THIS LITTLE PIGGY

Overview

Math is important in agriculture when determining weights of animals, for marketing, administration of vaccines, determining feed rations and determining pen space. It is also used in the ear notch identification system. Students will apply math skills used in real life swine production.

Hogs are raised in various types of housing ranging from indoor housing systems to pasture. Sows can give birth (farrow) up to three times a year. Farrowing stalls are used to protect the baby pigs from being injured by the sow. Pigs are weaned, separated from the sow, when they are 2-4 weeks old. It takes about 5-6 months for a pig to reach market weight of 220-260 pounds.

Objectives

1. Students will learn the life cycle of a pig.
2. Students will learn 12 popular breeds of pigs.
3. Students will apply math skills of multiplication, addition, subtraction, fractions to measure weight of pig, average daily gain, amount to feed, amount of medication needed and identification system.

Background Information

Swine are monogastrics which means their stomach has one compartment. Because the stomach area is smaller, they require higher amounts of concentrates which are grains low in fiber and higher in digestible nutrients. Pigs will eat about 870 pounds of corn and 120 pounds of protein to reach market weight. It takes about 3.5 pounds of feed to produce 1 pound of live weight.

The average size of a pig:
- Newborn pig is 3-4 pounds
- Weaned pig is 10-15 pounds (2-4 weeks old)
- Feeder pig is 50-60 pounds
- Finishing pig 110 - 260 pounds
- Pigs move to finishing barns until they reach 260 pounds
- Market pigs weigh 220-260 pounds
- Dressing percentage (amount of meat for consumption) is 70% of the live weight.

Pork is an important part of our diet. It provides our body with protein that builds strong muscles and helps our bodies grow big and strong. Pork is also a great source of iron, zinc and B-vitamins. Modern technology, along with the work of farmers, has brought consumers the leanest bacon, ham and sausage and other pork products possible.

THIS LITTLE PIGGY

Background Information Continued

Electronic equipment allows farmers to monitor the fat content of the pig and adjust the pig's diet to produce very lean meat. This equipment, along with breeding techniques, allows farmers to choose leaner animals for breeding stock and to supply consumers with lean, tasty products they want. Compared to ten years ago, pork has 30% less fat, 14% fewer calories and 10% less cholesterol.

There are different types of production systems for swine:
- Farrow-to-finish farms where the pigs stay on the same farm from birth to finishing at market weights of about 260 pounds.
- Farrow-nursery farms that will farrow pigs and then sell 40-60 pound feeder pigs to grow-finish farms.
- Farrow-to-wean farms that sell 10-15 pound weaned pigs to nursery-grow-finish farms.
- Wean-to-finish farms that buy weaned pigs and finish them to market weights.

No other animal produces a wider range of by-products that pigs do. One example is that there are over 40 different drugs and medical products produced including heart valves, insulin, and skin to help with burns.

Vocabulary

Barrow: A male pig not used for breeding.

Boar: A male pig used for breeding.

Farrow: To give birth to piglets.

Gilt: A female pig that has not given birth to piglets.

Litter: A group of piglets born at the same time. Litter sizes are usually 8 - 12 piglets.

Piglet: A baby pig.

Pork: The meat that comes from pigs. Pork chops, bacon, ham, sausage and pork roast are some examples of pork

Sow: A female pig used for breeding. Pigs are pregnant for 3 months, 3 weeks and 3 days. (112-115 days).

Swine: Term used to describe the species

Wean: When a piglet is big enough to eat on its own and doesn't nurse from the sow anymore.
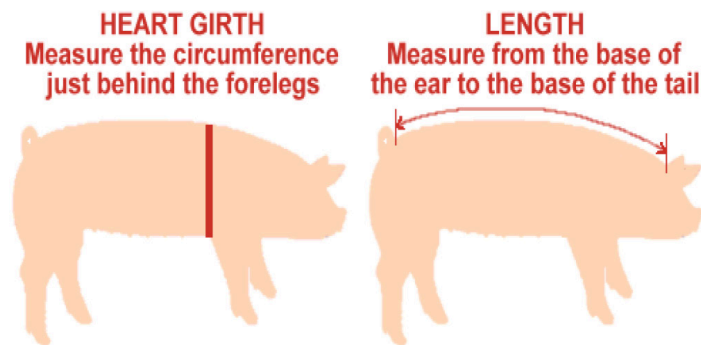
KFAC

Procedure

Thought problem #1:

Use girth and length measurements in an algorithm to predict weight of the pig.

Algorithm - L x G xG/400

The process is to measure the girth (around the body under the armpits), and the length (from the top of the head to the tail bone.

How to Calculate Pig Weight Using a Measuring Tape

HEART GIRTH
Measure the circumference just behind the forelegs

LENGTH
Measure from the base of the ear to the base of the tail

1. Measure the pig's heart girth. Place the fabric measuring tape around the pig, just behind the front legs.
   • Note the pig's circumference in inches.

2. Measure the pig's length. Start at the base of the pig's ears and measure to the base of its tail.
   • Note the pig's length in inches.

3. Calculate the pig's girth measurement. To calculate the girth, you will square the heart girth measurement.
   • For example, if the pig had a heart girth of 44 inches: 44 x 44 = 1936

4. Multiply the pig's girth measurement by its length.
   • If our example pig had a length measurement of 39 inches: 1936 x 39 = 75,504

5. Divide your total by 400 to get the estimated total live weight
   • For example: 75,504 / 400 = 188.76 lbs.

6. To estimate carcass weight, multiply your live weight by 72%.
   • For example: 188.76 x 0.72 = 135.90 lbs

KFAC

Thought Problem #2:
You will determine how much antibiotics to use to treat pigs who have pneumonia.

You have 32 pigs in a pen you are raising as a 4-H project. Seven of the pigs quit eating and are hanging their heads and coughing a lot. When you take the temperature of the sick pigs they are running a fever of several degrees. Your veterinarian checks the pigs and suggests you give an antibiotic that is approved for use on swine that have pneumonia. This is referred to as "on label" treatment since the antibiotic is labeled for treating pigs with pneumonia.

You weigh the 7 sick pigs as a group. They are averaging 220 pounds. You will be selling these pigs when they reach 250 pounds. They are gaining 1.5 pounds per day when they feel well. Assume the pigs will be back on feed and gaining weight again in one week.

1. How much antibiotic should you administer to each sick pig? Solve for X.
   Your medication label says to administer 2ml or cc's to a pig per each 100 pounds of weight. The pigs weigh 220 pounds each.

$$(\frac{2}{100} = \frac{x}{220});$$

$$2 \times 220 = \frac{x}{100}$$
$$440 = 100x$$
$$x = \frac{440}{100}$$
$$x = 4.4 \text{ ml for each pig.}$$

2. How much antibiotic will you need to buy to treat all 7 pigs? 4.4 ml or cc's x 7 = 30.8cc's.
   The veterinarian can give you the exact amount needed or they may sell you a 50 cc bottle of antibiotic. How much antibiotic would you need to store safely in the refrigerator if you purchased a 50cc bottle?

Thought Problem #3:
How much water do your 32 pigs need daily?
If you have 32 pigs averaging 220 pounds how many gallons of water would they need per day?
2/200 = x /220;
2 x 220 = x/200
440 = 200x; x = 440 /200; x = ? gallons for each pig. 32 pigs x ? = gallons needed per day.

Table 2. Readily available supply of clean, fresh water	
Weight (lbs)	Gallons per day
50	1.0
100	1.5
200	2.0
250	2.5

THIS LITTLE PIGGY

Thought Problem #4:
You have chosen to take a pig to the 4-H Fair on July 20th. Using math, you need to determine when to buy the pig and how much it should gain each day to reach the end weight of 260 pounds at the fair.
This little piggy was born with 9 other piglets on April 8th. It weighed 3 pounds at birth. This piglet gained 50 pounds in 16 days.

Answer A: What day and what month did it reach 53 pounds?
April 8 + 16 days =

Answer B: What was it's average daily gain during the finisher part of the growth cycle
75 pounds / 30 days =

Answer C: What was it's average daily gain overall?

Growth Phase	Date	Weight	Days on Feed	Pounds Gained per Feeding Period	Average Daily Gain
Newborn	April 8	3 pounds	NA	3	NA
Feeder	April 21 ?A?	53 pounds	16	50	3.1
Finisher	May 13	133 pounds	30	80	2.6 ?B?
Market	July 25	263 pounds	70	127	1.8
	TOTAL		**116**	**260**	**2.24 ?C?**

Discussion Questions:
How does this math relate to your real life? Apply the same math principles used in the pig math to determine how to create a thought problem for the following scenarios.

You need to determine how much dog food to give your half grown pet. The label gives directions based on weight of the dog. Construct a thought problem that solves for this.

What if you were sick with an ear infection? How would the doctor determine the amount of antibiotic to prescribe to you?

What if you are a light weight football player that needs to gain 50 pounds from spring training til fall football season? How would you determine your needed average daily gain?

In order to prevent dehydration during the hot summer months of football practice, you need to drink a certain amount of water during practice. How would you determine how much water is needed each day?

KFAC

THIS LITTLE PIGGY

Applied Math

1. For your birthday, your uncle gave you a 55 pound pig. You plan to raise it to 245 pounds and then sell it. How many pounds does it need to gain?

245 pounds to sell – 55 pounds now = 190 pounds to gain

2. If it gains about 1.6 pounds each day, how many days will it take to reach 245 pounds? (round to the nearest whole number). How many months is that?

190 pounds needed to gain / 1.6 pounds each day = 118.75 or 119 days
119 days / 30 days each month = 3.9 or 4 months

3. Your uncle has three sows (mother pigs) that together have 36 piglets. If they each have the same number of piglets, how many are in each litter (group of piglets)?

36 piglets / 3 sows = 12 piglets per sow

4. If one sow only has four piglets and the remaining two have equal numbers, how many piglets do they each have (using the piglets from number 3)?

36 piglets – 4 piglets = 32 piglets
32 piglets / 2 sows = 16 piglets per sow

5. One sow and her piglets use 58 bushels of corn to grow. If corn costs $4.30 per bushel, how much will you spend on corn?

58 bushels x $4.30 per bushel = $294.40

6. You sell your 250 pound pig for $60 per one hundred pounds. How much money do you make? This will give you the gross income. To calculate the net income, you would need to consider all other expenses of raising a pig (i.e. feed, housing, equipment).

250 pounds / 100 pounds = 2.5
$60 per one hundred pounds x 2.5 = $150(gross income) for your pig

KFAC

Pig Trivia

Pork is the most widely eaten meat in the world. The average American eats 46 pounds of pork per year.

Pigs are one of the few animals that won't overeat. They eat to a calorie level and then stop eating.

The largest pig on record is a Poland China named "Big Bill," owned by Burford Butler of Jackson Tennessee. He weighed 2,552 pounds and was 9 feet long.

Pigs can't sweat as they don't have sweat glands.

A pig's squeal reaches 110-115 decibels, the same as the sound of a jet.

There are over 100 million pigs raised in the United States.

There are 72 different breeds of pigs. Some popular breeds are:

Hampshire	Duroc	Yorkshire
Landraced	Poland China	Chester White
Spot	Berkshire	Lacombe
Hereford	Pietrain	Tamworth

The top 10 pork producing states are:

Iowa	Illinois
Minnesota	North Carolina
Indiana	Oklahoma
Missouri	Nebraska
Wisconsin	Ohio

Want to learn more?
Good information sheet on pigs from Illinois Ag in the Classroom!
http://www.wisagclassroom.org/wp-content/uploads/2011/09/Pork-Plans.pdf

Kansas Kids Connection Magazine: Pig Tales found on our website!

THIS LITTLE PIGGY

Applied Math

1. For your birthday, your uncle gave you a 55 pound pig. You plan to raise it to 245 pounds and then sell it. How many pounds does it need to gain?

2. If it gains about 1.6 pounds each day, how many days will it take to reach 245 pounds? (round to the nearest whole number). How many months is that?

3. Your uncle has three sows (mother pigs) that together have 36 piglets. If they each have the same number of piglets, how many are in each litter (group of piglets)?

4. If one sow only has four piglets and the remaining two have equal numbers, how many piglets do they each have (using the piglets from number 3)?

5. One sow and her piglets use 58 bushels of corn to grow. If corn costs $2.75 per bushel, how much will you spend on corn?

6. You sell your 250 pound pig for $55 per one hundred pounds. How much money do you make?

KFAC

THIS LITTLE PIGGY

Swine producers use a ear notching system that takes math to interpret. Study the universal system and the examples. Then mark notches on pictures in Student handout B & C. Swine producers use a ear notching system that takes math to interpret. Study the universal system and the examples. Then mark notches on pictures in Student handout B & C.

Universal Ear Notching System

Joel DeRouchey
Extension Specialist
Updated January 2013

Kristine L. Clowers
Youth Livestock Coordinator
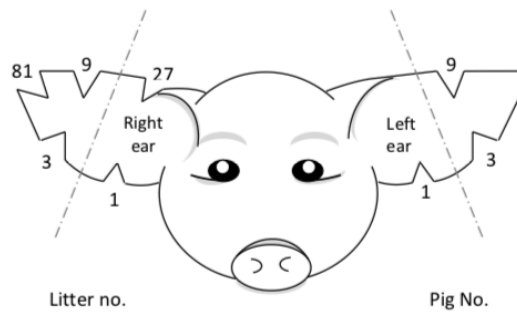
The Universal Ear Notching System is the standard way to permanently identify swine. This is generally completed during the first week after farrowing while the pigs are still small and easy to handle.

The pig's right ear is the litter ear and the pig's left ear is the individual pig number in the litter.

Ear Notch 9 – 3   Ear Notch 9 – 3
Ear Notch 11 – 4   Ear Notch 11 – 4
Ear Notch 30 - 5   Ear Notch 30 - 5

Department of Animal Sciences and Industry · Kansas State University · 16
Updated January 2013

Universal Ear Notching System Worksheet
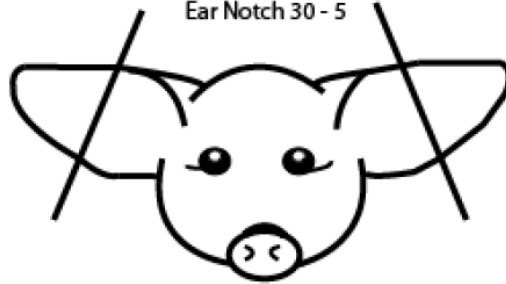
Ear Notch 13 - 9
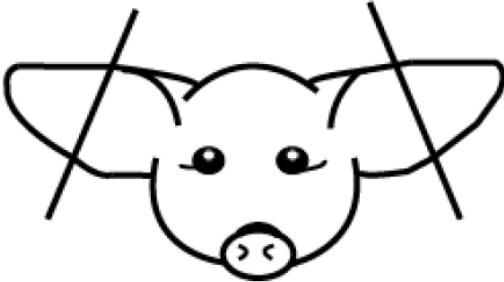
Ear Notch 9 - 3

Ear Notch 5 - 12

Ear Notch 11 - 4

Ear Notch 48 - 6
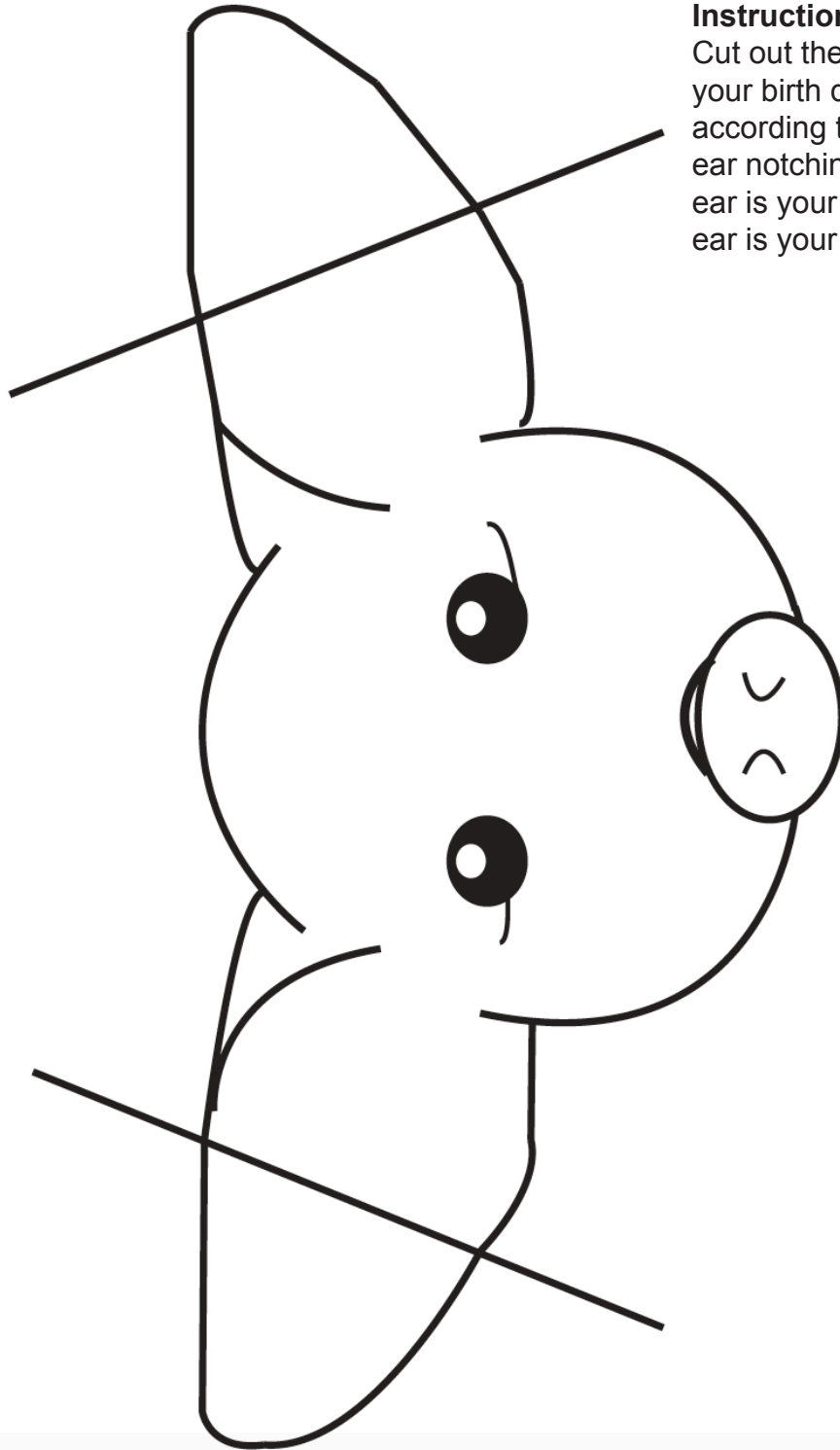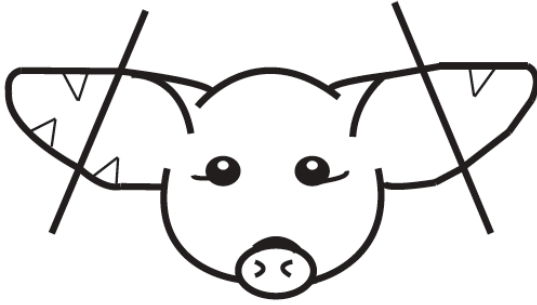
Ear Notch 30 - 5

KFAC
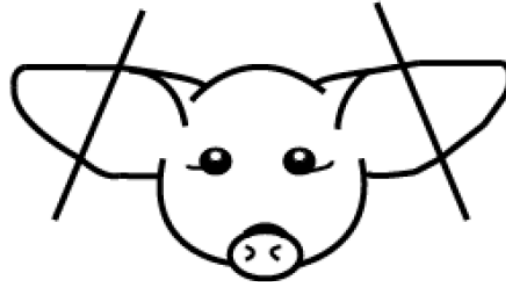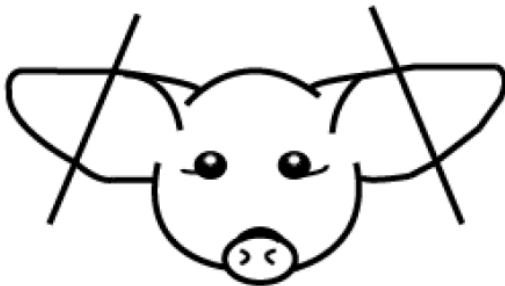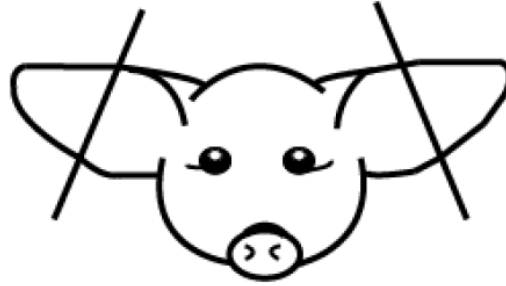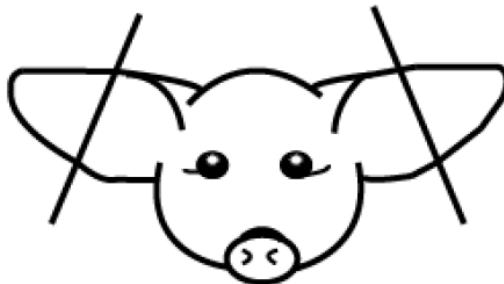
Instructions:
Cut out the piglet and notch your birth date in the ears according to the universal ear notching system. Left ear is your birth date; Right ear is your birth month.
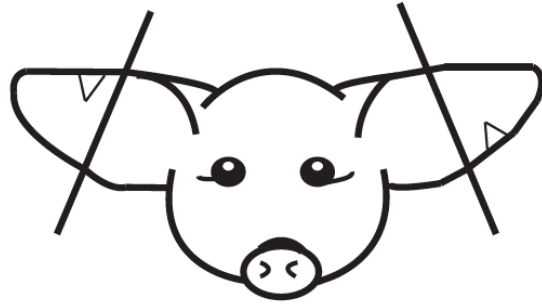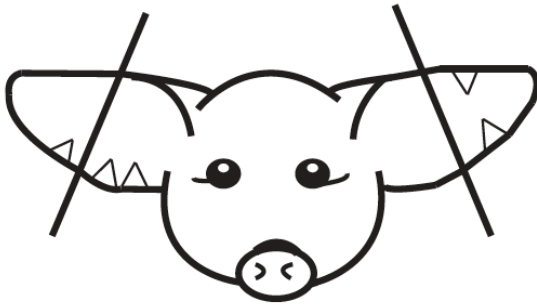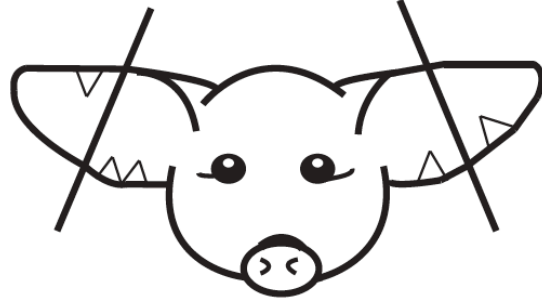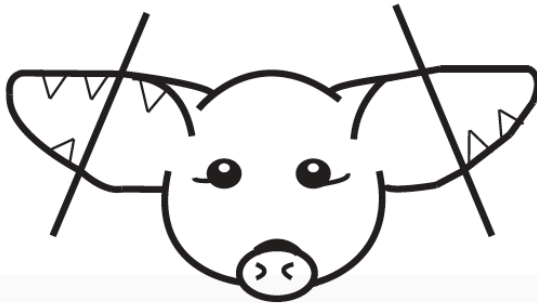
Ear Notch 13 - 9

Ear Notch 9 - 3

Ear Notch 5 - 12

Ear Notch 11 - 4

Ear Notch 48 - 6

Ear Notch 30 - 5