LESSON PLAN :	ANIMAL SCIENCE		

Lesson Title:	REMARKABLE RUMINANT		
Grades:	6-8	Lesson Duration:	3 hours

Lesson Objectives:

In this lesson, students will follow the farm to fork process of producing beef, learn how cattle and other ruminants convert grass into nutrient-rich foods such as milk and meat, discover ways cattle recycle food waste, and identify careers in the beef cattle industry..

Standards:

5-8 Geography Standard 14: How human actions modify the physical environment.

•   Objective 3   The physical environment can both accommodate and be endangered by human activities.

5-8 Geography Standard 15: How physical systems affect human systems.

•   Objective 1   The characteristics of a physical environment provide opportunities for and impose constraints on human activities.

Science (SCIENCE)

MS-ESS3: Earth and Human Activity

•   MS-ESS3-3   Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

MS-LS2 Ecosystems: Interactions, Energy, and Dynamics

•   MS-LS2-1   Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

•   MS-LS2-2   Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

Materials / Equipment:

Interest Approach:

•   Energy Chain image to display (https://cdn.agclassroom.org/media/uploads/lp604/sun_grass_beef_and_dairy.png)

Activity 1:

•   LCD projector or TV to display PowerPoint presentation

•   Beef Life Cycle Board Game, 1 copy per student

•   Beef Life Cycle PowerPoint

Activity 2:

•   Example rangeland images to display

•   A Cow's Digestive System video

•   Remarkable Ruminant handout, 1 per student

Activity 3:

•   Food Waste Scenarios printout, 1 copy per class

•   Finding Value in Food Waste printout, 1 copy per class

Activity 4:

•   Blank sheet of paper, 1 per student

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

•   Beef Life Cycle Board Game

•   Beef Life Cycle PowerPoint

•   Finding Value in Food Waste

•   Food Waste Scenarios

•   Mapping Out Commodities and Byproducts (Optional Enriching Activity)

•   Remarkable Ruminant handout

Links and handouts can be found here: https://www.agclassroom.org/matrix/lesson/604/

Summary of Tasks / Actions:

Vocabulary Words

byproduct: an incidental or secondary product made in the manufacture or synthesis of something else

calf: the name for baby cattle

feedlot: a type of farm operation where cattle are fed balanced feed rations in preparation for harvesting

forage: bulky food such as grass or hay typically consumed by livestock

heifer: female bovine that has not produced a calf

rangeland: open country used for grazing or hunting animals

ruminant: an animal with a four-compartment stomach

steer: male bovine that has been castrated

Did You Know? (Ag Facts)

•   When beef cattle are harvested, approximately 98% of the animal is used for meat or other byproducts such as leather, glue, soap, insulin, or gelatin.[1]

•   Disneyland in California sells over 4 million hamburgers each year.[1]

•   The United States and Brazil are the top beef producing countries in the world.[2]

•   More than 100 medicines, including insulin come from cattle.[2]

Background Agricultural Connections

Beef From Farm to Fork

Beef cattle grow from young calves to mature steers or heifers in 14-18 months. Calves can be born any month of the year, but spring is the most common season. After a calf is born it will spend the first few months of its life side-by-side with its mother. The calf receives its nutrition from its mother's milk. As the calf grows, it will also begin to eat grass, hay, or other forages. When the calf reaches six to eight months of age, the calf will be weaned, or separated from its mother. The growing calf will continue to eat grass and other forages as it grows. Beef cattle typically spend the majority of their lives on private or public rangelands where their diet consists of grass and other forages. For most beef cattle, their final stage of growth takes place at a feedlot where their diet consists mostly of corn and hay which has higher nutrient density than most rangelands. This final stage of growth prepares the animal for harvesting. Once the

animal is harvested, it is processed into various meat cuts, such as steak or roast, or processed into hamburger, a form of ground or chopped beef formed into the familiar patty of a hamburger or cheeseburger. The beef is then sold to consumers at a retail outlet, like a grocery store or a restaurant, completing the farm to fork journey.

Cattle Digestion

Along with animals such as goats, sheep, buffalo, deer, elk, giraffes, and camels, cattle have a four compartment stomach. The function of these four compartments allow cattle to physically and chemically digest food that cannot be utilized by humans or animals that only have a simple stomach with one compartment (monogastrics). The ruminant digestive system of cattle actually helps us use feed resources that would otherwise be discarded as waste. These waste products are known as byproducts or incidental products created by the manufacture of something else. An example is a potato peel. French fries are consumed regularly across our country. What happens to all the potato peels? The Ore-Ida French Fry processing plants in Oregon and Idaho send their potato peels to be consumed by cattle in feedlots. The cattle eat the potato peels and convert a waste product into beef, a food rich in zinc, iron, and protein. In summary, humans cannot digest the majority of what cattle eat. They turn something of little value to humans (like grass) into highly nutritious beef.

When properly managed, cattle can also improve the quality and health of the rangelands where they live and graze. Typically, rangelands are located in areas that are too rocky, steep, or otherwise ineffecient for growing human food crops. Keeping this land in grass prevents soil erosion. Cattle also provide natural fertilizer for the land in the form of manure.

Careers

The entire farm to fork journey of beef products requires the joint efforts of many different careers. Farmers and ranchers, food processors, and transportation specialists each work with a team of people to produce, process, and transport beef products to be enjoyed by consumers.

See Less...

Interest Approach - Engagement

1.   Ask students, "Can you name something that can convert grass into nutrient-rich foods that we eat?"

2.   After students have time to think and offer answers, display the following image and add sunlight to the equation. "Energy comes from the sun and produces grass. Humans cannot digest and gain essential nutrition from grass. What can convert grass into foods like meat, milk, and other dairy products?"

3.   The answer is livestock. Specifically, animals like sheep, goats, and cattle that have a unique digestive system allowing them to break down the cellulose in plants. Today they will be learning about the digestive system of cattle and other ways cattle recycle and conserve resources while producing nutrient-rich food.

Procedures

Activity 1: Beef From Farm to Fork

1.   Explain to students that there are many processes in our life that follow a specific cycle from start to finish. Cattle, the source of our beef, go through a variety of steps from start to finish. This brief activity will explain and illustrate what cattle eat and where they live as they grow and mature.

2.   Distribute the Beef Life Cycle Board Game, one per student.

3.   Open the attached Beef Life Cycle PowerPoint.

4.   Read through the instructions with the students and go through the PowerPoint as they take notes on their game board.

5.   After finishing the worksheet, have students write a "$2 summary" of the lesson on the back of their game board. Each word is worth 10 cents, and students must write until they reach $2.

•   This summary activity can be scaffolded by giving students specific words related to the learning that they must include in their summaries. You may also increase to any amount of money to require

additional length. Possible words to include in the summary include: beef life cycle, calves, ranch, feed yard, harvest, or supermarket.

Activity 2: The Remarkable Ruminant

1.   Ask students, "How many people currently live on the earth?" Accept an answer of approximately 7 billion or go to the World Population Clock for a more precise answer. Follow up by asking students if the world population is expected to increase or decrease in coming years. (increase)

2.   Conclude with students that it is, and will become, increasingly important to use our land wisely to provide homes, food, space, and resources for a growing population.

3.   Ask, "Can we use ALL of our open space to grow crops for food?" Display the following images for illustration.

4.   Ask students:

•   Is some land too dry or too wet for crop growth?

•   Is some soil too rocky or sandy to grow crops?

•   Could steep inclines or cold climates prohibit a farmer from growing crops successfully?

5.   Ask students to think back to what they have learned so far. Could the land that is unsuitable for crop farming be used by cattle (or sheep) to produce food? (Yes!) Tell students that this is possible due to a unique digestive system. Show the video clip, A Cow's Digestive System (1:35 mins).

6.   Distribute the Remarkable Ruminant handout to students. Instruct students to read the article on page 1 and highlight each example they find of ways cattle convert otherwise unusable resources into useable resources. Students will then complete pages 2 and 3 of the worksheet.

Activity 3: How Cattle Recycle

Preparation: Prior to class, print 1 copy of the attached Food Waste Scenarios. Cut scenarios into individual strips and save until you reach step three. Print 1 copy of the attached Finding Value in Food Waste and cut into eight individual strips. Distribute the slips around the room before students arrive. You can leave them visible or hide under chairs, tape to the walls, etc.

1.   Ask students to brainstorm all of the places where food goes to waste. Students will likely think of uneaten food at their home, school cafeteria, or restaurants. Once students have exhausted their own ideas, provide a prompt. Ask, "When you are preparing food at home is there any portion of the food that you throw away?" Provide examples such as:

•   Do you ever peel a fruit or vegetable and throw away the peel?

•   Do you ever throw away the core of an apple or the rind of a watermelon?

•   Do you always eat the heel/crust of a loaf of bread?

2.   Point out that on a house-by-house basis, the amount of food waste may be relatively small (though potentially impactful). Ask students to think about the waste from a large food processing facility. Ask, "Are there food processing facilities that could produce truckloads of waste?"

3.   Divide the class into eight groups. Give each group one Food Waste Scenario slip. Allow groups to read and discuss their assigned scenario and come up with a potential solution.

4.   Next, introduce the concept of cattle being able to digest food and receive nutritional value from foods that humans either do not choose to eat or cannot eat because it provides little/no nutritional value to our bodies.

5.   Inform students that they will find strips of paper around the room that contain the nutritional value of the food product represented in their scenarios. Instruct students to search for the papers to find the information they need to determine if the food waste from their scenario could be used in another way.

6.   Once students have found the slip of paper to match their scenario, have them come up with another solution for the food waste based upon what they learn. Have each group share their scenario and solution with the class.

7.   After each group has shared with the class, use the following questions for reflection:

• What is the definition of a byproduct?

o An incidental or secondary product made in the manufacture of something else. To learn about additional feeds from byproducts, see the Enriching Activity below titled, "Digging Deeper into Byproduct Feeds."

• What limitations can farmers/ranchers face in feeding their cattle byproduct feeds?"

o Some byproduct feeds have geographic limitations. For example, citrus fruits are only grown in a few states. To further discuss the geography of these byproducts, see the Enriching Activity below titled, "Mapping Out Commodities and Byproducts."

• What makes cattle different from humans and allows them to digest food waste products like the ones we discussed today?

o Cattle are ruminants which means they have for compartments in their "stomach" allowing them to break down and digest plant products that other animals and humans cannot.

• So what? Why does this matter or why is this important?

o The world population is growing exponentially which places a greater demand than ever before for food. Using alternative food sources that would otherwise go to waste, and feeding them to ruminants like cattle, allows farmers to efficiently and economically produce food for this growing population.

Activity 4: Careers

1. Create a T-chart on the board and brainstorm careers related to producing beef. The left side will focus on careers directly related to the farmer/rancher. The right side will focus on careers that help market/sell the beef to consumers.

• Left side: Careers directly related to the cattle farm/ranch

o Seed Salesman: needed to grow hay and grain to feed cows

o Grain and Hay Farmer: grows hay and grain

o Veterinarian: help manage and oversee prevention of disease and treatment of sick cows

o Feed Salesman/Animal Nutritionist: cattle need feed to eat; nutritionists help formulate balanced rations for cattle

o Feedlot Manager: cattle are finished growing in feedlots

o Extension Agent: provide continuing education for farmer/rancher which helps them learn the newest and most updated information for growing beef

• Right side: Careers that help market/transport beef

o Farm Reporters or Broadcasters: report on cattle markets

o Auctioneers or Livestock Market Managers: assist farmers in selling cattle

o Cattle Buyers: buy cattle for processing facilities

o Truck Drivers: transport cattle to harvesting facility and boxed beef to distribution centers and restaurants

o Food Service Providers (e.g. US Foods): deliver specific cuts of beef to restaurants and chefs

o Restaurant and Grocery Store Employees: serve up beef as a part of meals and provide a place for consumers to buy beef

2. Create a foldable to organize notes on. See pictures below for illustration.

a. Place paper in landscape orientation and fold in half (left to right). Open paper back up.

b. Fold the left side to the midline and the right side to the midline to create a tri-fold.

c. Use scissors to make 6 tabs on both the left and right sides of the foldable allowing each tab to be opened individually.

d.   Use the careers listed on the T-chart, list one career per tab.

e.   Use the descriptions of each career from the T-chart to complete the foldable. The career will be listed on the outside of each tab and a description of the career will be written on the inside. The left side of the t-chart (careers directly related to the cattle farm/ranch) will be on the left side of the foldable and the right side of the t-chart (careers that help market/transport beef) will be on the right side of the foldable.

3.   To summarize the activity, have students turn the foldable over so the solid back (no tabs) is facing up. Instruct them to complete a 3-2-1 summary.

•   Record three things the student learned about agriculture careers.

•   Record two careers the student found interesting and would like to learn more about.

•   Record one question the student still has about agriculture careers related to beef.

Activity 5

Visit a local beef or dairy farm. Make sure to look at how the cattle are fed at different stages.

Concept Elaboration and Evaluation:

After conducting these activities, review and summarize the following key concepts:

•   Cattle have a unique ruminant digestive system allowing them to gain energy from food such as grass, hay, and other forages that are of no nutritional value to humans.

•   Cattle provide beef (hamburger, steak, roasts) and dairy products to our diet as well as many byproducts such as leather, medicines, etc.

•   Cattle can utilize land that is too dry, rocky, wet, or steep for crop production. Well managed grazing practices promote healthy rangelands.

•   Cattle can eat food processing byproducts rather than sending the waste to landfills.

 Enriching Activities

•   Digging Deeper into Byproduct Cattle Feeds: In Activity 3, students learned about eight byproducts that can be fed to cattle. There are many more examples. Assign students to research other common cattle feeds that are otherwise waste if not used as livestock feed. Possible feeds include:

barley or hops hulls   cereal by-products   citrus pulp   culled vegetables

cotton seed husks   grasses molasses   soy hulls

sugar beet pulp Grape Peels   Corn Gluten   Corn Stalks

•   Have students read the Huffington Post article, Farm Animals Actually Eat People's Leftovers - And It's Good For the Planet. If desired, use a KWL chart to increase engagement. Discuss student findings.

•   Mapping Out Commodities and ByProducts: To help students understand the geographic limitations of using byproducts for feed, distribute the attached Mapping Out Commodities and Byproducts activity sheet to each student. Have students research where the list of food products are commonly grown in the United States. The U.S. Department of Agriculture National Agricultural Statistics Service and the Interactive Map Project are two helpful websites that can be used or students may conduct their own internet search. Students may research products individually, work in groups, or do a special report on just one product.

o   If time allows, encourage students to explore the maps to find out what food products or waste products are local to your state and may be fed to cattle.

o   Note that bakery waste will likely not be listed. Instruct students to think of a local grocery story or bakery and have them think about what the store does with bakery items that are not sold. This is considered bakery waste and stores either need to dispose of it in the trash or have farmers pick it up.

o   If students research the entire list, they will need to use both websites to find the food commodities.

•   For a useful handout comparing the monogastric and ruminant digestive systems, see pages 6-7 of A Stomach At Work, created by Michigan State University Extension. For a lab activity demonstrating how the monogastric stomach works, see pages 1-4.

Follow up /References

Sources:

1.   http://beef2live.com/story-cattle-101-hist-breeds-fun-facts-terms-0-104671

2.   https://www.meat-online.co.za/10-interesting-facts-about-beef-and-cattle/

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LESSON PLAN :	ANIMAL SCIENCE		

Lesson Title:	SHEEP SEE, SHEEP DO		
Grades:	6-8	Lesson Duration:	2-3 Hours

Lesson Objectives:

.Students will explore the difference between inherited and acquired traits and understand why knowledge of inherited and acquired traits is important to agriculture. Activities in this lesson include trait sorting, two short movies, a PTC taste test, and student presentations.

Standards:

a.   MS-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

b.   MS-LS1-4 Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.

c.   MS-LS4-5 Gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms.

Materials / Equipment:

Interest Approach

☐   Sticky notes, 1 per student

Activity 1

☐   AITC Inherited vs. Acquired Kahoot! game(https://create.kahoot.it/share/70e94cb8-3648-4a63-81c7-e10542bc2728)

☐   Personal devices for students to play

☐   Projector/computer combination

•   Alternative Activity:

o   Traits List, cut apart and laminated (https://naitc-api.usu.edu/media/uploads/2016/04/15/traits_list.pdf)

o   Two baskets, one labeled "Inherited" and one labeled "Acquired"

☐   Lamb Eats What Mom Eats video(https://www.youtube.com/watch?v=M9X-w14s3tQ)

☐   PTC testing strips, available from most science supply companies

☐   Hard candies

Activity 2

☐   Guns, Germs, and Steel video clip (https://www.youtube.com/watch?v=0edh5Itvhy8)

Activity 3

☐   Farm Animal Prompt Cards, cut apart, 1 per student or group of students (https://naitc-api.usu.edu/media/uploads/2016/04/15/sheep_see_prompt_cards_2.pdf)

☐   Presentation Rubric, 1 per student (https://naitc-api.usu.edu/media/uploads/2016/04/15/rubric.pdf)

Summary of Tasks / Actions:

Vocabulary

acquired trait: traits that develop during the lifetime of the organism but are not in the organism's DNA and are not inherited by its offspring; acquired traits are often learned

domesticate: to breed a population of animals or plants to serve the purposes of human beings and to need and accept human care

inherited trait: a genetically determined characteristic or quality that distinguishes someone or something; inherited traits are passed in DNA from parents to their offspring

selective breeding: the intentional breeding of organisms with desirable traits in an attempt to produce offspring with desirable characteristics or with improved traits

temperament: the usual attitude, mood, or behavior of a person or animal

trait: a distinguishing characteristic or quality

Did you know? (Ag Facts)

☐   More than 50 breeds of sheep are raised in the United States.1

☐   As of January 2015, there were more than 5.2 million sheep in the United States.1

☐   Sheep eat a wide range of plants and can work like self-propelled lawnmowers to control weeds. They are even being used by ski resorts to keep slopes clear of brush and weeds in the summer.1

Background Agricultural Connections

My lamb is black, and he likes to eat Russian olive twigs just like his mother taught him. One of these traits is inherited and one is acquired. Can you guess which is which? Acquired traits develop during the lifetime of the organism but are not in the organism's DNA and are not inherited by its offspring. Inherited traits are genetically determined. A lamb learning to eat and prefer Russian olive twigs is an example of an acquired trait, and black wool is an inherited trait.

Animals acquire traits by learning from consequences and taking cues from their mothers or caretakers. Notably, mothers of many species teach their offspring about nutrition. Mothers teach their offspring what to eat, how to eat, and where to find food. In addition to learning, traits can also be acquired in response to environmental factors. An animal that has the genetic makeup to grow big and strong may be small and weak if it doesn't get the nutrition it needs. Similarly, a plant that has the genetic makeup to grow short and stout may be tall and spindly if it sprouts in a place with insufficient sunlight.

All organisms inherit and acquire traits, and this has important implications for farmers who grow plants and raise animals. Throughout history, many animals and plants have been domesticated, or selectively bred to exhibit and pass on certain inherited traits that make them easier for people to raise. After domestication, further selective breeding is often used to continue to improve the productivity and ease of managing agricultural plants and animals. Cows, tomatoes, corn, and strawberries are just a few examples of living things that have been selectively bred by humans for food. The inheritable traits that breeders select in plants and animals may be visible, like fruit or hair color, size, and body shape, or they may be invisible, like health characteristics and temperament.

In addition to breeding for desirable inherited traits, farmers also manipulate the environment and interact with plants and animals to develop desirable acquired traits. For example, fruit trees are staked to make them grow straight and pruned to grow an open canopy. Grapes are trained to grow on the supports provided to hold them off the ground. Dairy cows are given grain in the milk parlor to help them learn to come in and stand to be milked. Calves and lambs are taught that they can get milk by sucking on a bottle. Dogs and horses are trained to work with people, and they are also bred for traits that make them good workers. Often, the best farmers start with plants and animals that have good genetics (inherited traits) and then work hard to ensure that their plants and animals acquire traits that make them productive and easy to work with.

Interest Approach – Engagement

1.   Provide each student with a sticky note. Ask students to write their names in the middle of the sticky note.

2.   Draw a large table on the board with two columns. Title one column "Like what friends and family like" and the other "Just born that way."

3.   Ask students to place their sticky notes under the statement that they most agree with in response to the following poll question: "What determines the type of ice cream that you prefer; do you like what your friends and family like, or were you just born that way?"

4.   Lead a short, open-ended discussion on the poll results. Ask students why they answered as they did. Tell them that you will return to this poll question after learning more about inherited and acquired traits.

Procedures

Activity 1: Traits

1.   Explain to your students the difference between an inherited and an acquired trait.

2.   Provide each student with a personal device such as a laptop, tablet, or smartphone, and use the AITC Inherited vs. Acquired Kahoot! game (start a free account if you do not already have one and search the public Kahoots for AITC Inherited vs. Acquired Traits) to help students practice identifying the difference between inherited and acquired traits. If you do not have enough devices for each student, they may play as teams, or you may use the alternative activity described below.

•   Alternative Activity:

o   Pass out one trait from the Traits List to each student.

o   Using two baskets that you have labeled "Inherited" and "Acquired," ask students to place their trait statement into the correct basket as you walk down the aisle or to their tables.

o   Once all the traits are placed in the baskets, read each trait card in each basket and discuss the accuracy of the trait placement with the students. If any traits are in the wrong basket, switch the trait's location and help students understand why the trait fits in the other basket.

3.   Show students the Lambs Eat What Mom Eats movie. Ask students to explain what they saw. Did these lambs inherit or acquire their taste preferences?

4.   Next, hold a taste test using PTC testing strips to see which students can taste a bitter flavor. PTC can either be very bitter or virtually tasteless depending on the taster's genetic makeup. The ability to taste PTC is a trait that roughly 70% of Americans inherit. Have some hard candy available for those who can taste the bitter PTC to help them get rid of the unpleasant taste.

5.   Refer the students back to the poll question about ice cream preferences. Ask if they would change their answers after watching the movie and doing the PTC taste test, and allow them to move their sticky notes. If students don't already conclude that some traits can be both inherited and acquired, help them think about the example of taste preference. The ability to taste PTC is inherited, but the movie Lambs Eat What Mom Eats showed that taste can also be acquired through learning.

Activity 2: Value of Domesticated Animals

1.   Discuss with students how knowledge of inherited and acquired traits is important to agriculture. Explain the meaning of the term domesticate.

2.   Ask students to help you make a list of domestic farm animals on the board. Your list could include cattle, horses, sheep, goats, chickens, turkeys, or any other domestic animal commonly found on a farm.

3.   Next, ask students what purpose each of these animals has. Help students recognize that cattle provide meat and milk, horses historically provided transportation and power, sheep provide meat, wool, and sometimes milk, goats provide meat and milk, chickens provide meat and eggs, and turkeys provide meat.

4.   Point out that each animal's ancestors were once wild. Long ago humans began hunting wild animals. Recognizing that these animals could benefit their families by providing food to eat and fiber or leather for clothing and tools, humans began domesticating animals about 10,000 years ago. Over the ensuing years, farmers have repeatedly chosen to breed animals with the best characteristics for their needs. The animals that produced the most milk or the finest wool were kept for breeding, while others might have been sold or traded or used for meat. As a result of this selective breeding, farm animals have changed in behavior and appearance over the years.

5.   While referencing your list of farm animals on the board from steps one and two, ask your students why more animal species are not raised on farms.

6.   Allow students to begin thinking about this question, then show the first four minutes of Guns, Germs, and Steel (Part 5).

7.   Consider the following questions for class discussion during or after the video clip:

•   Why haven't most animal species been farmed? (they don't have a practical use to humans, they could be impractical to farm due to space or diet requirements)

•   What type of animals are best suited for farming? (large, plant-eating mammals)

•   Why aren't elephants farmed in Asia to accomplish work? (it takes too long for the animal to reach a mature age for working and for reproduction)

•   Why is temperament important to a domesticated animal? (safety and ability to get along with humans)

•   What inherited traits and acquired traits make an animal suitable for domestication? (a good temperament to get along with humans, a practical use/benefit to humans such as the ability to perform work or to provide food)

Activity 3: Student Presentations

1.   Assign each student or group of students a domestic farm animal by giving them one of the attached Farm Animal Prompt Cards.

2.   Provide students the Presentation Rubric. Ask them to create a short presentation about their animal and to include a visual support. This may be a poster or a PowerPoint, or you may choose to have the students use a multimedia tool like Glogster or Padlet.

3.   Instruct students to include the following items in their presentation:

•   Explanation of why this animal is suited to domestication

•   Name and pictures of assigned farm animal breed

•   Purpose of this breed

•   Examples of inherited traits that help this breed fulfill its purpose. Note: The prompt cards give students three examples of traits for each animal. To challenge your students, require them to find additional traits through their own research.

4.   Have the students present their videos and posters to the class and/or post them to your classroom blog or website.

Concept Elaboration and Evaluation

After conducting these activities, review and summarize the following key concepts:

☐   Farmers use knowledge of acquired and inherited traits to improve the productivity and ease of managing the plants and animals they raise.

☐   Acquired traits develop during the lifetime of the organism but are not in the organism's DNA.

☐   Inherited traits are genetically determined and passed from parents to offspring.

Follow up /References

https://www.agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=405