

Adopt-A-Cow: Beef

Lesson 3.5: Moo Management

KEY TERMS

Calving, Weaning, Checks & Balance, Vaccine, Veterinarian

EDUCATION STANDARDS

Mathematics

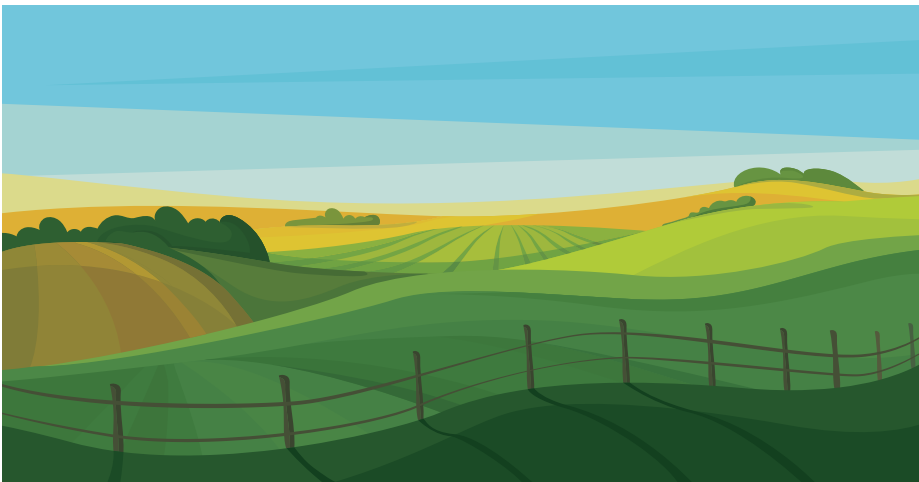
- 3.MD.C.9, 3.NF.A.1, 3.NF.A.3.c

Mathematics Practices

- SMP 3, SMP 5, SMP 6

TIME NEEDED

Board Game: (50 min)



EXPECTED LEARNER OUTCOMES

OBJECTIVE 1 – Youth explore the impact vaccinations can have on herd health as they make decisions related to caring for their own herd during a board game.

BACKGROUND

The most important job of a rancher is to ensure that his/her livestock remain healthy and safe. Ranchers care for their animals like parents and other guardians care for their children. They ensure their animals have all their basic necessities (food, water, and shelter) and they ensure that they remain in good health. To ensure their health they provide vaccines to protect them from illnesses and antibiotics to treat infections. On occasion they also employ veterinarian assistance in caring for these animals. Ranchers track the health history of their livestock, just like doctors track growth charts and immunizations for humans.

VOCABULARY

Colostrum – a nutrient rich, first milk produced by a mother during pregnancy. It provides newborn animals with a boost of immunity support during their first weeks of life.

Placenta – the organ that serves as the sac where the baby grows when in its mother's uterus.

Pneumonia – an infection that affects the lungs causing them to fill with fluid.

Scours – diarrhea of young animals that can cause severe dehydration and even death in young animals.

Uterus – the muscular organ that protects a baby while it develops.



Vaccine – a medical solution used to provide active immunity to specific infections or diseases.

Veterinarian – medical professional who practices medicine on animals.

Weaning – the process of removing the baby calf from its mother's milk and replacing the milk with a grass and/or grain-based diet.



GAME SET UP

SET UP

Print the following components of the game.

A description of the item, its corresponding page number or file name, and the number of copies needed for classroom style game are shown in the table below. If you intend to have your class do the game in small groups, you will need to multiply the number of copies by the number of groups.

Table 1. Components and Quantities

Game Components	Number of Copies	Page Number
Instructions	1	2-4
Game Board	1	Separate document
Large Pen	4 (one for each team)	5
Calf Pen	4 (one for each team)	5
Game Pieces	1	6
Vaccinated Calf Cards	5	7
Unvaccinated Calf Cards	5	8
Vaccinated Cow Cards	5	9
Unvaccinated Cow Cards	5	10
\$100 Bills *optional see note	5	11
\$50 Bills *optional see note	4	12
\$20 Bills *optional see note	10	13
\$10 Bills *optional see note	6	14
\$5 Bills *optional see note	10	15
Checks and Balances Sheet	12 (three for each team)	16
Cost List	4 (one for each team)	17
Barn Cards	1*	18-27

*The Barn Cards should be printed double-sided.

Once all components have been printed, cut them out. To increase longevity of materials, laminate them.

To make your game pieces stand up as they travel around the board, fold them into a triangle and add tape.



Figure 1. Game Piece Configuration Using Tape.



GAME INSTRUCTIONS

You and your team are about to embark on your first two years as a cattle producer. You may find that ranching can be a challenge. Droughts and severe storms, equipment problems and outbreaks of animal disease can all occur unexpectedly. Despite these challenges, your goal is to make as much money as possible in these two years by managing your cattle herd.

To manage your herd, you need to make decisions related to when to buy and sell cattle as well as how to protect them from disease.

There are different practices ranchers can use to protect their animals from disease.

- Animals can be vaccinated before bringing them onto the farm to protect against certain diseases. This is a great way to prevent certain diseases, but it can be expensive.
- Vaccines can also be given to new calves to boost their immune systems as they grow older and enter the herd.

To save money, some farmers may choose to not use disease prevention practices. However, sometimes animals can carry a virus, bacteria or pest and not appear sick. If a farmer purchases one of these animals and it infects the existing herd, it could end up costing more than a prevention option.

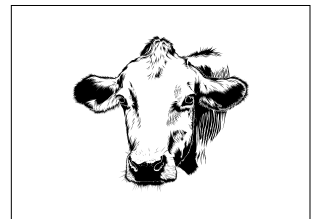
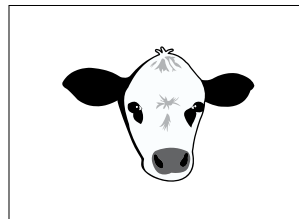
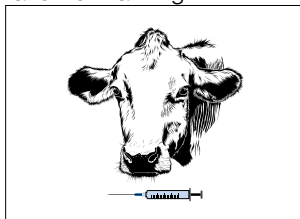
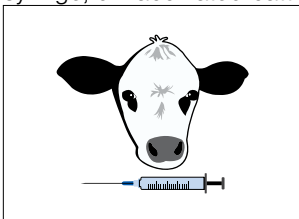
Time to Play: 1 hour

Game Inventory:

- Game board (1)
- Large pen (4)
- Calf pen (4)
- Barn cards (1 set, total of 40 cards)
- Game pieces (6)
- Vaccinated Calf Cards
- Unvaccinated Calf Cards
- Vaccinated Cow cards (1 set, total of 100 cards)
- Unvaccinated Cow Cards
- Checks and balances sheets (3 per team)
- Cost list (1 per team)
- Pencils (1 per team)
- Dice (to speed up the game use 2 die, otherwise 1 dice is perfect)
- Money (50- \$100 bills; 40- \$50 bills; 100- \$20 bills; 60- \$10 bills; 100- \$5 bills) *optional

Game Setup:

- Divide the youth into 4-5 teams.
Each team will start the game with (if you have enough game boards/pieces, you may chose to play this as individuals rather than teams).:
 - 1 large pen
 - 1 calf pen
 - 10 cows – Teams will need to identify if they have vaccinated cows or not. Vaccinated cattle are marked with a syringe, unvaccinated cattle have no marking.



- 3 checks and balances sheets – They will start with a balance of \$1000.
- 1 game piece
- *Optional game items:
 - \$1000 (Five \$100s; Two \$50s; Ten \$20s; Ten \$10s; and Twenty \$5s) – If you have larger groups, you can put one in charge of managing money; however, adding money can complicate the game and make it take longer if you have small groups.
- Place the entire set of barn cards on the space labeled “Barn Pile” on the game board.



NOTE: For large groups, you may want to divide the class in half, and then create 4 teams (8 teams total) playing on two separate game boards. If you set up 2 game boards, you will need two sets of all the materials listed above.

- Each player on the team should be assigned one of the roles listed below. If there are fewer or more than 4 people on a team, players may hold multiple roles or share tasks.

Team Roles:

If playing as individuals these roles are not necessary; however, they can be used to keep everyone within a group engaged in the game.

Rancher: This player will be the team leader. He or she will inform the accountant of money earned and spent, coordinate the buying and selling of animals with the purchaser, and will make sure the farm has the equipment needed.

Ranch Hand: This player will make sure that cattle are kept in their appropriate pens and will help the purchaser track the animals' health status.

Accountant: This player will keep track of money spent and earned on the checks and balance sheet.

Purchaser: This player will be responsible for the buying and selling of cows.

Teacher Role: Will run the slaughterhouse and auction. Will sell cows to and buy cows from each team and collect/pay money. The prices for cows bought or sold are listed on page 18.

LET'S PLAY:

- Team 1 begins the game. During each turn, teams will roll the die and advance their piece forward the number of spaces indicated, in the direction of the arrow.
- The Accountant for the team must fill out the checks and balances sheet for all money spent and earned. (See the checks and balances sheet for examples.) It is best practice for teams to keep no less than what their overhead expenses would be on hand. (For example for 20 head, they should have no less than \$80 in their account).
- Each team must follow the instructions for the space where they land.

STOP! Calving Day Space: You have reached calving season!



- You will roll a single die to determine how many of your cows will calve.
 - If you roll a 1, 3, 5 = $\frac{1}{2}$ of your cows calve,
 - If you roll a 2, 4 = $\frac{1}{4}$ of your cows calve, and
 - If you roll a 6 = All cows calve.
- **Note:** You CANNOT have a partial calf. If $\frac{1}{2}$ or $\frac{1}{4}$ of your herd is a fraction, round up. (example $\frac{1}{4}$ of 10 is 2 $\frac{1}{2}$, so 3 of your cows have calves.)
- You will need to determine if your calves will be vaccinated or not vaccinated.
 - To vaccinate your calves it will cost \$5/calf.

Calves will be kept in the calf pen until weaning and CANNOT be sold until they are weaned.

STOP! Weaning Day Space: Weaning is when baby calves stop getting milk from their moms and begin getting all their nutrients from the forages and grains that they eat.



- You will roll a single die to determine how calves are heifers (girls) and how many are bulls (boys). This roll will also indicate how many of your calves you must sell.
 - if you roll an even number = $\frac{3}{4}$ of your calves are heifers. Sell all bull calves.
 - if your roll an odd number = $\frac{1}{2}$ of your calves are heifers. Sell all bull calves.
- Heifer calves and bulls that you will be keeping will be moved to the large pen.
 - Once in the large pen calves can be sold.
 - At one year old, these calves will not have babies and therefore, will NOT be used when calculating number of calves on your next calving date.

Blue spaces: The auction is open.

- The team may buy and sell cows at auction (see price sheet).
- When purchasing, teams will be able to select vaccinated or unvaccinated cows.

Yellow (safety) spaces: The auction is closed. The team should use this time to discuss and revise animal disease management strategies. They should also assess their herd size and ability to continue to pay overhead.

Draw Card spaces: When a team lands on a “Draw Card from Barn Pile” space they must draw a card from the barn card pile and follow the instructions on the card. The team must read the instructions aloud as the event on the card may impact more than one team.

New Day spaces: It's time to start a new day. On the start of each new day, teams must pay their overhead expenses. Overhead pays for the various things that are required for the ranch's operation like feed, electricity, and payroll. The overhead expenses can be found on the price sheet.

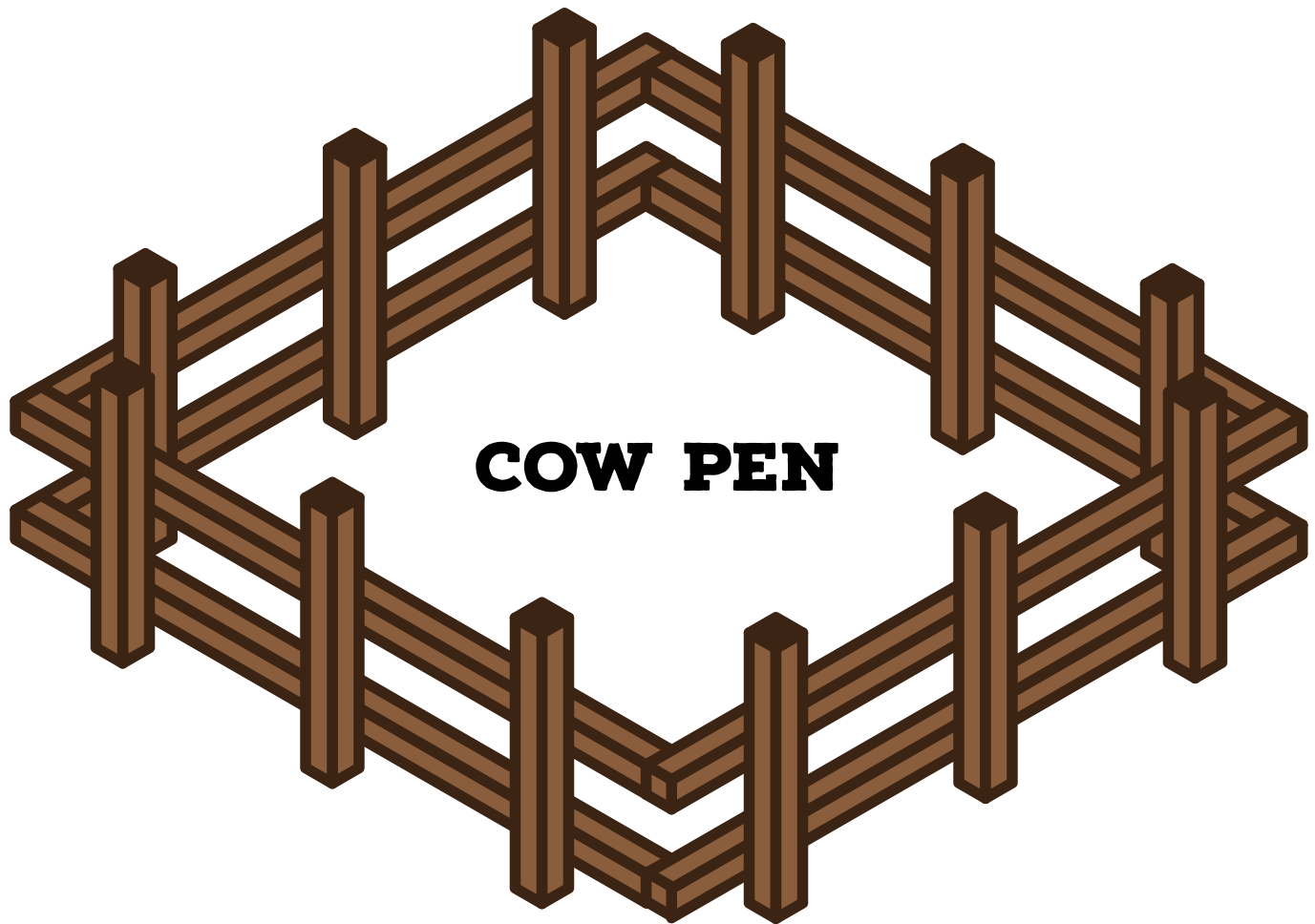
- IV. **Finishing the Game:** Once teams have completed two trips around the board, the game is over. Teams should tally up their farm's value which includes the sum of money and cows. The team that has the most money wins!

Continuing On: If time allows and youth want, the game can continue. When youth pass start the second time, they will trade all their calves, for cows and continue on as before.

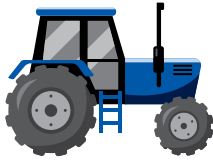
FREQUENTLY ASKED QUESTIONS:

What happens if you run out of money? – If a team runs out of money, they can give the bank cows equivalent to the dollar amount they owe. Then the next time they reach a blue square they need to sell a portion of their herd.

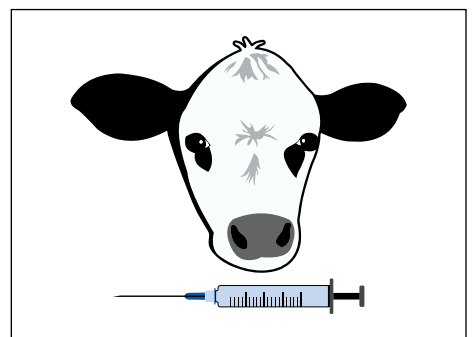
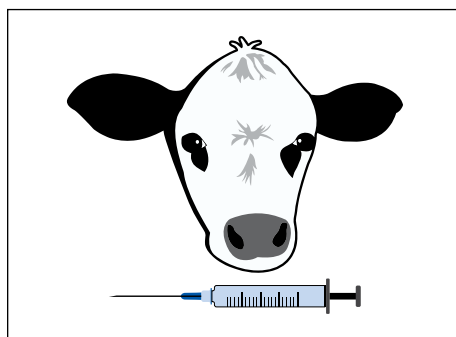
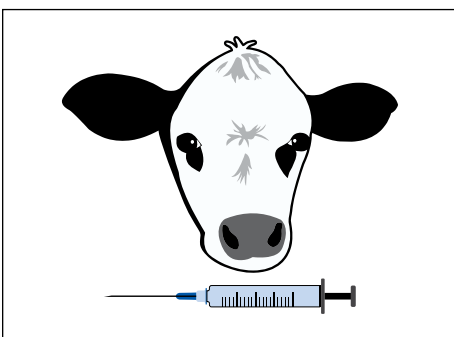
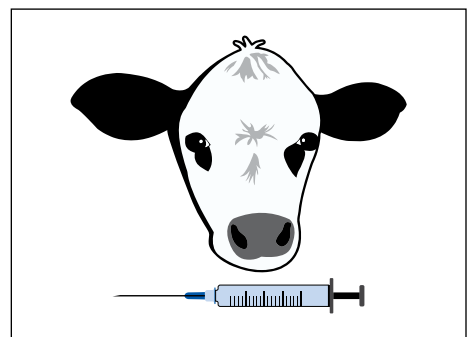
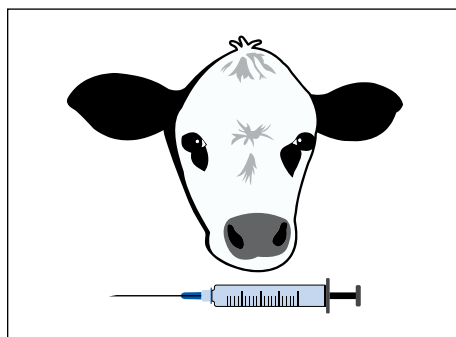
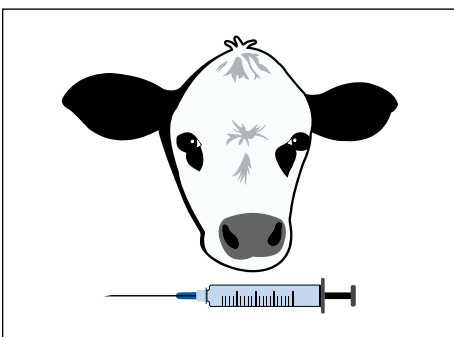
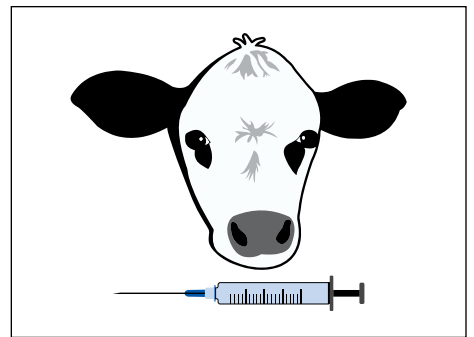
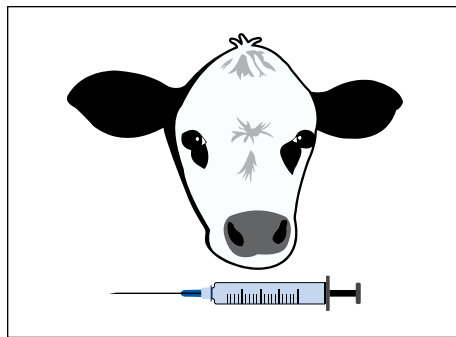
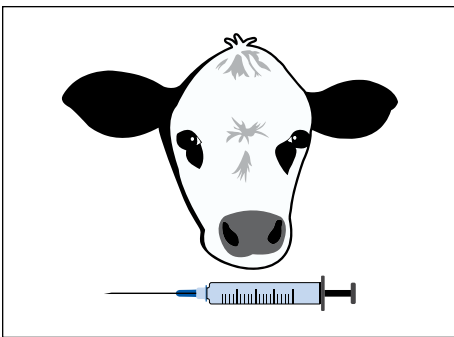
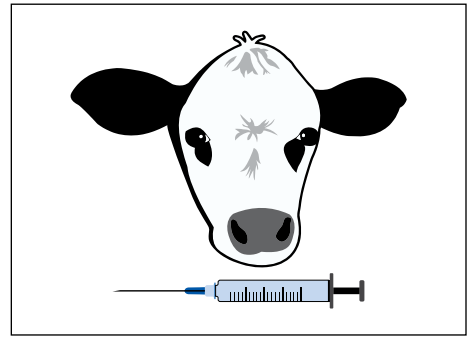
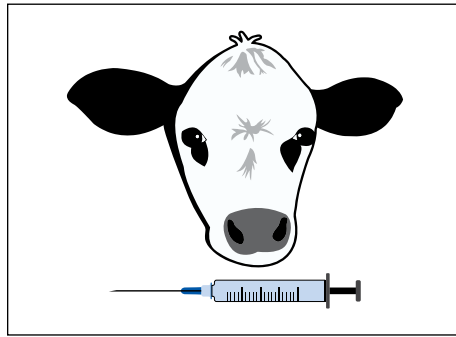
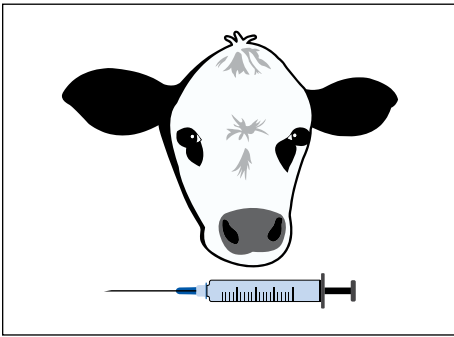
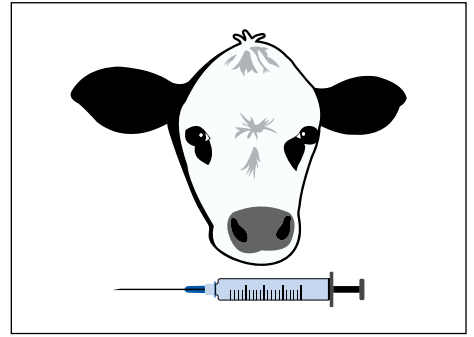
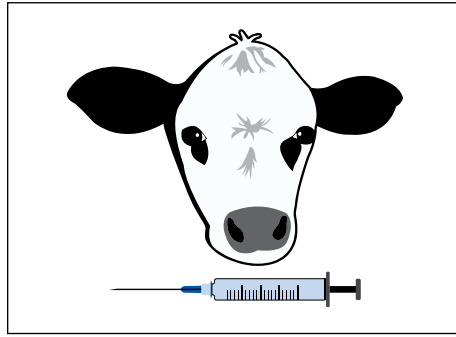
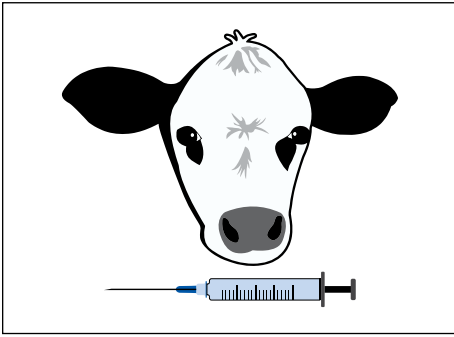




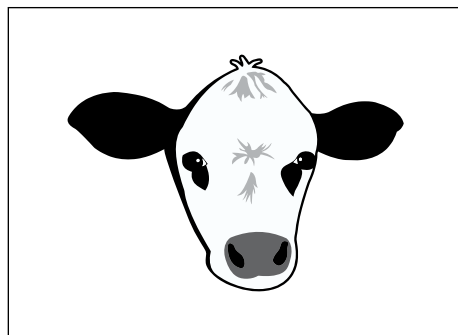
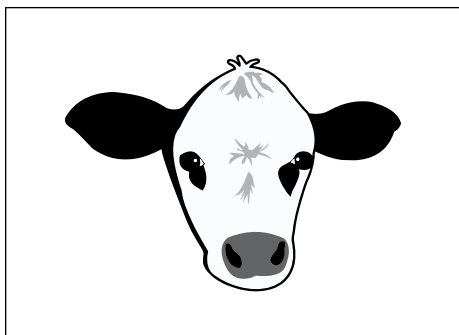
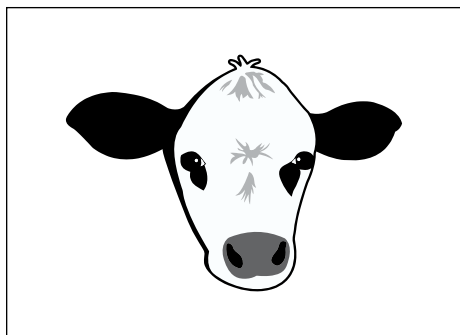
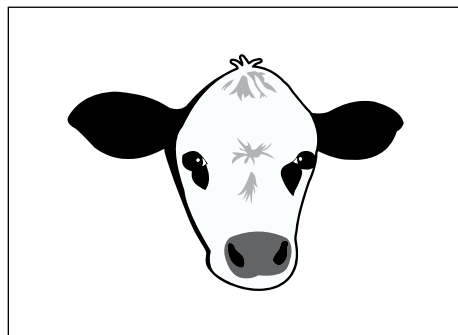
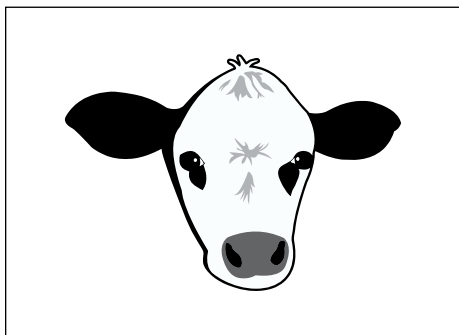
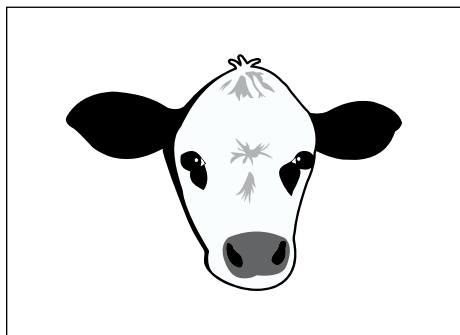
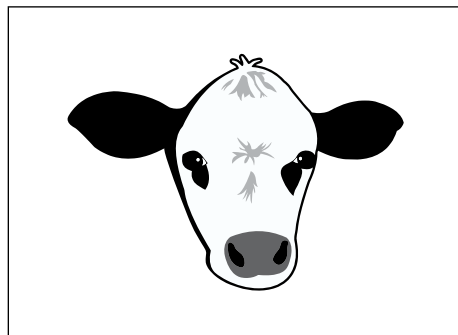
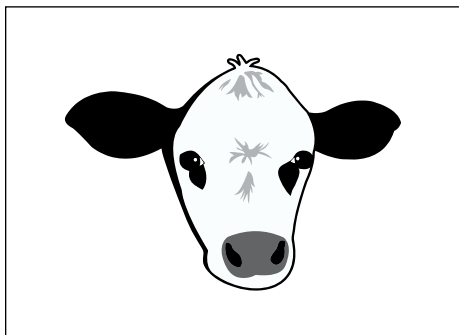
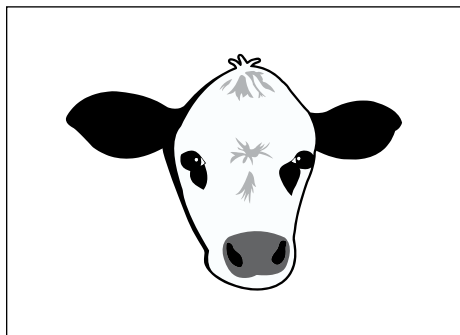
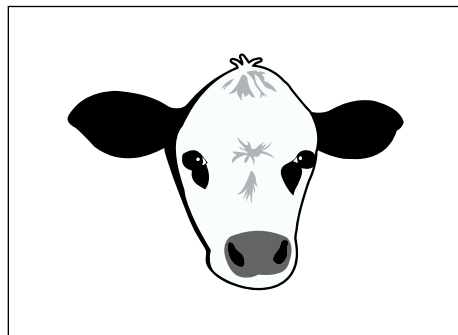
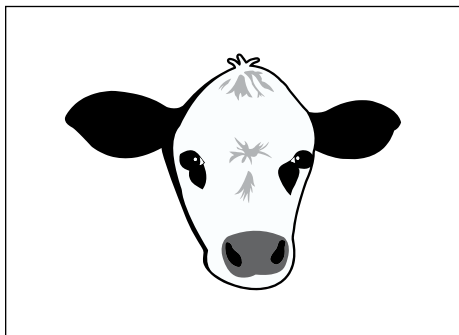
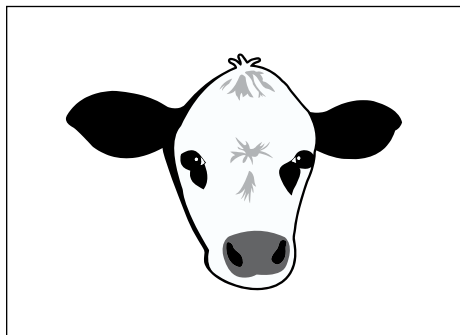
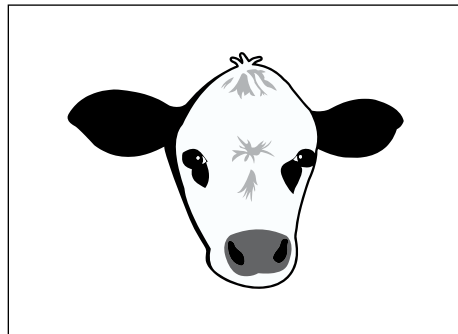
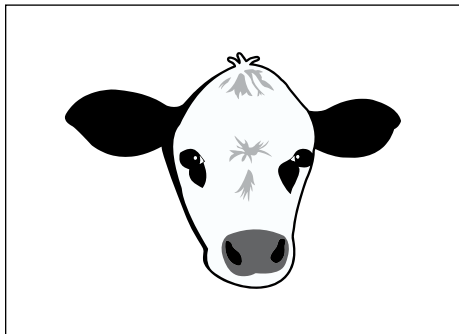
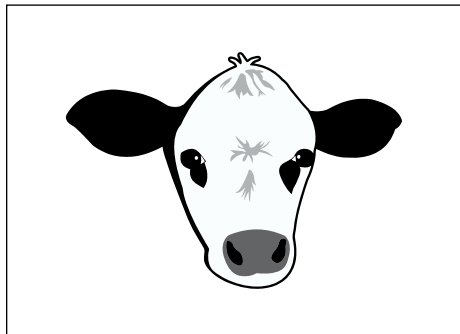
GAME PIECE



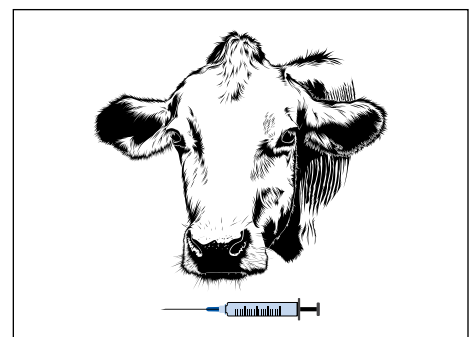
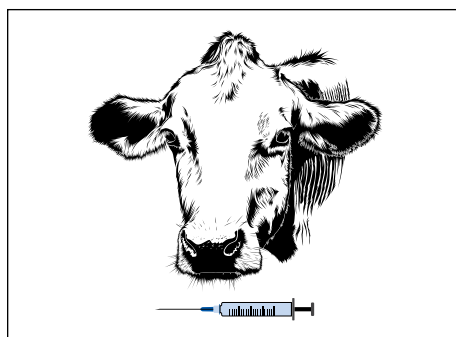
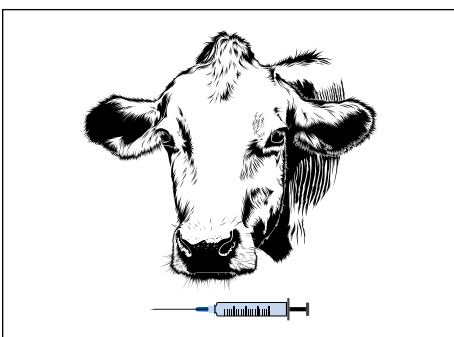
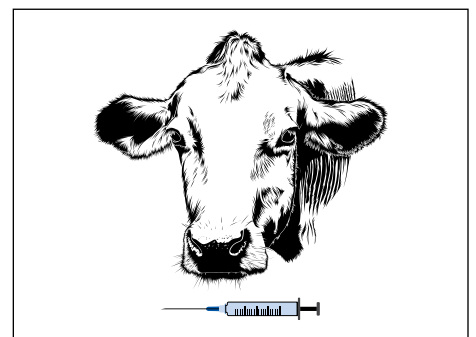
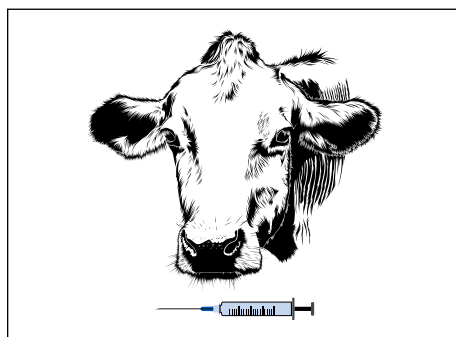
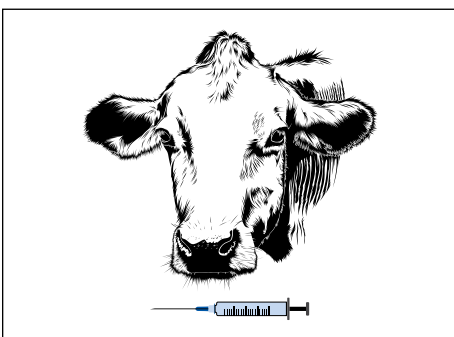
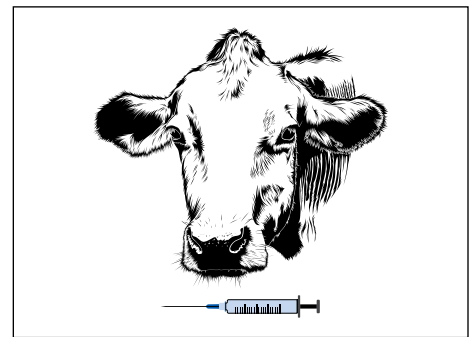
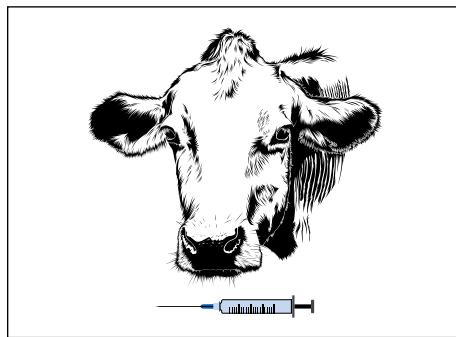
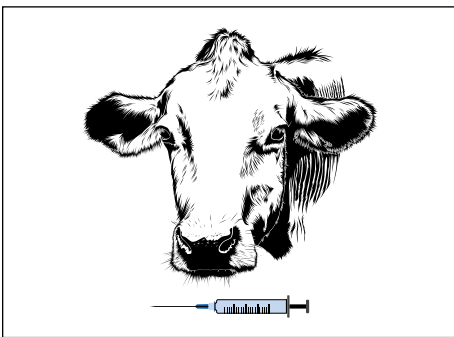
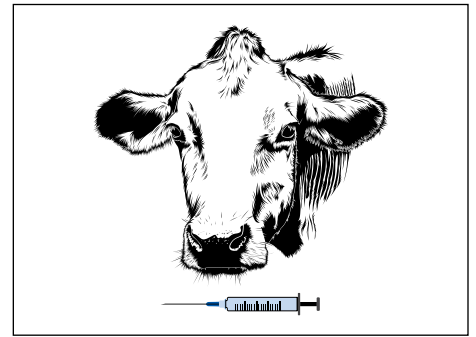
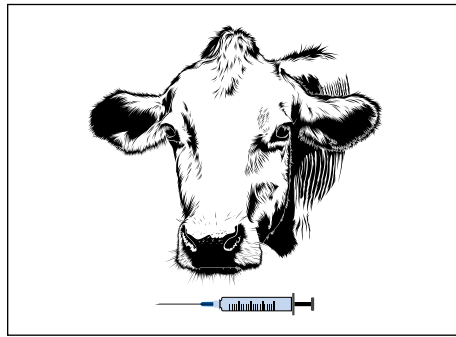
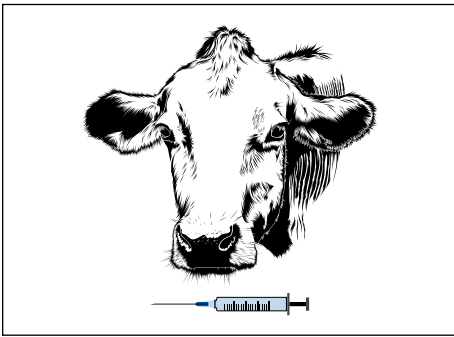
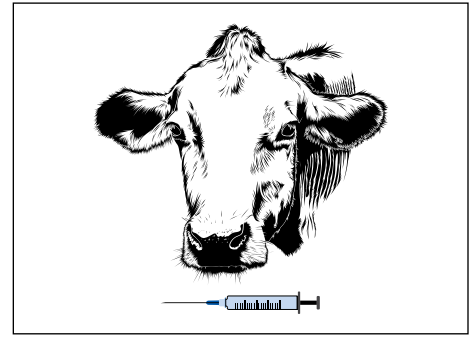
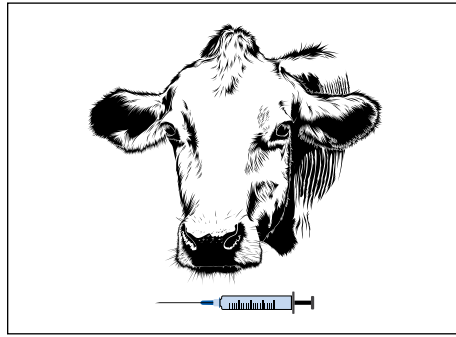
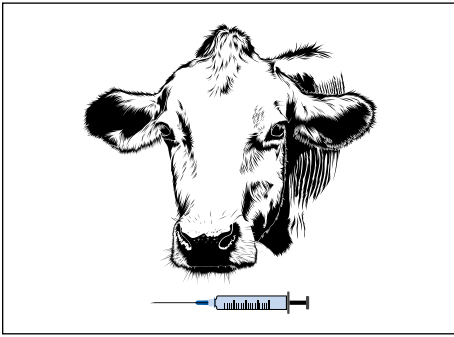
VACCINATED CALF CARDS



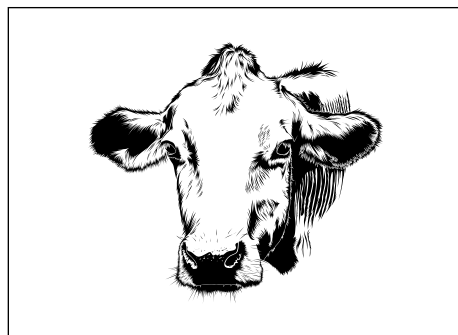
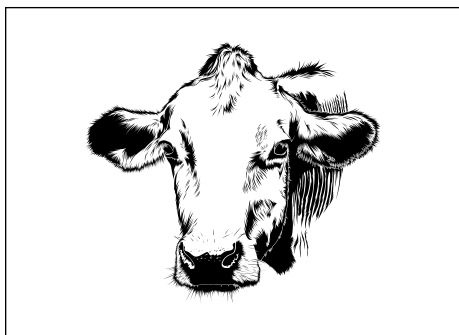
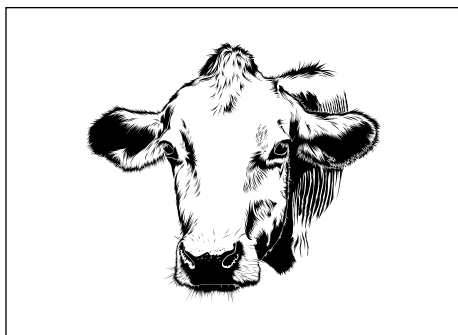
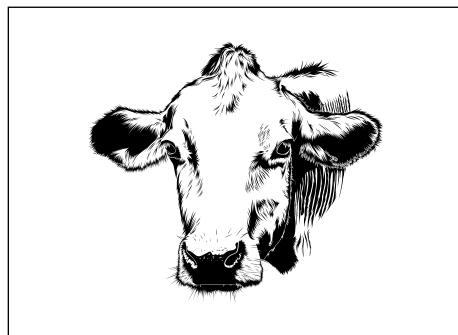
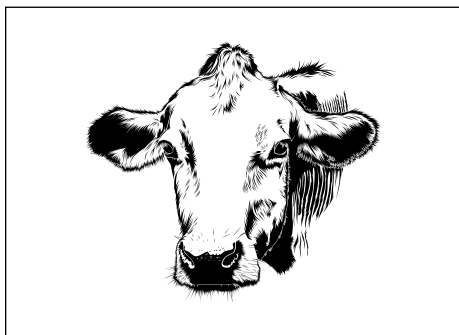
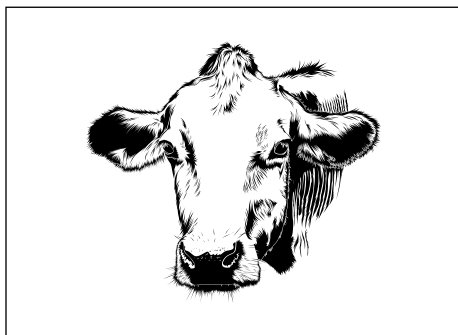
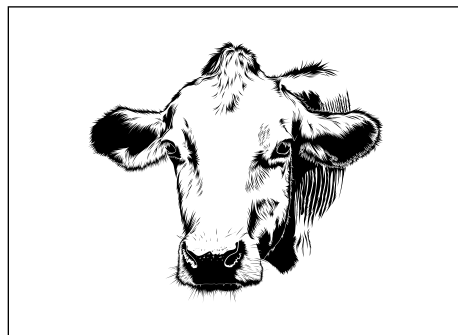
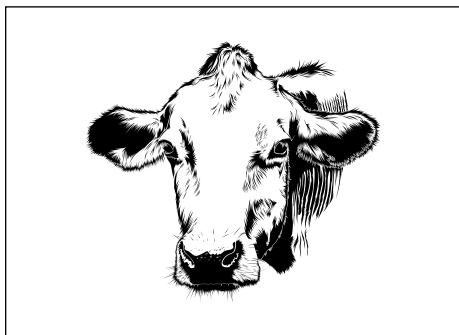
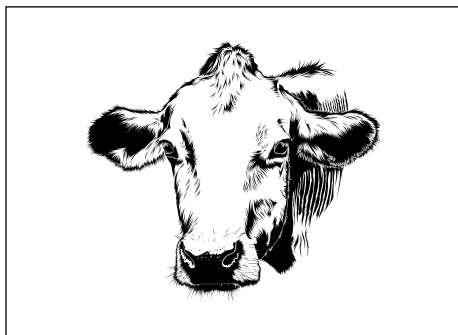
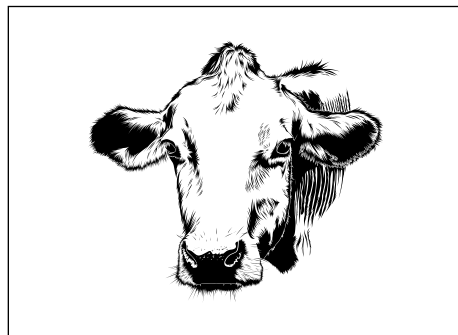
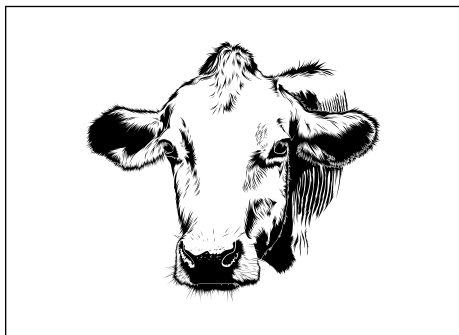
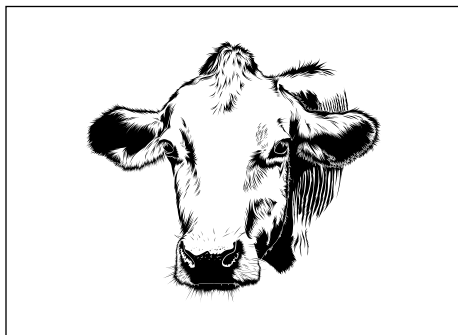
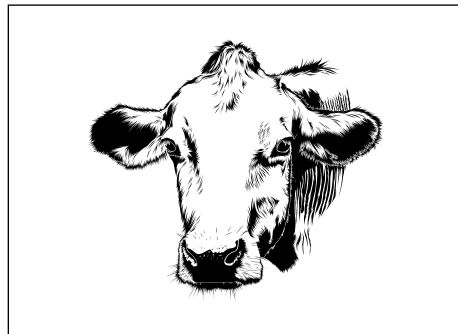
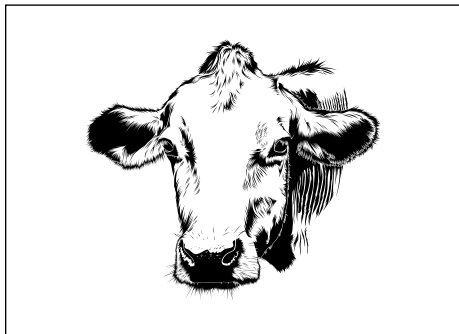
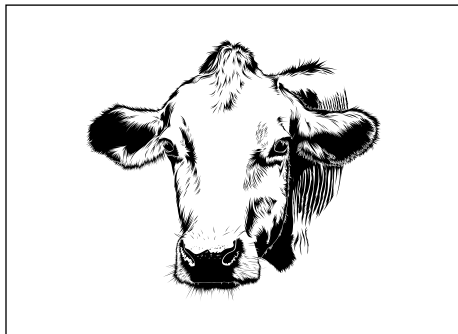
UNVACCINATED CALF CARDS



VACCINATED COW CARDS



UNVACCINATED COW CARDS



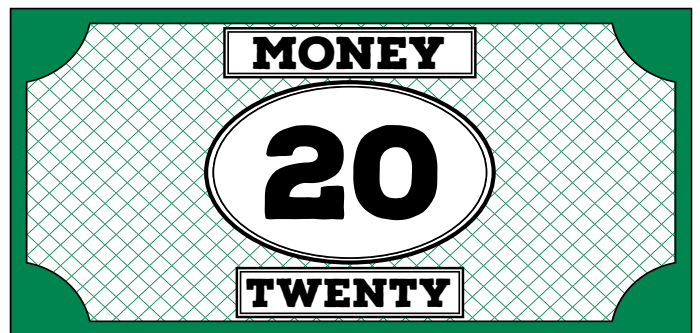
\$100 BILLS



\$50 BILLS



\$20 BILLS



\$10 BILLS



\$5 BILLS



CHECKS AND BALANCE SHEET

Starting Funds = \$1000

Action	Quantity	X	Rate	=	Total Cost	Funds on Hand + Total Cost	=	Remaining Funds
Example: Bought-Unvaccinated cows	5	X	\$10.00	=	-\$50.00	\$1000-\$50	=	\$950.00
Example: Sold-Unvaccinated cows	2	X	\$20.00	=	+\$40.00	\$950 + \$40	=	\$990.00
Example: Received Award	1	X	\$100	=	+ \$100	\$990 + \$100	=	\$1090.00
		X		=			=	
		X		=			=	
		X		=			=	
		X		=			=	
		X		=			=	
		X		=			=	
		X		=			=	
		X		=			=	
		X		=			=	
		X		=			=	
		X		=			=	
		X		=			=	
Total							=	\$



**SOUTH DAKOTA STATE
UNIVERSITY EXTENSION**



COST LIST

Auction prices:

Purchase price

- Unvaccinated cows = \$10.00 (each)
- Vaccinated cows = \$20.00 (each)

Selling price

- Unvaccinated cows = \$20.00 (each)
- Vaccinated cows = \$30.00 (each)
- Unvaccinated calves = \$10.00 (each)
- Vaccinated calves = \$15.00 (each)

Cost of additional items:

- Overhead cost (paid daily) = \$20 per 5 animals (i.e. \$20.00 1-5 animals; \$40.00 6-10 animals; \$60.00 11-15 animals; \$80.00 16-20 animals; \$100 21-25 animals; \$120 26-30 animals; \$140 31-35 animals; \$160 36-40 animals)

Animals = number of cows + number of calves



BARN CARDS



BARN CARDS

A disease outbreak affects cows.

Roll a die to determine what happens.

The following rules apply:

- Roll 1-2 = no loss
- Roll 3-4 = lose 2 cows
- Roll 5-6 = lose 5 cows

A disease outbreak affects cows.

Roll a die to determine what happens.

The following rules apply:

- All cows are vaccinated = no loss
- Some cows are unvaccinated = lose 3 cows
- Whole herd of cows is unvaccinated= lose 5 cows

The grain elevator is broken.

You must pay the teacher \$100 to repair the damage.

Coyotes have been spotted on your property.

Pay the teacher \$100 for removal.

A torrential rain causes flooding. Pastures and are flooded. Cattle are forced to swim to higher ground. You loose 2 calves and must pay \$100 to repair flood damage.

There is a vaccine shortage!

No teams can purchase vaccinated cows for their next two turns.

Leave this card face-up on the board until all the players have completed their next turn.

You invented a nutrition supplement that is popular with other producers.

All teams must pay you \$50.

Here's to the lucky!

If you have not yet lost any cows to disease, collect \$50 from the teacher.



BARN CARDS



BARN CARDS

A disease outbreak affects the calves.

Roll the die to determine what happens.

The following rules apply:

- Roll 1-2 = lose 5 calves
- Roll 3-4 = lose 2 calves
- Roll 5-6 = no loss

A disease outbreak affects the calves.

The following rules apply:

- All calves are vaccinated = no loss
- Some calves are vaccinated = lose 3 calves
- No calves are vaccinated = lose 5 calves

You want to learn about biosecurity from the veterinarian of the team who has the largest farm.

Pay the team with the largest number of cattle \$50 to have them train your staff.

The local cattle producer's association has given you an award for building a culture of biosecurity on your farm.

Collect \$100 from the teacher.

The market is flooded with cows! The price of cows has dropped. Selling prices decrease by \$10 per cow for all players on their next turn.

Leave this card face-up until all players have completed their next turn.

A bacterial disease outbreak affects cows.

Roll the die to determine what happens.

The following rules apply:

- Roll 1-2: lose 4 cows
- Roll 3-4: the vet can come out and treat the animals. No loss.
- Roll 5-6: the vet can come out and treat animals, but only a few get better. Lose 2 cows.

You need new boots to wear on the farm!

Pay the teacher \$20 to replace your boots.

A disease outbreak has occurred at the farm down the road. Only vaccinated animals can be sold on each team's next turn.

Leave this card face-up until all players have completed their next turn.



BARN CARDS



BARN CARDS

The tractor will not start.
Pay the teacher \$50 to repair.

A pharmaceutical company is conducting a clinical trial.
You may vaccinate up to 5 unvaccinated cows and up to 5 calves on your farm for free.

A bacterial disease outbreak affects calves.

Roll the die to determine what happens.

The following rules apply:

- Roll 1-2: the vet can come out and treat all sick calves. No loss.
- Roll 3-4: the vet can come out and treat the sick calves, but not all get better. Lose 3 calves.
- Roll 5-6 : lose 5 calves.

A disease outbreak affects cows.

The following rules apply:

- All cows are vaccinated = no loss
- Some cows are vaccinated = lose 3 cows
- No cows are vaccinated = lose 5 cows.

The boot washing station is old and needs to be replaced. Pay the teacher \$50.

A disease outbreak affects calves.

The following rules apply:

- All calves are vaccinated = no loss
- Some calves are vaccinated = lose 2 calves
- No calves are vaccinated = lose 5 calves

A disease outbreak affects cows.

The following rules apply:

- All cows vaccinated = no loss
- Some cows vaccinated = lose 3 cows
- No cows vaccinated = lose 5 cows

You just found out that your best employee is working on another farm as well.

Pay \$50 to the teacher to train the employee that is a disease risk for you and your cattle.



BARN CARDS



BARN CARDS

A tornado has blown through town.

The auction barn is closed to all players until their next turn.

Leave this card face up on the board until all players have completed their next turn.

A special coupon came in the mail.

You can vaccinate all previously unvaccinated animals for \$50 dollars.

If you do not have any unvaccinated animals, receive \$50 dollars from the teacher.

Pests have destroyed the grain crop and cattle feed is scarce.

Pay an additional \$20 in overhead costs to the teacher.

A derecho damaged your farm.

Pay the teacher \$10 for repairs.

Your cows have experienced a vaccine reaction and died.

Return 5 vaccinated cows to the teacher.

If you have fewer than 5 vaccinated cows, return all of them to the teacher.

A disease outbreak occurred at the auction.

No cows can be purchased for the next 2 turns. Leave this card face up on board until all teams complete their next 2 turns.

A disease impacts your cow herd.

All unvaccinated cows will not have calves this year.

Sell all unvaccinated cows on this turn for \$5 dollars each.

The auction barn is having a sale!

Any team can sell cows for double the price on their next turn.

Leave this card on the board until all teams have completed their next turn.



BARN CARDS



BARN CARDS

Severe drought conditions reduce the amount of grazing pasture available to your herd.

Pay \$10 per animal to purchase hay to feed them **OR** sell 50% of your cows at a reduced price (Unvaccinated cows = \$5.00 each and Vaccinated cows = \$10.00 each)

Your fence is in disrepair and your cattle have gotten into your neighbor's corn.

Pay the teacher \$100 for damages.

Your neighbor stops by the farm in his dirty work boots. You know he had a sickness go through his cow herd this week.

Some of your cows got sick.

Pay \$100 to the teacher for medicine to treat the animals.

You purchased an antibiotic to keep on hand for sick animals.

Keep this card to use to prevent loss of animals due to disease.

If you have not yet lost any cattle to disease, collect \$50 from the teacher.

You'd like to install a tire-washing station to clean the tires of all vehicles coming on to your farm to guard against disease.

Pay the teacher \$100, but hold on to this card, as it will be worth \$100 at the end of the game.

Your neighbor is looking to purchase 4 vaccinated cows. She is willing to pay \$40 for each cow.

Give the teacher 4 of your vaccinated cows and collect \$160.

Your neighbor is looking to purchase all your unvaccinated cows. He is willing to pay \$15 each.

Give the teacher all your unvaccinated cows and collect \$15 per cow.

