At the Sale Barn

Grades 6-8

Math

Objectives

Through classroom experiences, students will read about cattle auctions and solve math word problems related to buying cattle

Vocabulary

Auction—a sale at which things are sold to those who offer to pay the most

Bid—to make an offer to buy something

Bidder—the person at the auction who is bidding, or making an offer to buy something

Feeder cattle—steers or heifers mature enough to be placed in a feedlot where they will be fattened prior to slaughter

Stocker cattle—male or female cattle fed and maintained until they have reached a desirable weight to be sold for beef production

Background

Oklahoma is cattle country. Everywhere you go in our state, chances are you will see cattle grazing in fields at the side of the road. Our grasslands, that formerly fed vast herds of bison, are perfect for grazing cattle.

In 1910, just three years after statehood, the Edward Morris Company established a packing plant and livestock sales terminal on 120 acres two miles west of downtown Oklahoma City. The city fathers gave financial assistance, and Oklahoma City became the site of the state's first major industry – The Oklahoma National Stockyards Company.

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Livestock sales were handled only by private agreement between the seller and buyer using the services of commission companies, through 1961. At this time, a second method of trade was introduced, the **auction**. The auction provided even greater competition for available livestock.

With the auction came a new spurt of growth, and the Oklahoma National Stockyards Company soon became the world's largest market of **stocker** and **feeder** cattle, selling yearly receipts of well over a half a million head. Since the Stockyards opened, more than 102,000,000 head of livestock have been sold. Cattle auctions are still held Monday and Tuesday each week.

In addition to the Oklahoma National Stockyards, there are about 75 livestock auction barns scattered across the state. Cattle are sold by auction to the highest **bidder**. Swine, goats, sheep, horses and llamas are also sold at sale barns, usually on different days. Most auction barns only have sales on specific days of the week. Certain auction days may be reserved just for beef or dairy cattle or for goats or swine. Cattle may be sold at auction as stockers or feeders. Feeder cattle are sold to feed lots where they are fed until they reach a desired weight to be sold for beef production. Stocker cattle are sold to ranchers to be placed on pasture until they reach a desirable weight to be sold as feeders. Cattle may also be sold as cows, cow/calf pairs and bulls to restock herds.

It is the job of the auctioneer to get the most money possible for an animal or group of animals. Buyers look at the animal's age, size, quality and health. The auctioneer often starts with a high asking price, then drops it until he or she gets the first **bid**. Most auctions have one or more people serving as ringmen. Their job is to watch for bids from the crowd and make sure the auctioneer sees them. Auction chant (also known as "bid calling," "the auction cry," "the cattle rattle," or simply "auctioneering") is a rhythmic repetition of numbers and "filler words" spoken by American auctioneers in the process of conducting an auction. The chant consists of at least the current price and the asking price to outbid. Auctioneers typically develop their own style.

The auction chant is a repetition of two numbers at a time which indicate the monetary amount involved with the sale of an item. The first number is the amount of money which is currently being offered by a bidder for a given item. The second number is what the next bid needs to be in order to become the "high bidder" or simply "the current man on." In between the numbers are "filler words" which are what

the auctioneer says to tie the chant together making it smooth and rhythmic. Filler words serve as a thinking point for both the auctioneer and the bidders. Filler words can serve to make a statement, ask questions, or can simply serve as a means of adding rhythm to the chant (which all filler words should do regardless). Typical filler words, which are taught at schools of auctioneering, are "dollar bid," "now," and "will ya' give me?". The typically taught chant for beginning auctioneers using the following pattern: "One dollar bid, now two, now two, will ya' give me two? Two dollar bid, now three, now three, will ya' give me three?", and continues in this fashion until the crowd stops bidding and the item is sold to the highest bidder.

There are many tongue twisters that auctioneers practice to become an auctioneer. Most tongue twisters involve alliteration. One of the hardest, which auctioneers learn in auctioneer school, is called, "Betty Botter." This tongue twister was written by Carolyn Wells. There are many versions of this tongue twister, but here is one for you to try, if you are interested in becoming an auctioneer.

Betty Botter
By: Carolyn Wells

Betty Botter had some butter,
"But," she said, "this butter's bitter.
If I bake this bitter butter,
it would make my batter bitter.
But a bit of better butter–
that would make my batter better."

So she bought a bit of butter,
better than her bitter butter,
and she baked it in her batter,
and the batter was not bitter.
So 'twas better Betty Botter
bought a bit of better butter.

https://www.kidspot.com.au/things-to-do/activity-articles/tongue-twisters-betty-botter/news-story/23505dd2e281a77c2d1a8f8ca83cb636

Activity 1: A Day at the Auction, (Math)   1   50-minute class period

- Create a free account on https://www.cattleusa.com to show students a livestock auction in real time. You can watch and listen to a variety of livestock auctions across the nation.
- Discuss the auction chants and watch the price differences in the animals. Note animals sold as per head, per hundredweight, individually, or in groups.
- Record and average that day's selling price on Activity 1 Worksheet 1 "A Day at the Auction"

Activity 2: Cattle Market Math, (Math) 1   50-minute class period

- Provide copies of Activity 2 Worksheet 1 "Cattle Market Math." Students will solve the word problems.

Activity 3: Cattle Market Reports, (Math) 1   50-minute class period

- Provide copies of Activity 3 Worksheet 1 "Cattle Market Report." Students will calculate the mean, median, mode, and range for the price per hundredweight of the cattle labeled "fleshy."

Oklahoma Academic Standards

Activity 1 – A Day at the Auction (Math)

6.N.4.4   Solve and interpret real-world and mathematical problems including those involving money, measurement, geometry, and data requiring arithmetic with decimals, fractions and mixed numbers.

7.N.2.3   Solve real-world and mathematical problems involving addition, subtraction, multiplication and division of rational numbers; use efficient and generalizable procedures including but not limited to standard algorithms.

Activity 2 – Cattle Market Math (Math)

6.N.4.4   Solve and interpret real-world and mathematical problems including those involving money, measurement, geometry, and data requiring arithmetic with decimals, fractions and mixed numbers.

7.N.2.5   Solve real-world and mathematical problems involving calculations with rational numbers and positive integer exponents.

7.A.2.3   Use proportional reasoning to solve real-world and mathematical problems involving ratio.

Activity 3 – Cattle Market Reports (Math)

6.D.1.1   Calculate the mean, median, and mode for a set of real-world data.

6.D.1.2   Explain and justify which measure of central tendency (mean, median, and mode) would provide the most descriptive information for a given set of data.

7.D.1.1   Design simple experiments, collect data and calculate measures of central tendency (mean, median, and mode) and spread (range). Use these quantities to draw conclusions about the data collected and make predictions.

At the Sale Barn

Activity 1 Worksheet 1: At the Sale Barn

Name: _____**Date:** _____

Class/Hour/Teacher: _____

Fill out the chart below either at a sale barn, or by listening to a live auction online. The lot number is the animal that is being sold.

Lot Number	Number of Head	Average Weight	Price per hundredweight	Average Price per hundredweight	Lot Price

Average of the day's price per hundredweight:_____

Average of the day's lot price: _____

At the Sale Barn

Activity 2 Worksheet 1: Cattle Market Math

Name: _____Date: _____

Class/Hour/Teacher: _____

Directions: Solve the following word problems related to buying cattle at auction. Show your work.

Sample: Cattle are sold at auction by the hundredweight (cwt), which is 100 pounds.

So, a 600-pound animal that sells for $150 per cwt would cost $900:
    $150 ÷ 100 = $1.50 per pound
    600 pound calf= 600 X $1.50 = $900

A 620-pound animal that sells for $170 per hundredweight would cost $1,054:
    $170 ÷ 100 = $1.70
    620 pounds = 620 X $1.70 = $1,054

1. At auction, a 600 pound steer sold for $123 per hundredweight. How much did the buyer pay?

2. A 395-pound feeder steer sold for $202 per hundredweight. How much did the buyer pay?

3. A 420-pound feeder heifer sold for $128 per hundredweight. How much did the buyer pay?

4. A 420-pound feeder steer sold for $188 per hundredweight. How much did the buyer pay?

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5. Five head of cattle were sold for $7,500. Their total weight was 6,000. What was the cost of the cattle per hundredweight?

6. Fifty head of cattle, weighing an average 375 pounds sold for $225 per hundredweight. If each steer weighed exactly 375 pounds what would be the total cost?

7. At auction, Lucy Brown bought three heifers. One weighed 752 pounds and sold for $119 per hundredweight, one weighed 637 pounds and sold for $135 per hundredweight, and one weighed 700 pounds and sold for $98 per hundredweight. How much did she pay for the three heifers?

8. Robert Jones bought four heifers. One weighed 389 pounds and sold for $216 per hundredweight, one weighed 395 pounds and sold for $202 per hundredweight, one weighed 375 pounds and sold for $225 per hundredweight, and one weighed 420 pounds and sold for $188 per hundredweight. What was the total cost?

9. Travis White bought 15 head of cattle with an average weight of 389 pounds. He paid a total $3,244.95. What was the average price per head?

At the Sale Barn

Activity 3 Worksheet 1: Cattle Market Report

Name: _____ Date: _____

Class/Hour/Teacher: _____

FEEDER STEERS MEDIUM AND LARGE (PARTIAL LIST)
Report Date 4/26/2019-5/2/2019, Oklahoma National Stockyards, Oklahoma City, OK

HEAD	WEIGHT RANGE	AVERAGE WEIGHT	PRICE RANGE (per hundredweight)	AVERAGE PRICE (per hundredweight)	DESCRIPTION
8	770	770	130.00	130.00	Full
83	763-772	767	148.00-150.00	149.03	Thin Fleshed
3	310	310	190.00	190.00	Fleshy
2	310-335	323	180.00-190.00	184.81	Unweaned
37	848	848	128.00	128.00	Full
5	395	395	185.00	185.00	Unweaned
38	890	890	123.25	123.25	Fleshy
5	444	444	175.00	175.00	Fleshy
9	415-443	427	176.00-183.00	180.95	Unweaned
26	886	886	126.00	126.00	Full
2	475	475	162.00	162.00	Unweaned
27	903-940	915	113.50-122.00	120.10	Full
6	535-543	542	155.00-159.50	158.76	Fleshy
6	500-545	515	154.00-160.00	156.12	Unweaned
5	980	980	112.00	112.00	Full
31	570-585	581	154.00-156.00	154.51	Unweaned
15	677-687	685	143.00-150.00	148.62	Unweaned
12	623	623	156.00	156.00	Unweaned

Use the Cattle Market Report chart to answer the following questions.

1. **Find the central tendency numbers for the "fleshy" cattle**

Mean: _____   **Median:** _____   **Mode:** _____   **Range:** _____

2. **Find the central tendency numbers for the "unweaned" cattle**

Mean: _____   **Median:** _____   **Mode:** _____   **Range:** _____

3. **Find the central tendency numbers for the "full" cattle**

Mean: _____   **Median:** _____   **Mode:** _____   **Range:** _____

4. **Using the data, what was the total purchase price for the "Thin Fleshed" lot?**

Total purchase price: _____

Which measure of central tendency (mean, median, or mode) would provide the most descriptive information for this data? _____

Based on the data, what conclusions can you draw about the cattle market? _____
_____
_____

Based on the data, what predictions can you make about the cattle market? _____
_____
_____

At the Sale Barn

Activity 2 Worksheet 1: Cattle Market Math (ANSWERS)

Name: _____**Date:** _____

Class/Hour/Teacher: _____

Directions: Solve the following word problems related to buying cattle at auction. Show your work.

Sample: Cattle are sold at auction by the hundredweight (cwt), which is 100 pounds.

So, a 600-pound animal that sells for $150 per cwt would cost $900:
> *$150 ÷ 100 = $1.50 per pound*
> *600 pound calf= 600 X $1.50 = $900*

A 620-pound animal that sells for $170 per hundredweight would cost $1,054:
> *$170 ÷ 100 = $1.70*
> *620 pounds = 620 X $1.70 = $1,054*

1. At auction, a 600 pound steer sold for $123 per hundredweight. How much did the buyer pay?
   > $123 ÷ 100 = $1.23
   > 600 x $1.23 = **$738.00**

2. A 395-pound feeder steer sold for $202 per hundredweight. How much did the buyer pay?
   > $202 ÷ 100 = $2.02
   > 395 x $2.02 = **$797.90**

3. A 420-pound feeder heifer sold for $128 per hundredweight. How much did the buyer pay?
   > $128 ÷ 100 = $1.28
   > 420 x $1.28 = **$537.60**

4. A 420-pound feeder steer sold for $188 per hundredweight. How much did the buyer pay?
   > $188 ÷ 100 = $1.88
   > 420 x $1.88 = **$789.60**

5. Five head of cattle were sold for $7,500. Their total weight was 6,000 pounds. What was the cost of the cattle per hundredweight?

$7500 ÷ 6000 = $1.25
$1.25 x 100 = **$125**

6. Fifty head of cattle, weighing an average 375 pounds sold for $225 per hundredweight. If each steer weighed exactly 375 pounds what would be the total cost?

$225 ÷ 100 = $2.25
375 x $2.25 = $843.75 each
$843.75 x 50 head = **$42,187.50 total cost**

7. At auction, Lucy Brown bought three heifers. One weighed 752 pounds and sold for $119 per hundredweight, one weighed 637 pounds and sold for $135 per hundredweight, and one weighed 700 pounds and sold for $98 per hundredweight. How much did she pay for the three heifers?

$119 ÷ 100 = $1.19   752 x $1.19 = $894.88
$135 ÷ 100 = $1.35   637 x $1.35 = $859.95
$98 ÷ 100 = $0.98   700 x $0.98 = $686
$894.88 + $859.95 + $686 = **$2,440.83**

8. Robert Jones bought four heifers. One weighed 389 pounds and sold for $216 per hundredweight, one weighed 395 pounds and sold for $202 per hundredweight, one weighed 375 pounds and sold for $225 per hundredweight, and one weighed 420 pounds and sold for $188 per hundredweight. What was the total cost?

$216 ÷ 100 = $2.16   389 x $2.16 = $840.24
$202 ÷ 100 = $2.02   395 x $2.02 = $797.90
$225 ÷ 100 = $2.25   375 x $2.25 = $843.75
$188 ÷ 100 = $1.88   420 x $1.88 = $789.60
$840.24 + $797.90 + $843.75 + $789.60 = **$3271.49**

9. Travis White bought 15 head of cattle with an average weight of 389 pounds. He paid a total $3,244.95. What was the average price per head?

$3244.95 ÷ 15 = **$216.33**

At the Sale Barn

Activity 3 Worksheet 1: Cattle Market Report (ANSWERS)

Name: _____Date: _____

Class/Hour/Teacher: _____

FEEDER STEERS MEDIUM AND LARGE (PARTIAL LIST)

Report Date 4/26/2019-5/2/2019, Oklahoma National Stockyards, Oklahoma City, OK

HEAD	WEIGHT RANGE	AVERAGE WEIGHT	PRICE RANGE (per hundredweight)	AVERAGE PRICE (per hundredweight)	DESCRIPTION
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15	677-687	685	143.00-150.00	148.62	Unweaned
12	623	623	156.00	156.00	Unweaned

Use the Cattle Market Report chart to answer the following questions.

1. **Find the central tendency numbers for the "fleshy" cattle**

Mean: **$488.31**   Median: **$166.50**   Mode: **None**   Range: **67**

2. **Find the central tendency numbers for the "unweaned" cattle**

Mean: **$436.75**   Median: **$495**   Mode: **None**   Range: **300**

3. **Find the central tendency numbers for the "full" cattle**

Mean: **$123.22**   Median: **$126**   Mode: **None**   Range: **18**

4. **Using the data, what was the total purchase price for the "Thin Fleshed" lot?**

Total purchase price: **$94,854.89**

Which measure of central tendency (mean, median, or mode) would provide the most descriptive information for this data? **ANSWERS CAN VARY**

Based on the data, what conclusions can you draw about the cattle market? **ANSWERS CAN VARY**

Based on the data, what predictions can you make about the cattle market? **ANSWERS CAN VARY**