Build a Better Corral

Grade Level(s)

4th and 5th grade

Estimated Time

30 minutes

Purpose

Students will explore cattle flight zones and work as agricultural engineers to design a corral system that uses the research of Temple Grandin.

Materials

Links:

Website: www.linncoag.com 2020/21 virtual learning-drop down- May

Intro video: Build a Better Corral - YouTube

Book: The Girl who Thought in Pictures

Understanding flight zones Understanding the Flight Zone - YouTube

Design of a curved cattle chute Design of Curved Cattle Corrals, Yards, Races, and Chutes - YouTube

Ryan Bros Iowa video Working Facility - YouTube

Others:

Card stock, paper plate, yarn, straws, tape, scissors, marbles, and pipe cleaners

Design a western shirt craft worksheet

Understanding flight zones worksheet and comprehension review

Vocabulary

agricultural engineer: career in which people design farm machinery or help plan farm structures
alleyway: a narrow corridor built for livestock to travel through when being herded from one location to another nearby
flight zone: distance from an animal a handler must maintain for the animal to feel comfortable
handling: the way an animal is treated
livestock: animals raised to produce commodities such as food and fiber (i.e. cattle, sheep, hogs)
producer: someone who raises livestock or crops for others to consume

squeeze chute: a device used to restrain large animals, especially cattle and horses

Background

Moving **livestock** can be difficult if you do not understand how the animals think and move. Livestock handlers want to keep their animals calm when moving them to avoid stress and injury. If there are loud noises or other distractions, such as sights or even smells, many animals will become fearful or hesitant to move. An animal that is afraid can be dangerous for both the animal and the handler. Keeping the area free of distractions can help reduce animal **handling** problems. If the animals are kept calm and feel safe, they will usually move with little or no effort. Handlers want to keep animals calm so the animals are not negatively impacted. Stressed animals can have lower weight, reduced reproduction rates, and increased sickness.

Cattle **producers** use **alleyways** and **squeeze chutes** to move cattle while doctoring them. By understanding cattle behavior, such as their **flight zones**, along with creating alleyways and chutes with rounded turns and closed sides, producers can keep livestock calm. This greatly reduces the animals' stress levels while they are being handled. Understanding animal instincts allows producers to handle them easier. Livestock have wide angle vision, which allows them to see predators as well as handlers. Cattle and pigs have a visual field more than 300°. In sheep, the visual field ranges from 191° to 306° depending on the amount of wool on the head. Due to their wide-angle vision, they are aware of their surroundings. If the handler is in their blind spot, the animal will turn to see them.

Dr. Temple Grandin, a professor at Colorado State University, focuses on animal behavior and has made, and continues to make, a huge impact on how livestock are handled. She researches how livestock perceive their environment and helps producers develop livestock handling facilities that help keep the animal’s calm.

Temple Grandin was diagnosed with autism as a young girl in the 1950s. In 1961, she spent the summer at her aunt's ranch in Arizona. She became interested in the cattle and realized they were visual thinkers; they saw the world in much the same way as her and noticed details in their surroundings most people missed. In fact, Temple often describes herself as someone who "thinks in pictures." As a senior in high school in 1965, she created her first invention, a squeeze machine. The inspiration for this invention came from cattle chutes that keep cattle calm during vaccinations by squeezing them firmly, like a hug. Temple grew to love animals and earned her master's degree in Animal Science in 1975. In 1976, she invented the curved chute system for moving cattle. She earned her doctoral degree in Animal Science in 1989. Dr. Grandin was inducted into the National Cowgirl Hall of Fame in 2010 and was also named one of *Time* magazine's 100 most influential people that year.
Dr. Grandin's research led her to believe that the way animals, especially cattle, are handled and transported can potentially cause stress, pain, and fear. When cattle are moved on wet or slippery slopes or in poorly lit areas, they can be injured. She believes that this is cruel and unnecessary. In order to design a better system for handling livestock, she decided to put herself through the handling process. Using her

instincts, which are often similar to cattle, she realized cattle prefer pens and chutes with solid sides and well-lit areas, keeping them free from distractions, dark tight spaces, and shadows which could scare the cattle. Her invention of the curved chute system came from the realization that cattle tend to move in a circular pattern around their handlers. By designing a system with solid walls, non-slip floors, and a curved walkway allowing cattle to move in a single-file line through the alley, cattle are handled in a calm manner. Today, half of the cattle in United States and Canadian meat processing plants are handled with equipment that Grandin designed.

Dr. Temple Grandin travels and speaks to groups about animal behavior. Many professional speakers wear suits, however Dr. Grandin is well known for her unique style. She wears Western shirts, often paired with cowboy scarves. She may wear fancy or simple Western shirts, but her Western shirts are as constant as her passion for agriculture. In 2011, she even wore a Western shirt to the Golden Globe Awards in Hollywood!

Agricultural engineers are important to livestock producers. They often assist producers in designing livestock handling areas using the research from Dr. Grandin. They help producers apply basic science and engineering principles as they develop these livestock facilities. Often, agricultural engineers design machinery such as tractors and implements, animal housing or handling facilities, irrigation and drainage systems, and soil conservation systems. Agricultural engineers help design methods to decrease labor, which also increases a producer's ability to produce food.

Did you know?

- Temple Grandin was diagnosed with autism at age 2 and only began speaking after she was four years old. She went on to earn a bachelor's degree in psychology from Franklin Pierce College, a master's degree in animal science from Arizona State University, and a doctoral degree in animal science from the University of Illinois.
- In 2010, Temple Grandin was included in *Time* magazine's list of 100 most influential people in the world in the "Heroes" category.
- Dr. Grandin is an advocate of humane livestock practices and improvements of standards in slaughterhouses, serves as a consultant to the livestock industry regarding animal treatment and behavior, and is a professor at Colorado State University.

Interest Approach – Engagement

Read the story or listen to the video “The Girl who Thought in Pictures.” Discuss what it would be like to "think in pictures." Emphasize that there are no right or wrong ways to think; we all think differently.

Procedures

1. Watch the instructional video
2. Show the video Understanding Flight Zones to help students understand what a flight zone is and how it affects the comfort of the animals.
3. Pass out the flight zones handout and comprehension sheet. Ask students to work on the worksheet individually. Discuss as a class.

4. Present the following scenario to the students: *A local cattle operation has a problem. They need to move their cattle from pasture through a cattle chute to doctor them, but the cattle are afraid to walk through the chute.*
5. Explain to the students that their job is to design a cattle chute using the following guidelines:
   - The chute should have at least 3 turns causing the cattle to change directions.
   - The chute should end with a squeeze chute or pen to collect cattle.
   - The chute should start wide and then narrow as it reaches the squeeze chute or final pen, requiring the cattle to move through in a single-file line.
6. Organize the students into small groups and have each group work as a team to design a cattle chute
7. Provide each group with a paper plate, scissors, glue, and tape and access to card stock, yarn, straws, construction paper, and pipe cleaners to construct their prototypes. Give each group marbles to represent the cattle who will be moving through the chute.
8. After the prototypes are built and tested, allow time for the groups to share their designs. Ask the students to consider the following:
   a. What happened to the marble's motion when it hit the wall?
   b. Can the motion be predicted?
   c. Was there a change in energy?
   d. How does this compare to how cattle process information and respond to the chute and/or distractions?
9. Show the video Design of Curved Cattle Chutes.
10. Discuss cattle movement and chute design. How do cattle use their senses to process information? Discuss how the chutes on the video are similar and different from the student designs.
11. Challenge the students to modify their projects to create a chute that follows Dr. Grandin's guidelines—solid walls and curved alleyways which narrow—but do not duplicate the chute shown in the video.
12. Watch the Ryan Bros Iowa example Working Facility - YouTube
13. Morgan's family farm chute Shoot it is Time for a new Chute! (farmhouseflowers100.com)

Organization Affiliation

National Ag in the Classroom

Agriculture Literacy Outcomes

- Provide examples of specific ways farmers meet the needs of animals (T2.3-5.d)
- Provide examples of science being applied in farming for food, clothing, and shelter products (T4.3-5.d)

Iowa/ Common Core Standards

- *3-5-ETS1-1* Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- *3-5-ETS1-2* Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- *4-LS1-1* Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.