



SIZZLING DISCOVERIES

Reader Series | TOPIC #1

Exploring the path of

BEEF SUSTAINABILITY



At school you have been talking about animals, specifically cattle, in both your Science, and Family and Consumer Science classes. You're learning a lot of new information and facts that you didn't know. It's making you wonder what else you might not know about cattle, beef, and sustainability. Keep reading to learn more!

VOCABULARY WORDS

CATTLE

SUSTAINABILITY

RUMINANT

GREENHOUSE GAS

HERBIVORES

CARBON CYCLE

SEQUESTER

BEEF.

IT'S WHAT'S FOR DINNER.®

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CATTLE ARE IMPORTANT

Cattle are important in our daily lives for various things like food, cosmetics, sports equipment, and more. In addition to 42% of the animal going directly to beef, another 44% of the animal is used in numerous by-products.

Scan the QR to learn more about cattle by-products.



Cattle Across America

In different parts of the United States, specific regions take care of growing crops and raising animals. When it comes to beef, there are cow-calf operations in all 50 states, including Hawaii and Alaska.



Beef Sustainability Myth vs. Fact

What do you already know about beef **sustainability**? Test yourself using the Gimkit. Type "m" for myth and "f" for fact.



BEEF SUSTAINABILITY: Understanding and Visualizing Its Impact

Earlier, we discovered that cattle have a special way of digesting their food that leads to the release of a gas called methane. Methane is part of a natural process called the biogenic **carbon cycle**.

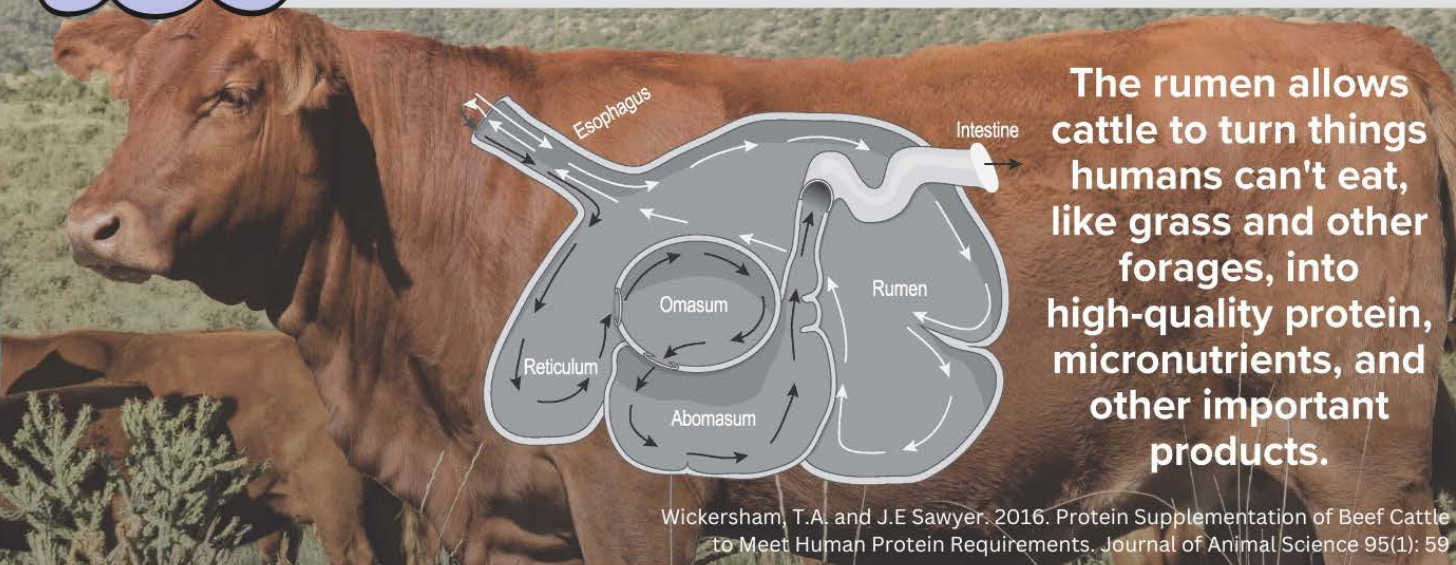
Unlike carbon dioxide (CO₂) from fossil fuels, which stays in the air for a very long time, methane from cattle only stays in the air for about 9-12 years. After that, it breaks down into CO₂, which can be used by plants during photosynthesis, helping them grow. Cattle eat these plants, and the cycle repeats. In contrast, CO₂ from burning fossil fuels takes a whopping 1000 years to return to geological reserves, which is ten times longer than it takes for methane from cattle to be reused by plants. To put it simply, the CO₂ from your car today will impact our climate for a longer time than your lifetime, your children's, or even your grandchildren's. So, the burning of fossil fuels has a long-lasting impact on our climate compared to methane, which is part of a shorter biogenic carbon cycle.

People often focus on cows producing methane, but it's important to know that this methane is naturally recycled back into the ground through the biogenic carbon cycle over time. Cattle, like the ones you might see grazing in fields during a road trip, can actually help restore the land and **sequester** carbon.

The land where cattle graze stores about 30% of the world's carbon. Cattle's role in the natural carbon cycle is crucial in maintaining these lands.



Excuse Me, I'm a Ruminant!



The rumen allows cattle to turn things humans can't eat, like grass and other forages, into high-quality protein, micronutrients, and other important products.

Wickersham, T.A. and J.E Sawyer. 2016. Protein Supplementation of Beef Cattle to Meet Human Protein Requirements. *Journal of Animal Science* 95(1): 59

Cattle are **herbivores** with hooves and a four-chambered stomach, which classifies them as **ruminants**. This special stomach allows them to digest their food multiple times by chewing and regurgitating grass or plants more than once, all within the different chambers of their stomach. Cattle's unique digestive system causes them to release methane into the atmosphere when they burp. Methane is a type of **greenhouse gas** that traps heat in the atmosphere. You might have experienced something similar when burping after drinking a fizzy soda that contains carbon dioxide.



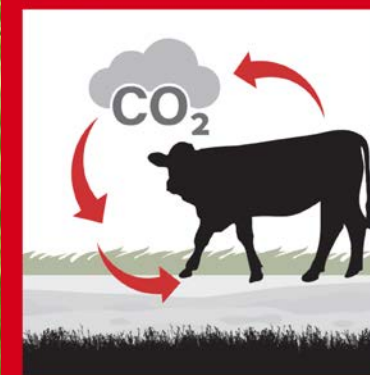
There are many exciting career choices waiting for you. Discover more about them here!



POSSIBLE CAREER PATHS

- Nutrition and Product Labeling
- Rancher
- Animal Scientist
- Cattle Geneticist

Learn More About Beef Sustainability



University of California-Davis
Explainer: The Biogenic Carbon Cycle and Cattle



Cattle and Carbon Videos



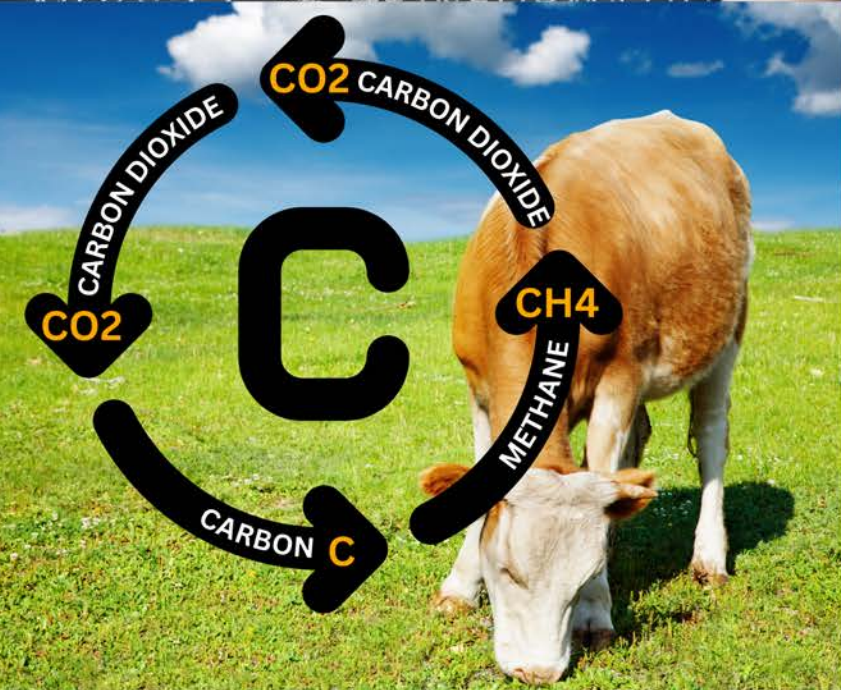
Interested in Learning More?

Use the following activity to debate with your classmates





Carbon Cycling Science Investigation



Understanding the carbon cycle can help you grasp the interconnectedness of our planet. When cattle eat grass that grows in soil rich in carbon, they help release this carbon from the soil. This allows it to enter the atmosphere and then return to the Earth's surface. This demonstrates how all four spheres of our planet work together. The cattle represent the biosphere, while carbon moves through the atmosphere. The geosphere holds carbon in the soil, and carbon can also be found in the hydrosphere where cattle may choose to cool off and have a drink. This process shows how everything – from the air you breathe to the food you eat – is connected.

Inside the Lab: The Carbon Cycle

MATERIALS

- Water
- 3 beakers
- Sugar, yeast, salt
- Spoon or Stirring Rod
- Timer
- Scale

PROCEDURE

1. Label the three beakers: "1", "2", and "3"
2. Add 1 gram of yeast to each beaker
3. Add 1 gram of sugar to beaker 2, and 1 gram of salt to beaker 3
4. Add 100 mL of warm water to each beaker and stir gently
5. Observe what happens in each beaker over the next 10-15 minutes and record your observations in the table

* Your teacher will provide a lab paper with a table to record your results.



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