

Adopt-A-Cow: Dairy

LESSON 4: WHAT'S FOR LUNCH?

KEY TERMS

Nutrients, Total Mixed Rations,
Ruminant

EDUCATION STANDARDS

English Language Arts

- SL.1, SL.2, SL.3

Educational Technology

- ET.EL.2

Science

- K-LS1-1

TIME NEEDED

Lesson and Videos: 20 minute

Activity: 30 minutes

MATERIAL LIST

Materials for the whole class:

- Computer/Projector/TV/
Promethean board
- PowerPoint
- Measuring cups
- Food scale
- Food stuff (see activity
preparation)

Materials for the individual students

- Snack bags



EXPECTED LEARNER OUTCOMES

OBJECTIVE 1 – Youth will visit the dairy farm through an instructional video and see how their cow's food is prepared.

OBJECTIVE 2 – Youth will learn about the nutritional needs of their cow and calf.

OBJECTIVE 3 – Youth will apply what they observed about feed mixing to create their own total mixed ration.

BACKGROUND

A nutrient is something our bodies need to grow and function properly. We get nutrients from the foods we eat each day. Each nutrient does a special job in our bodies to keep us healthy. Likewise, cattle need nutrients to grow and keep healthy. Cattle eat TMR.

TMR stands for "Total Mixed Ration," which is a way that dairy farmers ensure cows receive a balanced diet. Dairy farmers weigh the right combination of ingredients and then mix it together. This provides the correct amount of nutrients for their cows.

VOCABULARY

Nutrients – A nutrient is something our bodies need to grow and function properly. We get nutrients from the foods we eat each day. Each nutrient does a special job in our bodies to keep us healthy.

Protein – A nutrient that the body uses to build and repair muscles as well as for energy.



**SOUTH DAKOTA STATE
UNIVERSITY EXTENSION**



Fat – A nutrient that provides calories (energy) for the body, carries vitamins to our cells, pads organs, and is used to make hormones.

Carbohydrates – A nutrient the body uses as its main source of energy. They come in three forms: starch, sugar, and fiber.

Vitamins – A nutrient that helps our body use other nutrients like protein, carbohydrates, and fats.

Minerals – A nutrient that is needed for normal growth, development, and body functions such as bone strength and water balance.

Fiber – A form of carbohydrate that aids in digestion.

Total Mixed Ration (TMR) – A diet providing all the nutritional requirements a cow needs to be healthy and produce milk or meat.

Forage – A variety of grasses and grain that provide high levels of energy, protein, carotene, and calcium to help cows grow and produce milk.

Ruminant – Term for an animal with a four-compartment stomach allowing them to eat forages humans cannot eat.

ACTIVITY PREPARATION

Lesson is designed using a PowerPoint format. This is done to provide structure and speaking points. It also provides visual aids to help youth understand what is being discussed. In a less formal setting, a PowerPoint may not be appropriate, and educators may select not to use the formal presentation. Individual slides can be printed to provide visual aids.

Review the ingredients required for the Total Mixed Ration in Table 1 below. Consider dietary restrictions and consider alternatives as needed.

Table 1. What Do Cows Eat?

Item	What it represents	Example in Cow Diet	Example in Human Diet	Role it plays in the diet
Pretzels	Carbohydrate (Starch/Sugar)	Corn Silage and ground corn	Bread, pasta	Starches and sugars are used as the main source of energy.
Corn Chex	Carbohydrate (Fiber)	Corn Silage, DDG, Hay	Grains, Fruits, Vegetables	Aids in digestion and rumen function in cattle. Is an important part of gut health for humans as well.
Sunflower Seeds	Protein	Alfalfa, soybean meal and dried distillers' grain	Beef, pork, chicken, tofu	Provides slow release, long-term energy, which is used for muscle growth and support
Chocolate Chips	Fat	Dried Distillers and Soybean meal	Avocados, Nuts, Peanut butter	Provides supplemented nutrients to the cow to meet requirements to keep them healthy. Your body needs fat for energy to absorb vitamins to protect heart and brain health. There is good fat (HDL) and bad fat (LDL)
Popcorn Seasoning	Vitamins/Minerals	Many ingredients including additional vitamins and minerals are added to feed.	Supplements and many foods provide an abundance of certain required vitamins/minerals. Milk provides 13 essential nutrients	Provides supplemented nutrients to the cow to meet requirements to keep them healthy



ACTIVITY INSTRUCTIONS

I. Review Lesson 3 (Slide 2)

In the last lesson we discussed that cows need the same necessities that we have.

- a. Food
- b. Water
- c. Shelter
- d. Dairy cattle also require milking parlors.

We then designed our own environment for our cow.

II. What does a cow eat? (Slide 3) (7.5 minutes)

Let's check in with Riley on the farm to learn more about what cattle eat. (youtube.com/watch?v=gMpfl9JcAdI)

III. Balanced Diets (Slide 4)

Just as humans do, cows require a balanced diet to meet their needs during various stages of growth. Because of this, farmers feed their cows a Total Mixed Ration, or a TMR.

Today, we are going to look at the parts of a cow's diet using human foods to demonstrate the major parts of the diet.

What are some foods that we eat to stay healthy?

- a. Fruits and Vegetables
- b. Meats
- c. Milk (Dairy)
- d. Breads (Grains)

These foods all contain nutrients that are needed to keep us healthy: Protein, fat, carbohydrates, vitamins, minerals, and water.

Cattle require similar nutrients to be healthy.

IV. Cow vs. Humans - Same (Slide 5)

Do you think cattle diets look the same as humans?

Cows eat many of the same things that we eat as humans. We both eat a variety of fruits and vegetables.

V. Cow vs. Humans - Different (Slide 6)

What is the difference?

- a. Cows eat grass and other forages that humans can't eat.
- b. Cows are ruminant animals, meaning they have a four-compartment stomach. One of those compartments, the rumen, has microbes such as fungi, bacteria and protozoa that can break down plant fibers a human (simple) stomach cannot. This means cattle can eat many different feeds that humans or nonruminant animals, such as pigs, cannot digest.)
- c. Humans also can eat meat, which cattle cannot.

VI. Cow Stomach (Slide 7) (5 minutes)

Let's check in with a specialist to learn more about how cow stomachs work. (youtube.com/watch?v=hnQWgBcdzXY)

VII. Making a Total Mixed Ration (Slide 9-15): Provide youth with their snack bags.

Have you ever eaten trail mix?

What types of foods are usually included in trail mix?

Why do people eat trail mix?

Trail mix is an inexpensive snack that combines different types of food to provide high amounts of energy.

Did you know that dairy farmers feed a type of trail mix to cows for the same reason?



Read aloud or paraphrase the following: "TMR stands for 'Total Mixed Ration,' which is a way that farmers ensure that dairy cows get the right mix of food for their diet. Dairy farmers weigh out the right ingredients, then mix them together. Like your family might use a mixing bowl, farmers use a giant mixer called a feed mixer to ensure each bite the cow takes has the nutrients, or energy, protein, minerals, and vitamins, needed by the cow."

Let's look at those nutrients. (as you talk about each of the nutrients, provide youth with the appropriate ingredient to add to their snack bag.)

VIII. Carbohydrate (Starch/Sugar) (½ Cup Corn Chex) (Slide 10)

Carbohydrates are simple sugars that are readily digested to produce energy.

Comes in three forms: Starch, Sugar, and Fiber:

- a. Starch and sugar provide calories (energy) for the body.
- b. Fiber helps your body eliminate waste products.

Cow diets include corn silage and ground corn to meet these needs.

Human diets include bread and pasta, some fruits and vegetables, milk, and yogurt.

IX. Carbohydrate (Fiber) (1 Cup Pretzel) (Slide 11)

Carbohydrates in the form of fiber help your body eliminate waste products.

Fiber aids in digestion and rumen function in cattle. Is an important part of gut health for humans as well.

Cow diets include corn silage, DDG, and hay to meet fiber needs.

Human diets include grains, fruits, vegetables.

X. Protein (¼ Cup Sunflower Seeds) (Slide 12)

Proteins provide structural material to be used in muscle growth, repair, and maintenance. Sometimes used for energy.

Cow diets include alfalfa, soybean meal, and dried distillers' grains.

Human diets include meat, fish, poultry, beans.

XI. Fat (½ Cup chocolate chips) (Slide 13)

Fat Provides supplemented nutrients to the cow to meet requirements to keep them healthy. Your body needs some fat for energy to absorb vitamins to protect heart and brain health. There is good fat (HDL) and bad fat (LDL)

Cow diets include dried distillers' grains and soybean meal.

Human diets include peanut butter, avocados, and nuts.

XII. Vitamins & Minerals (1 teaspoon popcorn seasoning (Slide 14)

Vitamins help our body use other nutrients (protein, carbohydrates, and fats) and minerals are needed for normal growth and development to ensure healthy bones and blood.

Cow diets include various forages that they graze as well as supplements that provide additional vitamins and minerals to feed.

Human diets get their vitamins and minerals from a variety of foods as well as supplements.

XIII. Time to Mix it Up (Slide 15)

It is time for you to be your own mixer wagon and mix your ingredients. Try to get a good mix so that you get a bit of every ingredient in a handful.

Review:

- a. How is a farmer mixing a Total Mixed Ration (TMR) like someone baking a cake? How is it different?
It is similar because it requires a specific ingredient in a set amount. It is different because a TMR makes sure cows get



all the nutrients they need, while the correct ingredients for a cake are needed so it will properly bake.

- b. Why do farmers provide a TMR instead of letting cows eat whatever they want?

The cow needs the correct amount of energy, protein, minerals, and vitamins to stay healthy and produce milk.

Let kids enjoy their treat but try to discourage students from sorting out just one ingredient. Remember, that we created a 'feed' that has a balance of nutrients that we need and just like cow feed we need all of them together.

EXTENDED LEARNING

Learning the Food Groups Matching Game – To further explore the variety of foods that provide us with nutrients, utilize these food group cards to engage youth in a game. They can be used not only for memory, but also 'Go Fish' or other similar games.

- Proteins: nourishinteractive.com/system/assets/free-printables/669/kids-food_group-memory-game-cards-protein.pdf
- Dairy: nourishinteractive.com/system/assets/free-printables/668/kids-food_group-memory-game-cards-milk.pdf?1344985078
- Grains: nourishinteractive.com/system/assets/free-printables/670/kids-food_group-memory-game-cards-grains.pdf?1344985116
- Fruit: nourishinteractive.com/system/assets/free-printables/672/kids-food_group-memory-game-cards-fruits.pdf?1344985159
- Vegetables: nourishinteractive.com/system/assets/free-printables/671/kids-food_group-memory-game-cards-food_cards-vegetables.pdf?1344985134

SDSU Extension is an equal opportunity provider and employer in accordance with the nondiscrimination policies of South Dakota State University, the South Dakota Board of Regents and the United States Department of Agriculture.

Learn more at extension.sdstate.edu.

© 2025, South Dakota Board of Regents



**SOUTH DAKOTA STATE
UNIVERSITY EXTENSION**

