

Adopt-A-Cow: Beef

LESSON 2: BUILDING YOUR HERD

EDUCATION STANDARDS

English Language Arts

- SL.1, SL.2, SL.3

Educational Technology

- ET.EL.2

Science

- 3LS3-1

TIME NEEDED

Part I: Lesson Intro to Genetics

(20 min)

Part II: Activity: Build Your Herd

(20 min)

Part III: Cow Calf Intro Video (9

min)

MATERIAL LIST

Materials for the whole class:

- Computer/Projector/TV/
Promethean board
- PowerPoint

Materials for the individual or teams of students

- Worksheets
- Dice
- Cattle Breed Cards



EXPECTED LEARNER OUTCOMES

OBJECTIVE 1 – Youth will make observations about physical traits that are similar and different between parents and offspring.

OBJECTIVE 2 – Youth learn how to predict which traits are passed from parent to child. Youth will utilize Punnett squares to predict calf traits.

OBJECTIVE 3 – Youth will meet their adopted cow and calf and learn about newborn calf care.

BACKGROUND

Today's cattlemen use their knowledge of genetics to build herds that have traits that allow them to prosper in the South Dakota climate, produce healthy calves, and develop desirable muscle.

Traits are determined by the animal's genes. Animals have two genes for every trait; one that they inherit from their mother and the other from their father. The dominant version of the trait will always overpower the recessive version of the trait and will be expressed by the offspring. The probability of inheriting specific traits can be determined using a graphical technique called a Punnett square.

VOCABULARY

Breed – A group of animals within a species having a distinct appearance; that share similar traits.

Dominant Traits – A trait from a gene that expresses itself more prominently than another.



Genes – Comprised of DNA bases, genes are the basic unit of heredity defining traits.

Heredity – The passing of traits from parents to offspring.

Polled – Cattle that lack horns.

Punnett Square – A tool used by scientists to predict the genotype/instructions that are possible for offspring from a particular male and female based on their genetics.

Recessive Traits – A trait from a gene that expresses itself less prominently than another.

Traits – A genetically determined characteristic or feature.

LESSON PREPARATION

**Lesson is designed using a PowerPoint format. This is done to provide structure and speaking points. It also provides visual aids to help youth understand what is being discussed. In a less formal setting, a PowerPoint may not be appropriate, and educators may select not to use the formal presentation. Individual slides can be printed to provide visual aids.*

- Ensure the ability to play YouTube videos.
- Prepare to have students work in the same groups as they did for Lesson 1. In this lesson, they will work together to identify what their cattle herd looks like.
- Spend some time familiarizing yourself with the content of this lesson and selecting the version of the lesson that is most appropriate for your youth. The different versions have been designed with a broad audience in mind and several levels of understanding. In all versions of the lesson, youth are asked to use observation skills to identify physical traits that offspring inherit from their biological parents. In the case of students themselves, an example would be eye color and within cattle, hair color. Dominant vs. recessive traits are discussed. Youth utilize dice to determine what gene is inherited from their bull and which is inherited from their cow to determine their calf's physical traits.
 - **Version 1:** Within this version, youth are provided with information regarding a specific bull and cow pair. They are given information about genetics related to color, white markings, and horns. Youth follow instructions in the worksheet to identify what version of the genes are inherited from each parent. There are six different cow-bull pairs provided so that different teams/ranches can have different pairs and potential outcomes.
 - **Version 2:** Within version two, youth are provided three Punnett squares for their cow-bull pair (color, white markings, and horns). They identify the probability of different outcomes and identify what characteristics their calf has utilizing dice. There are six different cow-bull pairs provided so that different teams/ranches can have different pairs and potential outcomes.
 - **Version 3:** In this version, youth are provided a blank Punnett square along with genetic information for a cow and bull pair. They are asked to fill out the Punnett square, determine the probability of different outcomes and then utilize dice to determine their calf's physical traits. There are six different cow-bull pairs provided so that different teams/ranches can have different pairs and potential outcomes.
 - **Version 4:** Youth are provided a blank Punnett square and both a cow catalog and a bull catalog. They are asked to select a cow and a bull and fill out the Punnett square accordingly. They will then utilize dice to determine their calf's physical traits.
- Print out Beef Breeds for the youth to look at.
- Outreach Option: This activity can be facilitated in a community outreach scenario by simplifying it even more. This can be done by creating three di. One that indicates calf color (yellow, black, white, black, red, and brown); one that indicates horns (short curved horns, long curved horns, no horns, no horns, short straight horns, and long straight horns); and one for markings (no markings, white face, blaze, white face, spotted, and various white markings). These can be words or pictures. See example below.



LESSON INSTRUCTIONS

**Detailed notes are contained within the PowerPoint notes section for each slide.*

- I. Lesson 1 Review (Slide 2)
- II. What is a trait? (Slide 3)
- III. Recognizing human traits that are inherited from biological parents. (Slide 3-4)
- IV. Dominant vs Recessive Traits (Slide 4-9)
- V. Cattle Traits (Slide 10)
- VI. Cattle Breeds (Slide 11)
 - a. Hand out breed sheets for youth to review.
 - b. Discuss what they notice about the different breeds. What similarities are there between them? What differences?
- VII. Building Your Herd (Slide 12-14)
 - c. Prepare for the activity by handing out the appropriate Building the Herd worksheets. Youth can complete this in small groups or as individuals.
 - i. Example
Slides contain an example of determining the white markings. Youth will repeat the steps on their worksheets to identify their calf's color, white markings, and horns. Once youth have identified their traits proceed to the next slide and they can watch the video (Final Slide) as they color their calf.
 - ii. Version 1 (Slide 15-20)
 - iii. Version 2 (Slide 15-20)
 - iv. Version 3 and 4 (Slide 15-24)
The Version 4 groups will utilize the Cow and Bull catalogs to pick out their own bull and cow to use and fill out the Punnett squares accordingly and identify what their calf looks like.
- VIII. Meet Your Adopted Cow/Calf Pair Video (Last slide of each version)
Angus Simmental (youtu.be/26S6Yuc49zE)
Charolais (youtu.be/wP6oY9m5pGE)
 - d. Review what was learned in the video.
 - i. What breed is your cow/calf pair?
 - ii. What happens to the baby once it is born? How does this compare to a human baby?
 - iii. What other take-away points were there?

LITERATURE TO EXPLORE

Looking for literature to further explore topics from this lesson? Check out these books:

The Cow Book. by CJ Brown

Explore cattle breeds from A to Z.

Harvey by Michelle Weber

This colorful illustration follows Harvey the Hereford calf through his very first day on the ranch.

PHOTO CREDITS

- Hereford photo courtesy of Henry Elder/Encyclopedia Britannica, Inc.
- American Angus Association
- American Hereford Association
- North American Limousin Foundation
- Red Angus Association of America
- American Shorthorn Association
- American Simmental Association

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ANGUS



Photos courtesy of American Angus Association

Origin – Aberdeen and Angus Counties of Scotland

Arrival in U.S. – 1873 Kansas

Color – Solid Black

Weight – 1000-1300 lbs

Horns – None (Polled)

Other Descriptors – Moderate frame size, small, upturned ears

Important Traits – Excellent meat quality (nicely marbled), calving ease, and hardy



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CHAROLAIS



Origin – Charolles, France

Arrival in U.S. – 1934 Texas

Color – White to cream with pink muzzle, pale hooves

Weight – 700-1650 lbs

Horns - Horned or Polled (no horns)

Other Descriptors – Medium to large frame and short broad head

Important Traits – Heavily muscled, excellent grown rate, good feed conversion, and late maturity



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HEREFORD



Calf photo courtesy of Pixabay.com

Other photos courtesy of American Hereford Association

Origin – Herefordshire, England

Arrival in U.S. – 1817 Kentucky

Color – Rust brown to deep rich red body with white on face, crest, dewlap, underline, switch, and legs below the knee and hock.

Weight – 675 – 1075 lbs

Horns – Horned or Polled (no horns)

Other Descriptors – Moderate frame, deep brisket, broad head, and stocky legs

Important Traits – Foraging ability, docile, and good fertility



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LIMOUSIN



Photos courtesy of North American Limousin Foundation

Origin – Limousin and Marche regions of France

Arrival in U.S. – 1971 Kansas

Color – Yellow straw to reddish gold with lighter color under the stomach, inside the thighs and around eyes and muzzle. Breeders have recently selected for black coloring as a marketing strategy as consumers have begun to associate black hide with quality.

Weight – 1433-2205 lbs

Horns – Horned or Polled (no horns)

Other Descriptors – Medium to large frame size, long-bodied, short neck, and small head

Important Traits – Heavily muscled, high carcass yield, growth rate, and feed efficiency.



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RED ANGUS



Photos courtesy of Red Angus Association of America

Origin – Aberdeen and Angus Counties of Scotland

Arrival in U.S. – 1873 Kansas

Color – Red to reddish brown

Weight – 1000-1300 lbs

Horns – None (Polled)

Other Descriptors – Polled (hornless), moderate frame size, small upturned ears.

Important Traits – Excellent meat quality (nicely marbled), calving ease, and hardy, more heat resistant than black angus



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SHORTHORN



Photos courtesy of American Shorthorn Association

Origin – Tees River Valley in England

Arrival in U.S. – 1783 Virginia

Color – Red, white, red and white, or roan

Weight – 1200-1400 lbs

Horns – Horned or Polled (no horns)

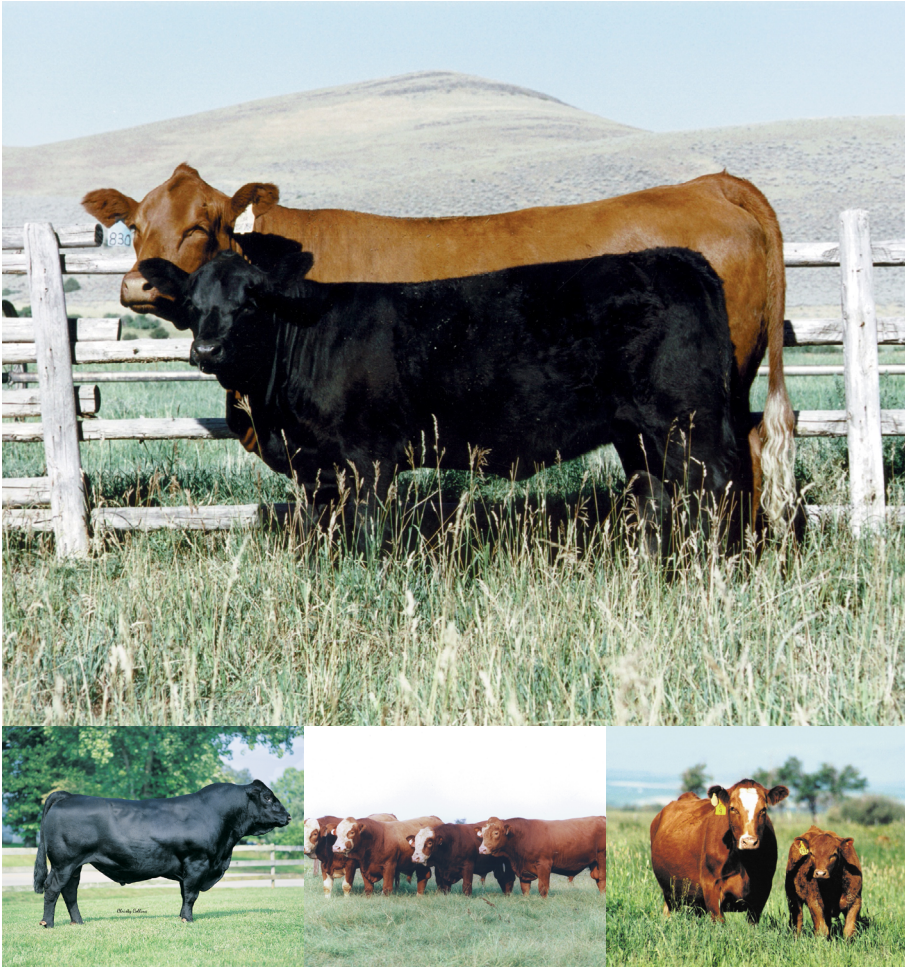
Other Descriptors – Moderate frame size, short broad head, wide-set eyes, and short horns. Developed to produce both dairy and beef.



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SIMMENTAL



Photos courtesy of American Simmental Association

Origin – Simme Valley of Switzerland.

Arrival in U.S. – 1887 Illinois

Color – Yellow-brown to dark red with white markings on the head, brisket, belly, and lower parts of the legs. May have white patches on the body. Breeders have recently selected for black coloring as a marketing strategy since consumers associate black hide with quality.

Weight – 1500-2900 lbs

Horns – Horned or Polled (no horns)

Other Descriptors – Large frame size, horned or polled, and long and deep bodied.

Important traits – Heavily muscled, high carcass yield, growth rate, feed efficiency, and milk production.



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