Cows, Corrals and Innovation

Grade Level: K-4

Essential Skills: 1, 4, 5, 9

NGSS: K-2-ETS1-1; K-2-ETS1-2; K-2-ETS1-3; 3-4-ETS1-1; 3-4-ETS1-2; 3-4-ETS1-3

CCSS: K.RL.1, K.RL.2, K.RL.3, K.RL.7, K.RL.10, K.RI.1, K.RI.2, K.RI.3, K.RI.7, K.RI.10, K.SL.1, K.SL.2, K.SL.3, 1.RL.1, 1.RL.2, 1.RI.1, 1.RI.2, 1.RI.7, 1.SL.1, 1.SL.2, 2.RI.1, 2.RF.1, 2,SL.1, 2.SL.2, 3.RL.1, 3.RI.1, 3.SL.1, 4.RI.1, 4.SL.1

Time: 45 minutes

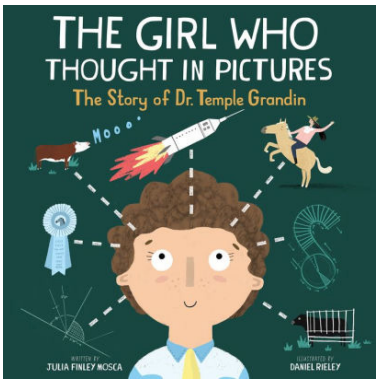
Materials:
- The Girl Who Thought in Pictures book
- Large Cattle Corral Example
- 6 Marbles
- (6) Small Cattle Corral
- (6) 2.5 oz. play dough
- (6) 32 toothpicks

AITC Library Resources:
Books:
John Deere: That's Who!
How to Build a Hug
'Til the Cows Come Home

More Lessons:
Agricultural Inventors
Ag Tag Matching Game
Allison Investigates

Description:
Explore the natural behaviors of cattle and engineer a handling system with guidance from Temple Grandin, renowned animal scientist. Students will be challenged to build a corral system using simple materials to move cattle.

Background:
The book The Girl Who Thought in Pictures tells renowned animal scientist, Dr. Temple Grandin's story from learning in the classroom as a child with autism, to designing livestock handling systems used across the world today.



Directions:
Part I: The Girl Who Thought in Pictures Book
1. Read the book The Girl Who Thought in Pictures as a class. As your reading ask students to identify ways that Temple was able to help cattle be more comfortable when they are being moved.
2. After, have students discuss the following questions:
    a. What would it be like to think in pictures?
    b. How do corrals and squeeze chutes help farmers and ranchers?
    c. What keeps cows calm while farmers and ranchers are doctoring them? *Remind students about the "hug machine" and Temple's innovative curved chute.

Part II: Engineer a Corral
1. Instruct students to use our imaginations to see what it's like to think in pictures similar to how Temple saw words and how cows see. Have students close their eyes and silently think about the word, "fruit".

2. Invite students to share with the class what they pictured when they heard the word fruit.

3. Explain to student that those were all great examples of how we all think differently when hearing the same word. Thinking in this way is very similar to how Temple Grandin processed words.

4. Today, we are going to explore how 'thinking in pictures' helped Temple Grandin develop corral and squeeze chute designs that help keep animals calm and comfortable. Farmers and ranchers use corrals and squeeze chutes when they are working to maintain their herd's overall health, similar to when we visit the doctor for a check-up.

5. Show students the example of a corral provided in this lesson. Discuss the features in the example such as the wide opening which allows multiple animals to enter and point out how the corral gradually narrows and curves as it leads up to the squeeze chute or "hug machine."

6. Divide students into six groups and provide them with a student kit (corral example, play

dough and toothpicks) to build a cattle chute given the scenario below.

Scenario: A local cattle operation has a challenge, they need to move their cattle from the pasture through a cattle chute but the cattle are afraid to walk through the chute.

Grade K-2: Read the Scenario, Say, "Just like Temple Grandin, you will use the materials that I will provide you to solve a challenge. Your challenge is to build an animal corral that opens wide on one end and narrows as it gets closer to the chute to help gather the cows. You will have 10 minutes to build your handling system. Once your system is built, quietly raise your hand, I will bring a marble to you to act as the cattle and we will see if your system works!"

Grade 3-4: Read the Scenario, Say, "Just like Temple Grandin, you will use the materials that I will provide you to solve a challenge. Your challenge is to build a corral that opens wide on one end and narrows as it gets closer to the squeeze chute or final pen. Your design needs: a wide opening at the start, at least two turns causing the cattle to change directions and a narrow end where the cattle reach the final pen or squeeze chute. In Temple's designs, she uses curves to encourage the cows to move forward because their natural response is to go back to where they came from, these curves encourage consistent forward movement. You will have 10 minutes to build your handling system. Once your system is built, sit quietly and raise your hand, I will bring a marble to you to act as the cattle and we will see if your system works!"

7. As the students are finishing or at the end of the time limit, provide each students with a marble to test their structure. If the marble does not make it to the end of the corral, challenge students to fix their designs.

8. After, discuss the following questions with students:
    a. What aspects of your design were successful in completing the challenge? What would you change about your design?
    b. What happened to the marble's motion when it hit the wall?
    c. Can the motion be predicted? What happens when the marble hits a corner versus a curved edge?
    d. How does Temple's design help farmers and ranchers?
    e. Why would cows need to be collected and kept calm?
    f. What did we learn about Temple Grandin and how does that relate to us?

Cattle Corral Example