Dairy

*Lesson Plan for Grade 3, Science*

*Prepared by NAITC*

*Modified by Mississippi State University, School of Human Science*

*for Mississippi Farm Bureau Federation - AITC*

# OVERVIEW & PURPOSE

Students will investigate the transfer of energy in the process of making milk. Students will understand that there are different forms of energy, that living things need energy to survive, and that the primary source of energy is the sun.

# EDUCATION STANDARDS

**Mississippi College-and-Career Readiness Standards:**

L.3.1.1 Examine evidence to communicate information that the internal and external structures of animals (e.g., heart, stomach, bone, lung, brain, skin, ears, appendages) function to support survival, growth, and behavior.

ELA-SL.3.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, teacher-led) with diverse partners on grade 3 topics and texts, building on others’ ideas and expressing their own clearly.

**NALOs:**

T1.3-5 e Recognize the natural resources used in agricultural practices to produce food, feed, clothing, landscaping plants, and fuel (e.g. soil, water, air, plants, animals, and minerals).

# OBJECTIVES

* Students will understand where milk comes from and how it is made into many products
* Students will investigate the transfer of energy in the process of making milk
* Students will observe that there are different forms of energy, that living things need energy to survive, and that the primary source of energy is the sun
* Students will differentiate between chemical, radiant, and kinetic energy and that all living things need energy to survive

# MATERIALS NEEDED

Activity 1: The Journey of Milk

* Glass of hay
* [The Journey of Milk](https://www.youtube.com/watch?v=nx0KYWxrO1k) video
* Whistle
* Bouncing ball such as a basketball or kickball, 1 per group
* *Using Energy* activity sheet, 1 per student

Activity 2: Relay Race

* *Sun, to Moo, to You Relay Cards*, 1 set per group
* Colored card stock (3-5 different colors)
* Jump rope, 1 per group

Activity 3: Better Butter

- Liquid heavy whipping cream

- Clean baby food jars (one per group)

### Essential Files (maps, charts, pictures, or documents)

* [Sun, to Moo, to You Relay Cards](https://drive.google.com/file/d/1IeUJHUFpXtUl3hkXLsn-qnqBcl8Xkds0/view?usp=drive_link)
* [Using Energy Activity Sheet](https://drive.google.com/file/d/1duP-cxZc1ZNrGiSXfM9v-luYpx0_4ikH/view?usp=drive_link)
* [Using Energy Activity Sheet Key](https://drive.google.com/file/d/1Xvm6jZs_4TwknYDpSBtaTZQJgo3CDJSK/view?usp=drive_link)
* [Reflection Sheet](https://docs.google.com/document/d/1k8yr0YhzEjnYFhISCVo2cQedQy4w8lg9/edit?usp=drive_link&ouid=109918902593538910659&rtpof=true&sd=true)
* [Better Butter Sheet](https://drive.google.com/file/d/1MFFQK__Xurd17DDV14P1gQktJNnLVrMn/view?usp=drive_link)

### Essential Links

* [The Journey of Milk](https://www.youtube.com/watch?v=nx0KYWxrO1k)

# Lesson Set Up:

Activity 1:

1. Divide students into predetermined groups. (3-4 students per group).
2. Load [The Journey of Milk](https://www.youtube.com/watch?v=nx0KYWxrO1k) YouTube video for the students to watch.
3. Print Using [Energy Activity Sheet (1 per student)](https://drive.google.com/file/d/1duP-cxZc1ZNrGiSXfM9v-luYpx0_4ikH/view?usp=drive_link)

Activity 2:

1. Copy the *Sun, to Moo, to You Relay Cards* onto 3-5 different colored sheets of cardstock. Cut each card out, creating a set of relay cards for 3-5 different teams.
2. Divide the students into teams of seven students. Teams without seven students will need to select one or more members to complete the relay twice.

Activity 3:

1. Divide students into groups of two or four, give each group a baby food jar

# Vocabulary

**energy:** power derived from the utilization of physical or chemical resources

**kinetic energy:** energy that a body possesses by virtue of being in motion

**photosynthesis:** the process by which green plants use sunlight to make food from carbon dioxide and water

# Ag Facts:

* In the past, a person could take up to 1 hour to milk 6 cows by hand. Today, a person can milk 100 or more cows per hour using modern machines and technology.
* Before modern milk delivery, when people traveled and wanted milk, they had to take their cows with them.
* Vanilla is America's favorite ice cream flavor.
* The U.S. dairy industry conducts more than 3.5 million tests each year to certify the milk we drink is safe and wholesome.

# Background Information for Teacher:

In this lesson, students will discover how the process of making milk involves energy transfer from the sun to dairy cows and finally, to the consumer. Students will understand the difference between chemical, radiant, and kinetic energy and that all living things need energy to survive.

Humans and animals get their **energy** from nutrients produced by plants. Humans and dairy cows can both receive energy from plants in the form of fruits, vegetables, or grains. All of the energy in nutrients originally comes from the sun.

Plants absorb the sun’s radiant energy and transform it into chemical energy through the process of **photosynthesis**. The plants use much of this energy to grow and store the remaining energy in their cells. When dairy cows eat feed, such as alfalfa, they are able to use the chemical energy stored in the plants they consume. Dairy cows use this energy to do everything from eating and digesting their food to breathing and producing milk. The milk produced by dairy cows also contains part of this energy. When we drink milk or eat products made with milk, we receive the energy that originally came from the sun. Our bodies rely on **kinetic** (physical) energy to do work, have fun, and accomplish tasks.

# LEARNING PROCEDURES

Interest Approach:

1. Ask students, "What is energy?" Allow students to offer answers using their background knowledge.
2. Ask students questions to help them identify when energy is required and that it is transferred through cycles. Questions could include, "What activities require energy?" "Where do you get energy?"

**Activity 1: The Journey of Milk**

1. Ask the students to think of their favorite sport. How would they feel if they played in the championship game of this sport and had not had anything to eat? Have students complete a “Think-pair-share” moment by pairing students up and have them share their responses with their partner.
2. Survey the class for different responses. How many said tired, sick, or grumpy? Brainstorm with the students why they might feel tired. Ask how they would feel if, after the game, you offered them a nice, cold glass of… hay?! Explain that dairy cows convert the feed they eat into the milk we consume on a daily basis. Energy plays an important role in this process.
3. Show the students [The Journey of Milk](https://www.youtube.com/watch?v=nx0KYWxrO1k), a video about the process of making milk. Instruct the students to look for how dairy cows use and consume energy at each step of production.
4. Discuss the video with the students and work as a class to construct a production timeline on the board. Explain that in each of these steps, energy transfers. In a moment, they will go outside to see how energy moves between objects and people.
5. Take the students outside. Organize the students into groups of three to four and provide each group with a bouncing ball. Instruct the students to pass the ball between their group members in a variety of patterns. The teacher determines the patterns and may wish to blow the whistle to get the students’ attention in changing patterns. Possible pattern ideas include bounce pass-chest pass, skipping every other person, increasing the number of bounces with each pass, passing the ball clockwise vs. counter-clockwise, etc.
6. Take the students inside the classroom to debrief the activity. Discuss:
   * Use student volunteers to demonstrate how we use kinetic energy to pass the ball.
   * Use student volunteers to demonstrate how we absorb kinetic energy when we catch the ball.
   * What happens to energy when the ball bounces?
   * What happens to the ball when it is windy outside?
   * What happens if you bounce a ball on grass? A basketball court?
7. Explain that just as we used energy to pass the ball, we use energy to do many other things in our daily lives as well. Distribute the *Using Energy* activity sheet. Instruct the students to first identify and label ways our bodies use energy.
8. Next, they will identify and label how dairy cows use energy. Focus on the energy dairy cows use to create milk. Ask the students to share with a partner where the energy comes from and where it goes when cows create milk. Have the partners share with the entire class.
9. Briefly, review the timeline created at the beginning of the lesson and review how energy moves between each step of the process.

**Activity 2: Relay Race**

1. In preparation for this activity, copy the *Sun, to Moo, to You Relay Cards* onto 3-5 different colored sheets of cardstock. Cut each card out, creating a set of relay cards for 3-5 different teams.
2. Divide the students into teams of seven students. Teams without seven students will need to select one or more members to complete the relay twice.
3. Assign each team a color based on the color of their *Sun, to Moo, to You Relay Cards*. Outside, the students line up with their teams in single file lines. Five yards in front of each team’s starting line, place a jump rope. Several feet beyond the jump rope, spread out the team’s relay cards face down. Five yards further, place a finish line.
4. Explain to the students that they are about to participate in a relay race team competition. Build up the importance of supporting each other and contributing to the goals of the team. Demonstrate how each student will individually leave his or her team’s starting line. They will run to the jump rope and jump rope five times. Next, they will pick up one of the seven relay cards and run to the finish line. Once they are at the finish line, they will yell, “Moo!” to signal the next teammate in line to begin the relay.
5. Once the entire team has crossed the finish line, the team members will work together to put each of the relay cards in the correct order. The cards will create a sequence showing how energy moves within the process of making milk. When the team has completed the entire relay, team members must all sit quietly in a line. The first team sitting quietly on the grass wins! The winning group reviews the correct order with the class.

**Activity 3: Better Butter**

1. Discuss with your class where milk comes from and how milk is made into many products, including butter.
2. Go through the safety procedures and importance of cleanliness with students.
3. Group students into groups of two or four.
4. Discuss the whipping cream in its liquid form and let the students know that a change will be taking place with the whipping cream. The cream will change from liquid whipping cream to solid butter.
5. Pour whipping cream into baby food jars until half full.
6. Let the students screw on lids. Before shaking, the teacher should check to make sure the lids are securely closed.
7. Instruct students to shake the baby food jars. Teams or groups of students can take turns shaking the jars. The butter is done when there is one mound of butter in the center. There may also be a small amount of clear water, which can be drained off.

**Concept Elaboration and Evaluation**

* After conducting these activities, review and summarize the following key concepts by completing the reflection sheet

# Additional Learning Procedures

To help students review and elaborate more about dairy, try using the [“I used to think… Now I think..”](https://drive.google.com/file/d/1IHCpm_U-VGwWHiQv9eq8dpjBG6lmpPYg/view?usp=drive_link) method to allow students to think deeper and make new connections.

Additional texts to include:

[From Milk to Ice Cream](https://www.agfoundation.org/recommended-pubs/from-milk-to-ice-cream-who-made-my-lunch)

[From Milk to Cheese](https://www.agfoundation.org/recommended-pubs/from-milk-to-cheese-who-made-my-lunch)

[The Cow Conundrum](https://www.agfoundation.org/recommended-pubs/the-cow-conundrum)



Source: <https://www.agclassroom.org/teacher/matrix/>

*The MS Farm Bureau Women’s Committee has additional resources to help aid you in this lesson with a lifesize cow prop, please contact Dedra Luke at 601-977-4169 to learn more!*

*For more information and additional lessons visit*

*https://msfb.org/ag-in-the-classroom/lesson-plans/.*