken into account when determining the boundaries of a marketing area. Federal orders serve to maintain stable marketing relationships for all handlers and producers supplying marketing areas, thus facilitating the complex process of marketing fresh milk.

Figure 1. Federal Milk Marketing Orders



How does the Federal Milk Marketing Order effect milk prices?

Milk pricing regulations in Federal Milk Marketing Orders are among the most complicated commodity pricing regimes across all of agriculture. Milk pricing regulations in place today stem from pricing reform in 2000 that introduced end-product pricing formulas, by which regulated milk handlers are required to pay producers based on their utilization of the milk. Producers in a marketing area (Figure 1) share in the proceeds of all milk sales "pooled" on an order, and the regulated minimum milk price reflects the end-product pricing formulas and the farm's share of the revenue sharing pool. For nearly 20 years there were only 10 milk marketing orders, but in September 2018

California was introduced into the FMMO system as a result of the 2014 Farm Bill. Today, there are 11 FMMOs in the United States. These prices are used to determine two-week and monthly weighted average commodity values. The two-week prices are used to determine advanced pricing factors for pricing fluid milk products. The monthly weighted average prices are used to determine both the component value and the classified value of milk. Both the two-week and monthly prices utilize end-product pricing formulas (described below) to determine the classified value.

Class I	Class II	Class III	Class IV
• Fluid Milk	• Ice Cream • Cottage Cheese • Yogurt	• Hard Cheese • Whey • Cream Cheese	• Butter • Milk Powder

Activity 9.2

1. Crops / farming
2. Selling dairy or beef cattle for meat
3. Cull cattle sales
4. Other full or part-time jobs

1. Fluid milk sales
2. Cull sales
3. Value-Added business (Selling cheese, ice cream, anything dairy that is not fluid milk)
4. Crop sales
5. Government payouts

1. Feed
2. Vet bills
3. Labor costs
4. Utilizes
5. Taxes

*There could be more then what is listed above

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