Be Ag Smart! THE CORN CONNECTION

Be Ag Smart! The Corn Connection has been developed and produced by Texas Farm Bureau Agriculture in the Classroom

P.O. Box 2689
7420 Fish Pond Rd.
Waco, TX 76710

Teachers—For lesson plans, videos and other resources for your classroom, go to texasfarmbureau.org

Although there is an increasing number of uses for corn, feeding livestock remains the primary use for American corn. Approximately 96% of corn produced in Texas is used for livestock feed. Nationally, livestock and poultry directly consume approximately 40% of the country's corn crop in addition to a significant amount of corn by-products, such as distillers grains. Corn-fed animals gain weight quickly from corn's high-starch, high-energy content, making corn and distillers grains a preferred feed choice of feedlot operators. Additionally, corn improves the milk production of dairy cows and reduces the amount of land needed to support their feed requirements.

HAVE YOU EVER WONDERED?

Why does popcorn pop?
Each kernel has some starch in it. When it gets hot, the moisture turns to steam. That steam makes it explode, flipping the popcorn inside out.

How long has popcorn been around?
For a very long time! Native Americans ate popcorn and used it as decoration for ceremonial headdresses, necklaces and ornaments.

Is popcorn really healthy?
Yes! It is a grain, so it gives our bodies carbohydrates. In other words, we get energy from popcorn.

DID YOU KNOW?

With more than 4,200 uses, corn is used in a myriad of products we use on a regular basis. From traditional uses, such as feed and food, to the arenas of ethanol and bioplastics, corn is a vital part of our way of life.

CORN FOR FOOD

When was the last time you ate corn? Think carefully. Corn is used as much more than just a tasty, vegetable side dish! According to the Corn Refiners Association, nearly 4,000 food items in your grocery store contain corn ingredients—and that doesn't include the products that come from corn-fed animals or the sweet, whole-kernel corn that's available on the cob, in cans or frozen. While sweet corn only accounts for approximately 1% of corn production in the United States, 10% of field corn is processed for food ingredients. This processed corn is used in a variety of foods, including fruit snacks, Oreos, chocolate milk, graham crackers and ice cream! It's safe to say that every time you sit down for a meal, corn is on the table.

WHAT DOES A SPIDER DO IN A CORN FIELD?

She builds a cob-web!

CORN FOR INDUSTRIAL USES

Corn can be found in a number of industrial applications, such as bioplastics and fabrics. Because of advances in technology, you can find corn in a number of items, including crayons, compostable tableware, food containers, shirts and carpet. These bioplastic items are made from cornstarch. Some farm equipment is even being made from corn!

CORN FOR FUEL

Domestic ethanol producers are turning corn into environmentally friendly, renewable fuel. This clean-burning, high-octane fuel contributes to the country's energy independence. Henry Ford first thought of using corn as fuel.

HOW TALL IS A CORN PLANT?

A typical corn plant is anywhere from 5 to 12 feet tall. Generally, the corn plant is approximately 6 to 8 feet tall in Texas.

BE A CORN DETECTIVE

Unscramble the words to learn what foods corn can be found in.

nroc sekalf   c_ _ _ f _ a_ _ _

cei earcm   _c_ _ _ _ _m

oads   s_ _ _

nuteap ttreub   _ e _ _u_ _u _ _ e_

upchket   k _ _ _h_ _

alads ingsserd   s_ l _ d _ _ e _ _ _ _g

ylelj   _e_ _ _

mallmarowssh   _ a _ s _ _ _ _ l _ _ s

tcoa hipcs   _ a _ o _ _i _ _

Answer key on back page.

CORN PUTTY

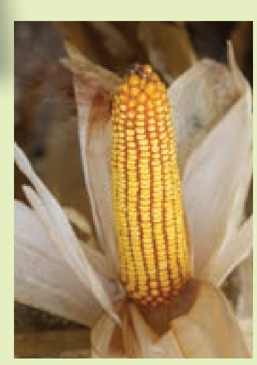
Play with it like clay. Then watch it become liquid again.

1 cup cornstarch
1/4 cup Food coloring

Blend mixture with fork. It should flow when the bowl is tipped but feel solid when you touch it. If it's too thick, add a little water. If it's too runny, add a little cornstarch.

TYPES OF CORN

Sweet Corn is the type of corn people grow in their vegetable gardens. Sweet corn is the corn on the cob, canned and frozen corn that people eat. Sweet corn can be grown year round in warm-weather climates. The ears are harvested before the seeds begin to harden.



Field Corn, also known as dent or feed corn, makes up more than 90% of the corn you see growing in the fields. It is hard on the outside and starchy on the inside. While most often considered a food for animals, it can be found in products you use every day!

Popcorn is a special type of corn that retains water within the kernel. When the kernel is heated, the water also heats and builds up pressure. This pressure causes the kernel to turn inside out and then you have hot, fluffy popcorn!

HOW MANY EARS GROW ON A CORN PLANT?

The number of ears grown on a plant is based on its genetics. Most Texas corn is bred to develop one large ear and one smaller ear.

NATIVE AMERICANS DISCOVERED THE MANY USES OF CORN

Mayan, Aztec and Inca Indians of Central and South America learned to use almost every part of the corn plant. They were not only the first to discover corn but also the first to experiment with its many uses. Immature corn was eaten as a fresh vegetable. The dry, mature kernels of corn were ground into flour, parched or popped. Native American Chief Massasoit made a necklace out of popcorn to give to the Pilgrims as a gift. They would use the dried husks to make baskets, shoes and even corn husk dolls. The silks of the plants could be used as doll hair. The corn cobs were burned for fuel or made into ceremonial rattling sticks.

HOW MANY ROWS ARE THERE ON AN EAR OF CORN?

The average corn ear has 16 rows. Corn ears always have an even number of rows.

HOW MANY KERNELS ARE THERE ON AN EAR OF CORN?

A typical ear has approximately 800 kernels, but this number can vary from 500-1,200 kernels.

WHY ARE THERE SILKS ON CORN?

Corn silks are necessary for pollen from the tassels to fertilize the plant. Silks will concentrate pollen to a developing ear of corn. Every kernel on a plant will have a silk connected to it. In harsh, hot summers, the silks can dry out before all the sites on a cob are fertilized, creating gaps where no kernels are developed.

HOW BIG IS AN ACRE?

One acre is 4,840 square yards or 43,560 square feet—about the size of a standard football field.

HOW BIG IS A BUSHEL?

Every crop is measured in bushels, or weight. A bushel of shelled corn is 56 pounds—approximately the size of a large bag of dog food.

TEXAS CORN PRODUCTION

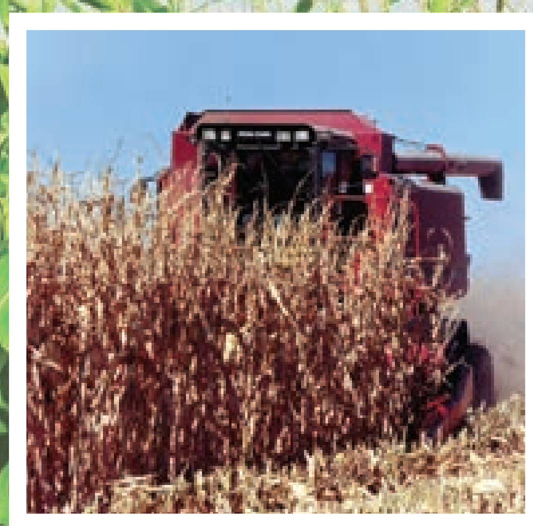
On average, Texas plants 2 million acres that yield an average of 120 bushels per acre. Statewide, Texas produces more than 301 million bushels of corn. Irrigated corn produces approximately 65% of the state's corn crop, while only 40% of planted corn in Texas is irrigated. Texas corn production contributes approximately $1.2 billion to the state's economy.

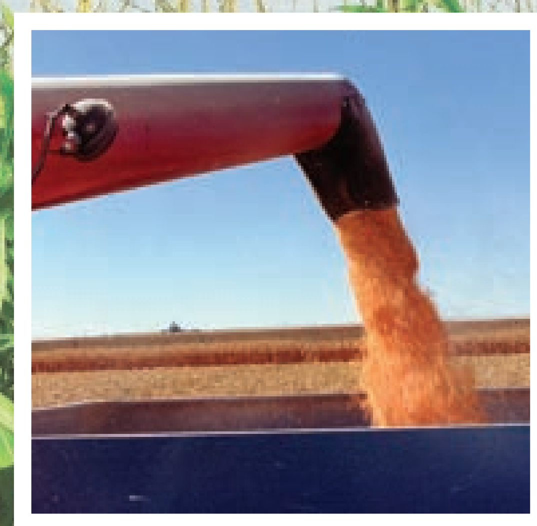
PLANTING CORN

Corn is planted when the soil is warm enough to germinate the seeds, but not so early that the young plants are likely to be damaged by frost. With so many diverse climates across our state, planting dates vary by geographic location. Texas' planting season begins as early as mid-February and ends as late as mid-June.

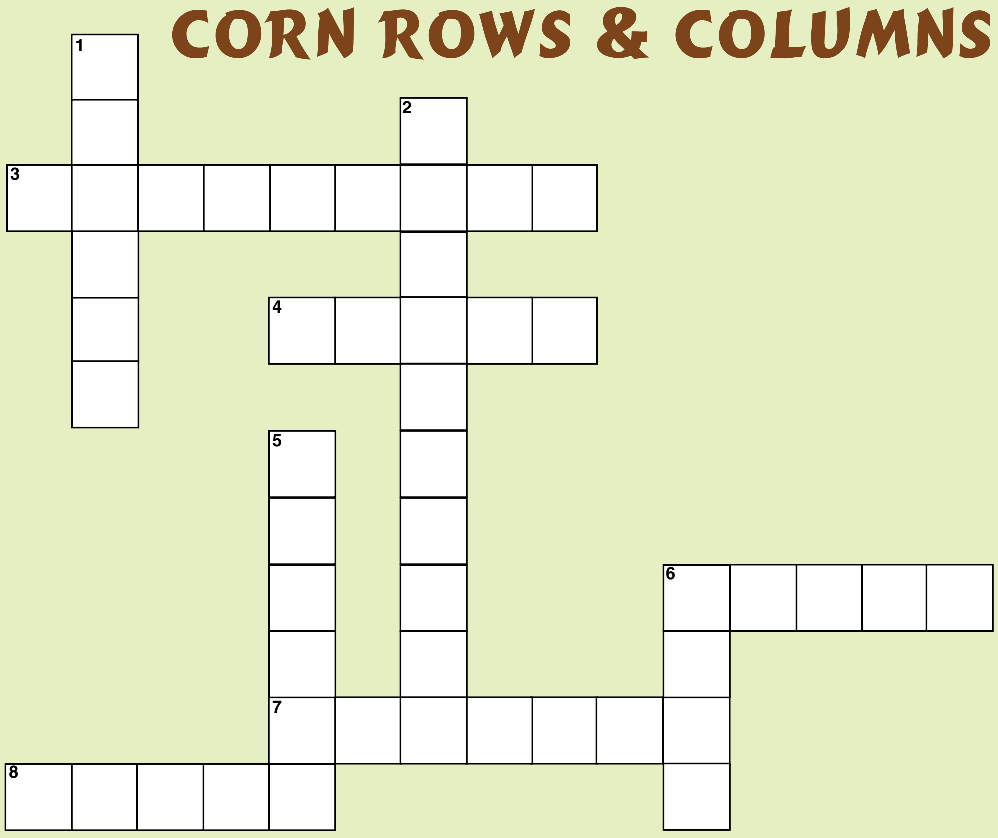
HARVESTING CORN

Corn is harvested when the plant has reached physical maturity. Similar to planting season, harvest time depends greatly on geographic location, as well as weather conditions. Additionally, different corn hybrids take different lengths of time to reach maturity.





CORN ROWS & COLUMNS



DOWN

1. Something a baby wears on its bottom.
2. Corn product used in biodegradable plastics.
5. Part of corn plant that receives energy from the sun.
6. What part of the corn plant can be used as hair on husk dolls besides the husk?

ACROSS

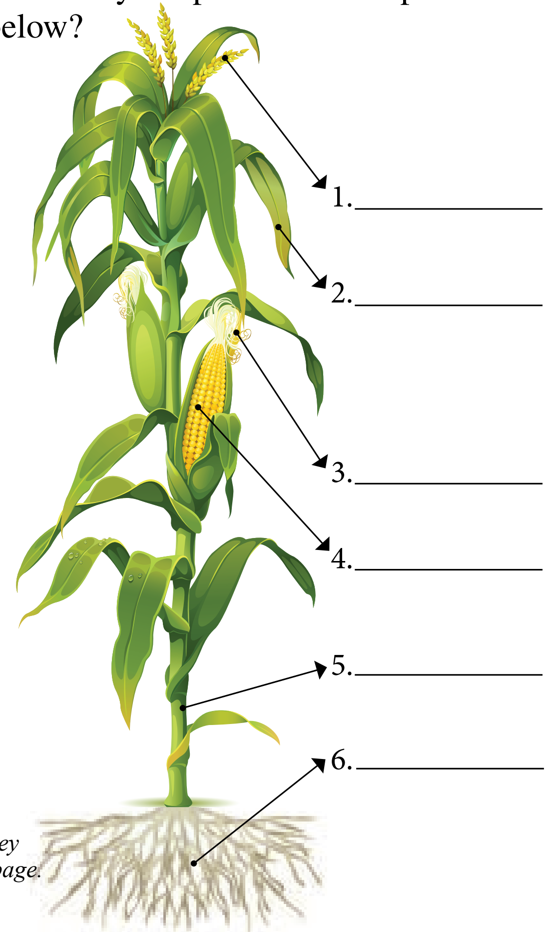
3. Native American chief who presented popcorn necklaces to the Pilgrims.
4. Sweet to eat and something you collect at Halloween.
6. The corn product used as a sweetener.
7. Fuel made from corn.
8. Corn is a member of what plant family?

Answer key on back page.

ALL ABOUT CORN

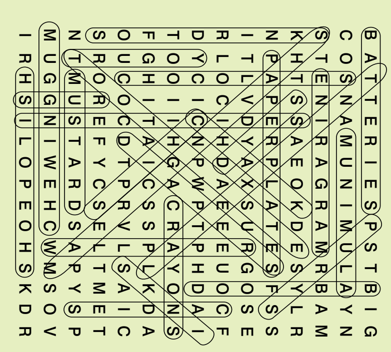
Can you identify the parts of a corn plant listed below?

stalk
leaf
tassel
silks
ear
roots



Answer key on back page.

CORNY WORD SEARCH KEY



HOW DO YOU KNOW YOU HAVE REACHED THE END OF A CORN FIELD?

You have to turn the corn-er.

CORNY WORD SEARCH

RUGS	MARGARINE
CHALK	DYES
MUSTARD	SYRUP
TOOTHPASTE	INKS
CHOCOLATES	ALUMINUM
INSECTICIDES	BATTERIES
CHEWING GUM	YOGURT
CRAYONS	SHOE POLISH
WALLPAPER	SOFT DRINKS
BABY FOOD	LATEX PAINT
PAPER PLATES	CANDIES
SHAVING CREAM	DIAPERS
CHIPS	

B	A	T	T	E	R	I	E	S	P	S	T	B	I	G
C	O	S	N	A	M	U	N	I	M	U	L	A	Y	N
S	T	E	N	I	R	A	G	R	A	M	R	B	A	M
K	H	T	S	S	A	E	O	K	D	E	S	Y	L	R
N	P	A	P	E	R	P	L	A	T	E	S	F	S	S
I	T	L	V	D	Y	A	X	S	U	R	G	O	S	E
R	L	O	C	I	H	D	A	E	E	E	U	O	C	F
D	Y	C	I	C	N	P	W	P	T	P	H	D	A	I
T	O	O	I	I	H	G	A	C	R	A	Y	O	N	S
F	G	H	I	T	A	I	C	S	S	P	L	K	D	A
O	U	C	O	C	D	T	P	R	V	L	S	A	I	C
S	R	O	R	E	F	Y	C	S	E	L	T	M	E	T
N	T	M	U	S	T	A	R	D	S	A	P	Y	S	P
M	U	G	G	N	I	W	E	H	C	W	M	S	O	V
I	R	H	S	I	L	O	P	E	O	H	S	K	D	R

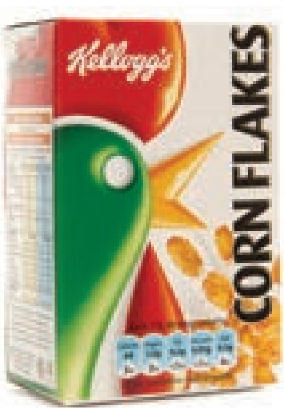
CORN ROWS & COLUMNS PUZZLE SOLUTION
DOWN: 1) Diaper; 2) Cornstarch; 5) Leaves; 6) Silk; ACROSS: 3) Massosoit; 4) Candy; 6) Syrup; 7) Ethanol; 8) Grass
ALL ABOUT CORN SOLUTION
1) tassel; 2) leaf; 3) silks; 4) ear; 5) stalk; 6) roots
CORN DETECTIVE SOLUTION
corn flakes; ice cream; soda; peanut butter; ketchup; salad dressing; jelly; marshmallows; taco chips

WHERE DOES CORN COME FROM?

Modern corn descended from a grass called teosinte, which appears to have originated in Mexico. This plant still grows there today. The first-known ears of corn were only a few inches long. Centuries of breeding have resulted in bigger, fuller ears of corn. Even though corn has evolved to its current state, it still belongs to the grass family!

ONE BUSHEL OF CORN

can produce each of these products

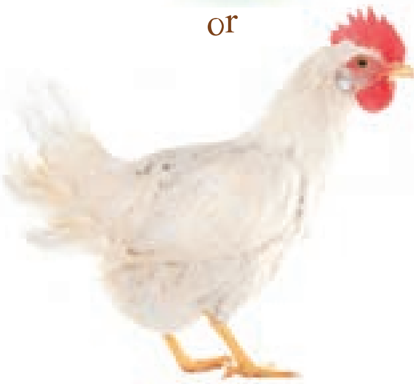


38 BOXES OF CEREAL (12 OZ.)

or

22.4 LBS. OF PLA FIBER/POLYMER for corn plastic products

or



or

FEED 10 BROILERS FROM BIRTH TO FINISHING WEIGHT

33 LBS. OF STARCH, USED FOR CRAYONS, RUBBER TIRES, SALAD DRESSING, PANCAKES... THE LIST GOES ON!

or

13.5 LBS. OF HIGH PROTEIN LIVESTOCK FEED

or

258 SIX-PACKS OF SODA

or

33 LBS. OF SWEETENER

or

2.8 GALLONS OF ETHANOL AND 17.5 LBS. OF DISTILLERS GRAINS

Sources: USDA-ERS, USDA, industry statistics, National Corn Growers Association, Cargill Dow Polymer, University of Arkansas Department of Poultry Science

TEXAS FARM BUREAU

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Cotton In Touch With You Daily

Cotton is one of the most important crops grown in the United States. From field to fabric and more, cotton touches us daily in the food we eat, the clothes we wear and in so many other ways. It can truly be called the ALL-PURPOSE CROP.

Did you know?

Cotton is a food, fiber and feed crop!

This means that not only do we wear cotton, but we eat it and can feed it to livestock, too. In the U.S., cotton is regulated as a food crop.

Cotton By-products

There are three primary products derived from cotton production: cotton lint, linters and cottonseed.

Linters

Linters are short fibers that cling to the seed after the lint is removed. *Linters are used in plastics, paper products, films, yarns and cosmetics.*

Cotton Lint

Cotton lint is the raw fiber from the cotton plant which is pressed into bales at the cotton gin. *Lint is used in clothes, shoe strings, pillowcases, denim, towels and dollar bills.*

Cottonseed

About two-thirds of a harvested cotton crop is composed of seed, which is crushed to separate its three products—oil, meal and hulls.

Cottonseed oil:
The oil is the cottonseed's most valuable by-product. It is obtained by crushing the cottonseed kernel. *Cottonseed oil is used in cooking oil, salad dressing, soaps, cosmetics and in preparation of snack foods like chips, crackers and cookies.*

Hulls:
Cotton hulls are the outer covering of the cottonseed. *Hulls are used in livestock feed, fertilizer, fuel and packing materials.*

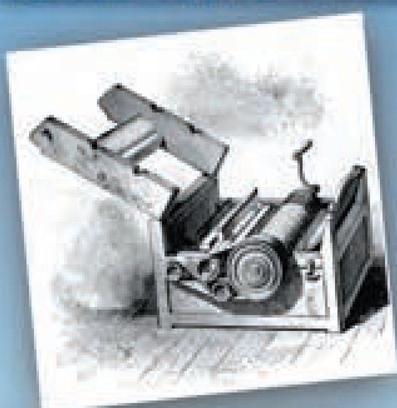
Meal:
Meal is the second most valuable by-product of cottonseed. *Meal is made by grinding the cottonseed and is used in livestock and poultry feed, natural fertilizer for lawns, gardens and flower beds.*

Where did the T-Shirt get its name?

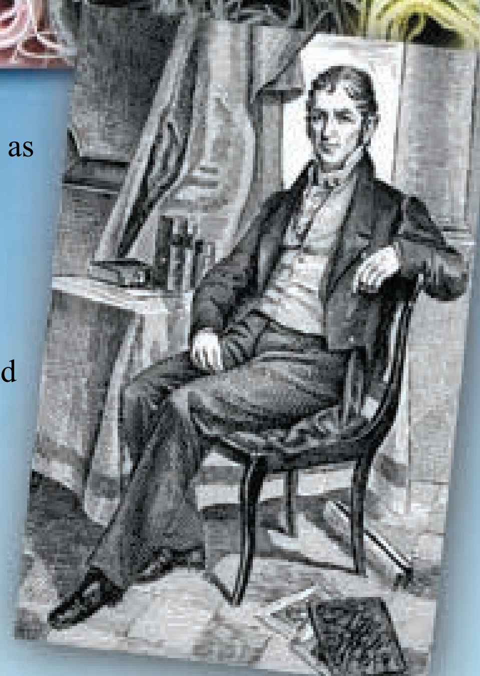
The first T-shirts were elbow and hip length undershirts issued to sailors in the U.S. Navy in 1880. The shirt resembled a perfect "T" when laid out on a flat surface.

T-shirts are made from cotton!

History of Cotton



- Cotton has been cultivated and used to make fabrics in the Americas for at least 7,000 years.
- Cotton cloth was used to wrap mummies in Egypt as early as 12,000 B.C.



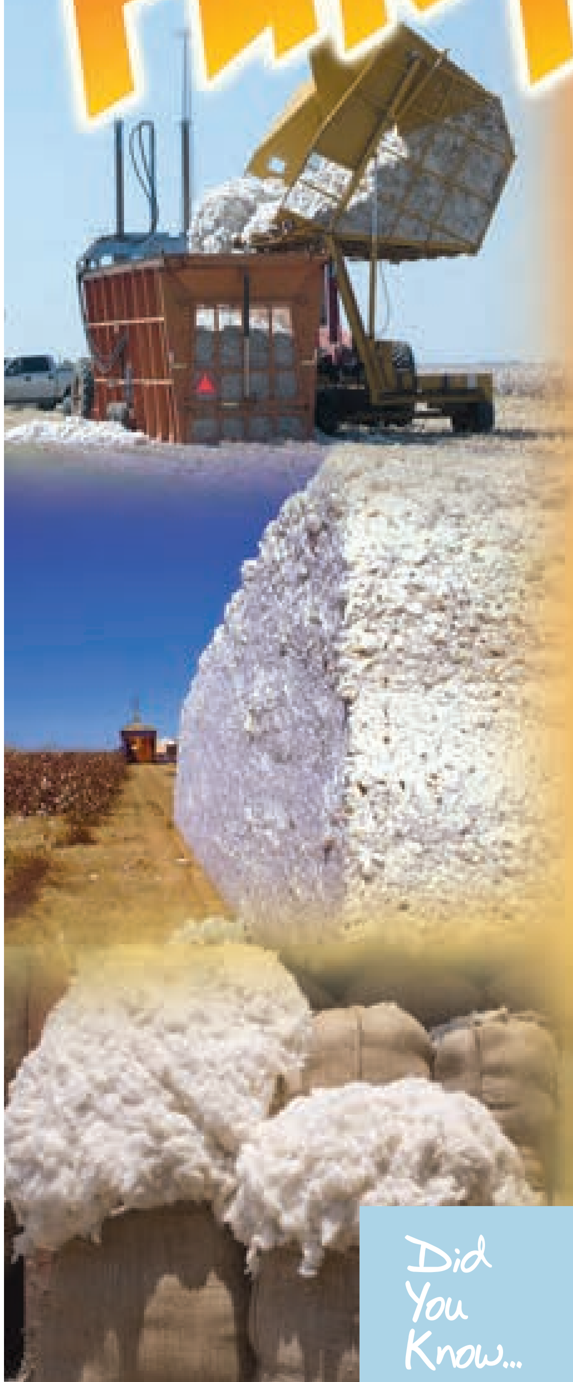
Did you know?

- In the early days of growing cotton, the lint had to be separated from the seed by hand. It took one person working a 10-hour day to separate 1 pound of cotton lint from the seed.
- In 1793, Eli Whitney invented the cotton gin (short for engine) that could separate 50 pounds of lint in a 10-hour day. The cotton gin revolutionized the cotton industry.

Today's cotton gin

- Improvements have been made to the gin over the years. Today, cotton gins have multiple machines and parts for removing trash, drying, moisturizing, sorting, cleaning and baling in 480-pound bundles called bales.
- A modern cotton gin can separate nearly 29,000 pounds of lint in ONE HOUR!

FUN FACTS



What is produced from a bale of cotton?

One bale of cotton can make:

215	Jeans or	**249**	Bed Sheets or
690	Terry Bath Towels or	**765**	Men's Dress Shirts or
1,217	Men's T-Shirts or	**1,256**	Pillowcases or
2,104	Boxer Shorts or	**3,085**	Diapers or
4,321	Mid-Calf Socks or	**313,600**	$100 Bills

What is a module?

- Once cotton is harvested, it is stored in modules for protection against the weather.
- A module builder hydraulically compresses the cotton from the picker into a module of cotton, which is usually stored in the field or in the gin yard until the cotton is ginned.
- A module holds about 13 to 15 bales.
- By forming modules that can be stored, either in the field or at the gin, harvest can continue when crop conditions and weather allow, regardless of the ginning rate.
- Round modules are fully enclosed on the circumference by a specially engineered polyethylene film that protects the cotton while also providing a compressive force to maintain the module density. This density protects the cotton from moisture and wind.

What is a bale?

- The bale is a standard of measurement for processed cotton. Cotton bales weigh between 480 and 500 pounds.
- At the cotton gin, the cotton fiber is separated from the cotton seed. The cotton fiber is compressed into bales.
- Every year, approximately 8 to 9 million bales are used by U.S. textile industries.
- The U.S. exports 6 to 9 million bales of cotton each year.

Cotton and U.S. currency

- United States paper currency is made up of 75% cotton and 25% linen.
- This means that there is three-fourths of a pound of cotton in each pound of dollar bills.

Brain Teaser

If one bale of cotton makes 313,600 $100 bills, then how many $1 bills can a bale of cotton produce?

Answer on page 4

Did You Know...

- In 1848, Levi Strauss invented a new kind of cotton work pants called denim jeans. Gold miners in California used them because they were so rugged. Today, we still wear Levis.
- In 1905, Wilbur and Orville Wright used cotton fabric to cover the wings of the first airplane they flew at Kitty Hawk, N.C.

Top Cotton-Producing States

Can you label the states?

- Alabama
- Arizona
- Arkansas
- California
- Florida
- Georgia
- Kansas
- Louisiana
- Mississippi
- Missouri
- New Mexico
- North Carolina
- Oklahoma
- South Carolina
- Tennessee
- Texas
- Virginia

Boll Weevil

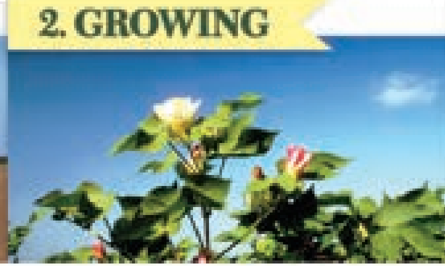
- The boll weevil is the primary enemy of the cotton plant.
- Boll weevils eat the young buds, flowers and bolls of the cotton plant.
- In 1892, the boll weevil migrated from Mexico through the area of Brownsville, Texas and spread rapidly throughout the Cotton Belt.
- In the late 1970s, the National Boll Weevil Eradication Program was launched by the United States Department of Agriculture.
- The National Boll Weevil Eradication Program ranks close to Eli Whitney's invention of the cotton gin as one of the greatest advancements ever for the U.S. cotton industry.
- There are several regions of Texas that are not boll weevil-free. Our state is still battling this pest.
- Today, more than one million cotton acres are active in the eradication program.

Cotton—from Field to Fabric

1. PLANTING

Farmers prepare the ground for planting by creating furrows in the soil. This lets the soil warm faster in the spring and directs irrigation water across the field. When the soil reaches about 65 degrees, mechanical planters will place the seed in the soil. The mechanical planters can cover as many as 12 rows at a time. Cotton planting can begin as early as February in South Texas and as late as June in northern areas of the Cotton Belt.

2. GROWING



Seedlings emerge from the soil within one or two weeks after planting. The plant will bloom at about 8-10 weeks. Within three days, the flower will pollinate itself, change from a creamy white color to pinkish red and then wither and fall off —leaving behind the developing boll. The cotton boll develops at about 10 weeks.

3. BOLL OPENS

Cotton bolls open 50 to 70 days after bloom, letting air in to dry the white, clean fiber and fluff it. Now, the cotton crop is ready to be harvested.

4. PICKING

For hundreds of years, cotton was picked by hand. Now, thanks to technology, equipment such as the mechanical cotton picker or brush stripper are used to remove the fiber from the plant. Cotton harvesting begins in July in South Texas and in October in more northern areas of the Cotton Belt.

5. MODULES

Cotton from the picker is dumped on the ground and compressed hydraulically with a module builder to form a module. There are two kinds of modules that allow cotton to be stored until it can be ginned. Round modules and rectangular modules allow farmers to continue to harvest, utilizing the best weather conditions, regardless of the ginning rate in their area.

6. GINNING

The modules are taken to the cotton gin where the cotton will be dried, cleaned and have its seed and fiber mechanically separated. The gin contains revolving circular saws that pull the raw fiber through closely-spaced ribs that prevent the seed from passing through.

7. COTTONSEED

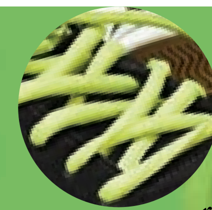
The cottonseed is processed into cottonseed meal, cottonseed oil, hulls and linters. The meal and hulls can be used in livestock feed or in fertilizer. The oil is used in several products, including cooking oils, cosmetics and snack foods. Linters are manufactured into a variety of chemical and non-chemical products.

8. COTTON LINT

The raw fiber, now called lint, is pressed into bales. These bales are banded with 8 steel straps, tested for classing, wrapped for protection and then shipped to storage yards, textile mills and foreign countries. Textile mills process these bales in stages until they produce yarn or cloth—which can be made into clothing, sheets, towels and other products.

Cotton Patch Scramble

What is that? Unscramble the letters below each photo to spell out the name of these cotton by-products you use every day.

1. 
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6. ldroal blli

7. 
cilaleowpss

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toopat cihp

COTTON CROSSWORD

ACROSS

3 Insect that is enemy to the cotton plant.
6 Most valuable by-product of the cottonseed.
7 Machine used to separate the seeds from the cotton lint.
8 Name of the area in the U.S. where cotton is grown.
10 480 pounds of compressed cotton fiber.

DOWN

1 The part of the plant that holds the cotton fiber.
2 Inventor of the cotton gin.
4 Outer covering of the cotton seed.
5 Storage for harvested cotton before going to the gin.
9 This state is number one in the production of cotton.

Cotton Connection

Solution:

Cotton Patch Scramble Answer Key:

1. shoe strings
2. toothpaste
3. thread
4. cooking oil
5. livestock feed
6. dollar bill
7. pillowcases
8. potato chip

Page 2 Brain Teaser Answer:

The same number—313,600

Produced by:
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TEXAS FARM BUREAU'S

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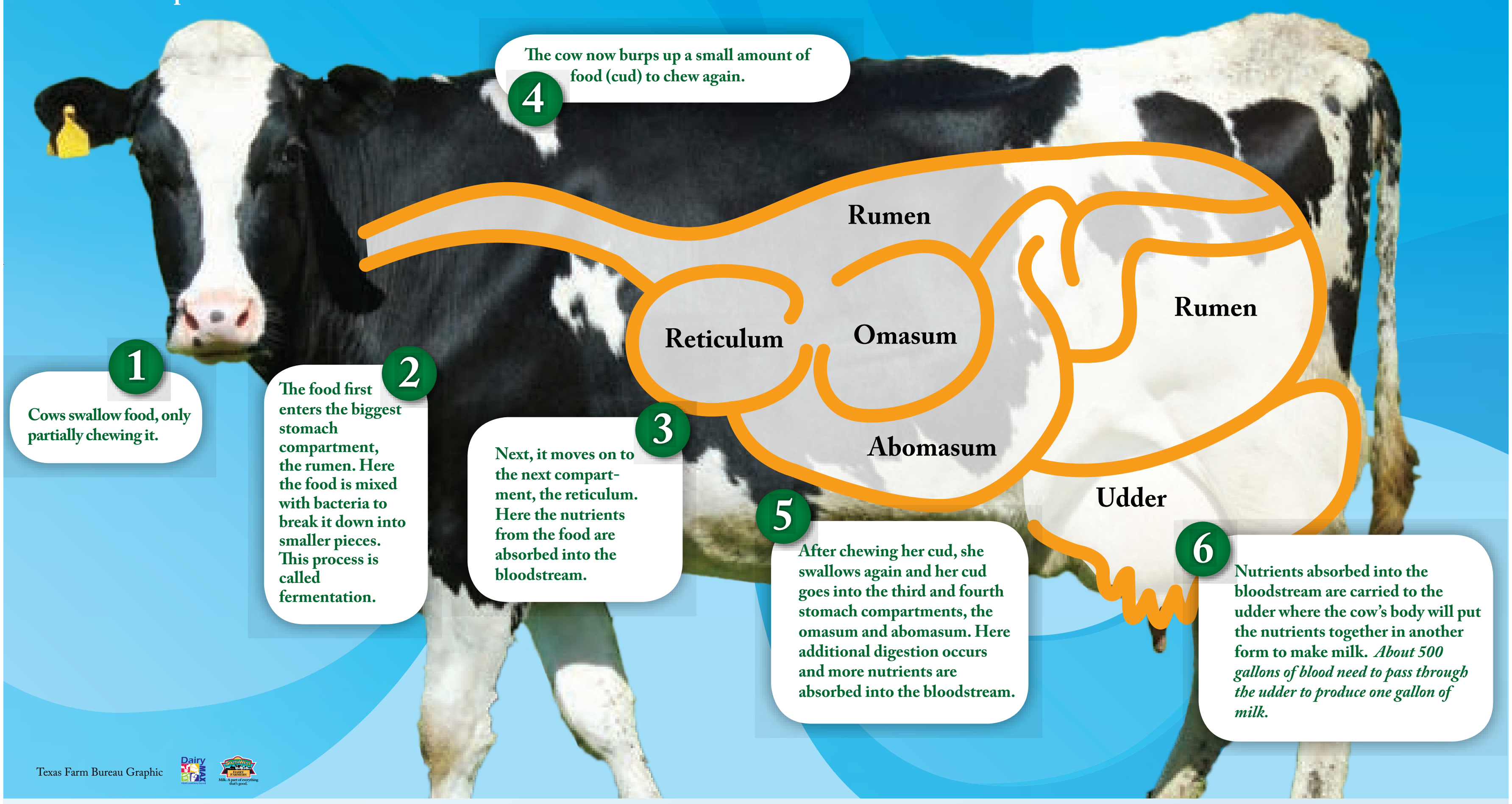
How a Cow Makes Milk

Cows have a unique digestive system. Milk cows are ruminants having a large stomach with four separate compartments. This gives cows a decided advantage in digesting and utilizing parts of plants which are normally useless. Substances such as cellulose, found in grass and hay, and other waste products, such as cottonseed hulls and beet pulp, can be utilized by the dairy cow to make two highly nutritious products—milk and meat.



How are cows milked?

Before milking machines were invented, farmers milked all their cows by hand. This may sound like fun, but it was hard work! To milk one cow, it could take up to 20 minutes. This made it hard for a farmer to own many cows. Other chores had to be done as well. Today, milking machines and milking parlors make it possible for one person to milk 100 cows in one hour. The cows' udders are cleaned and then a milking machine is attached. The machine uses a vacuum that acts like our hand motions that would be used to milk a cow. This stimulates the cow to allow the milk to be released, only taking about 10 minutes to milk. The milk is then pushed through pipes where it is cooled very quickly and then stored in a tank. Dairy cows are milked two or three times a day, depending on the dairy.

DAIRY BREEDS

There are many breeds of dairy cows that come in numerous colors and patterns. The most common is the Holstein, which is black and white. These cows are known for producing the most milk out of all breeds. Another common breed in Texas is the Jersey. They have a tan color and produce milk that is high in butterfat, which is used to make cheese and ice cream. When farmers choose what they want to raise on their dairy, they consider many options such as size of the cow, how much milk they can produce, if it is high in protein or butterfat and even how they would adapt to the climate of the farm's location.

HOLSTEIN

- Originated in Europe and was brought to the U.S. by Dutch settlers.
- Known for the highest milk production of all dairy breeds.
- The Holstein is the dominant dairy breed in the U.S.

JERSEY

- Originated from the island of Jersey, 15 miles off the coast of France.
- Jerseys produce more butterfat in their milk than other dairy breeds.

Dairy Farmers Recycle

Dairy farmers protect the land and water by using safe and effective practices. Manure from cows is collected in lagoons that are lined in heavy plastic. Here, the manure is turned into liquid. It is then used as a natural fertilizer on crops that feed the dairy cows. Plant scientists and engineers look at the land layout and needs of the plants to determine how much fertilizer to apply. The water on dairy farms is also recycled. The water used to clean stalls and milking parlors is also collected in the lagoons, to be added to the crop land.

What happens to milk *after* it comes from the cow?

First, the raw milk is **pasteurized**, where it is heated to kill bacteria and extend its shelf life—which keeps milk fresher for a longer period of time.

Homogenization is the next step. This process mixes and disperses the milkfat throughout milk to create a uniform mixture. This prevents the cream from rising to the top. Lastly, as part of the **standardization** process, cream is mixed in to the skimmed milk more consistently to create a variety of milkfat classifications, such as whole, reduced fat, lowfat and fat-free (also known as skim milk).

What are the differences in milk?

Milk is simple and pure, no matter which brand or percentage you drink. When you see whole, 2%, 1% or skim milk, that just tells you the amount of milkfat the gallon holds.

SAY CHEESE!

To make cheese, milk is heated and mixed with a culture. Cultures contain different types of good bacteria that give various cheeses their distinct flavors, textures and colors. The culture makes the milk curdle, clumping the milk's proteins together to form lumpy curds and whey, which is the liquid part of the milk that remains.

The whey is drained from the curds. You can eat the curds as fresh cheese, or you can wait until the curds are aged.

The kind of milk used, the amount of fat in the milk, how the curds are used and whey are formed, and how the cheese is stored also account for different colors and tastes. Even the sizes and shapes of cheeses are different.

MOO MATH

1. Even cows need a break. A cow can produce milk for about 305 of the 365 days in a year. If she produces 144 cups of milk per day, how many cups does she produce in 305 days?

2. Many of us buy milk in gallon jugs. How many gallon jugs can that cow fill in a day if 1 gallon equals 16 cups?

3. Before milking machines were invented in 1894, a farmer could milk 6 cows per hour by hand. How long would the milking take if the farmer had 15 cows?

4. Farmers can now milk a cow in about 10 minutes with a milking machine. If a farmer has 6 milking machines going at once, how many cows can be milked in one hour?

5. There are about 9 million milk cows in the U.S. today and about 90% of them are the black and white Holstein breed. How many U.S. cows are Holsteins?

Milk and Yogurt

Milk

There are many different varieties of milk, all of which contain 9 essential nutrients and are a great way to get your 3-A-Day™ of dairy.

AN 8 OZ SERVING OF:

FAT-FREE MILK- 80 calories, 0 grams of fat

1% LOWFAT MILK- 100 calories, 2.5 grams of fat

2% REDUCED FAT MILK- 120 calories, 5 grams of fat

WHOLE MILK- 150 calories, 8 grams of fat

Other varieties of milk include:
- Evaporated Milk
- Evaporated Fat-Free Milk
- Sweetened Condensed Milk

FLAVORED MILK... has a high proportion of nutrients in relation to their energy content.

Yogurt

Yogurt is a mixture of milk and cream fermented by a culture. The culture converts some of the lactose (milk sugar) into lactic acid.

Most people eat yogurt primarily for breakfast, as a snack or dessert, but yogurt can:
- Enhance flavor, nutrition and moisture in muffins
- Improve tenderness by marinating meats or poultry
- Be found in sauces or dips, sandwich fillings or desserts
- Be a low-calorie substitute for sour cream, cream cheese or mayonnaise

Other Cultured Dairy Goods:
Buttermilk

Texas Farm Bureau Graphic

MILK'S KEY VITAMINS

CALCIUM
Helps build strong bones and teeth

PROTEIN
Helps build and maintain lean muscle

VITAMIN A
Supports good vision

VITAMIN D
Supports a healthy heart

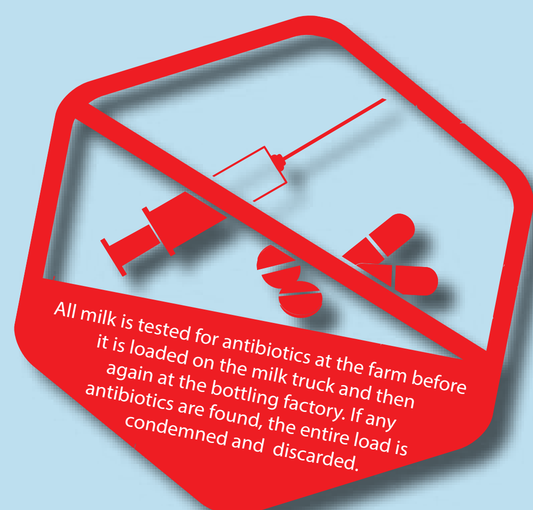
VITAMIN B-12
Works closely with folate to make red blood cells

POTASSIUM
Helps regulate the balance of fluids in your body

RIBOFLAVIN
Helps convert food into energy

NIACIN
Helps enzymes function normally

PHOSPHORUS
Works with calcium and vitamin D to help keep bones strong



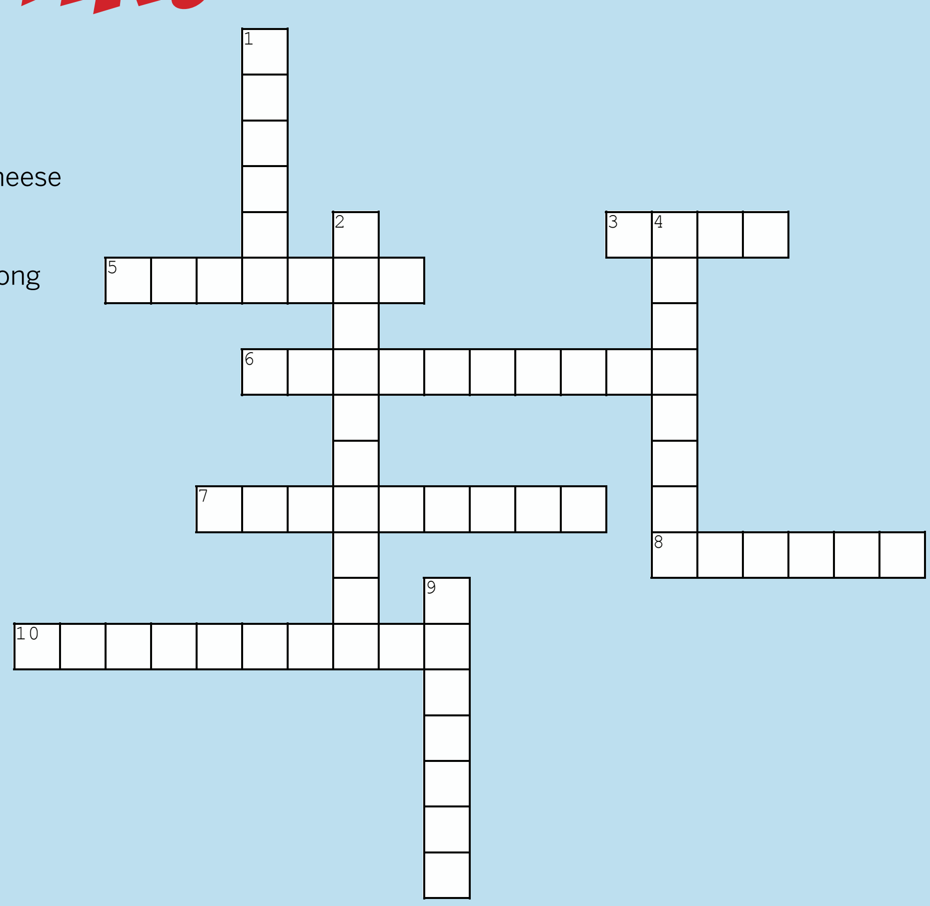
CROSSWORD FUN!

ACROSS

3. The liquid part of milk that remains after the making of cheese
5. Helps build and maintain lean muscle
6. Works with calcium and Vitamin D to help keep bones strong
7. Helps regulate the balance of fluids in your body
8. Helps enzymes function normally in your body
10. Top dairy-producing state in America

DOWN

1. A mixture of cream and milk fermented by a culture
2. Helps convert food into energy
4. The most common dairy breed in the United States
9. Helps build strong bones and teeth



Fill in the Blank Fun!

Label these dairy-related pictures using the titles below.

Consumer—Now that you know where dairy products come from, you can enjoy them even more! Remember to eat at least three servings of dairy foods every day!

Processing—The milk is tested and packaged at the milk processing plant.

Feeding—Dairy farmers feed and care for their cows.

Grocery Store—From the milk processing plant, milk and other dairy products are moved to grocery stores where you may purchase them.

Milking—Farmers milk cows twice every day by machine.

Testing—Milk is tested again and again to ensure it is safe for humans.

Refrigerator—Keep your dairy foods cold in your refrigerator at home.

Cooling—The cow's milk is stored in the bulk tank where it is kept cool and fresh.

Hauling—Milk is transported from the farm to the dairy processing plant by refrigerated trucks.

Top States

Label and color these top dairy-producing states on the map below.

1. California
2. Wisconsin
3. Idaho
4. New York
5. Texas

ICE CREAM

HOME MADE

Materials

The recipe is for one student so everyone can have their own bag

- Measuring cups and spoons
- ½ cup milk
- ½ teaspoon vanilla
- 1 tablespoon sugar
- 4 cups crushed ice, regular will work as well
- 4 tablespoons salt, rock salt is best
- 2 quart Ziploc bags
- 1 gallon Ziploc freezer bag

Directions

1. Place the milk, vanilla and sugar into one of the quart-sized bags. Seal the bag, trying to get the most air out as possible.
2. Place this bag inside the other quart-sized bag and seal again.
3. Put the bag of liquid inside the gallon-sized bag and fill with ice. Sprinkle salt on the ice.
4. Squeeze the air out of the bag and close.
5. Shake and massage the bag, letting your liquid get surrounded by ice. In about five minutes, the liquid should turn to ice cream.
6. Take out the quart bag, wiping it off. Cut off a bottom corner and squeeze into a bowl or eat out of the bag.

Did you know?

- It takes 10 pounds of milk to make 1 pound of cheese.
- On average, Americans eat about 34 pounds of cheese per year. That's more than one ton in a year!
- A dairy cow can produce 6 gallons of milk in a day.
- There are 8 grams of protein in an 8-ounce glass of milk—that's more protein than an egg!
- 4 million gallons of yogurt is needed for McDonald's in one year.
- 170,000 cows are needed to make enough cheese for Pizza Hut for one year.
- It takes 12 pounds of milk to make one gallon of ice cream.

Crossword Puzzle Answers:

ACROSS
3. Whey
5. Protein
6. Phosphorus
7. Potassium
8. Niacin
10. California

DOWN
1. Yogurt
2. Riboflavin
4. Holstein
9. Calcium

Moo Math Answers:

1. 43,920 Cups
2. 2,745 gallons
3. 2.5 hours
4. 60 cows
5. 81,000,000

TEXAS FARM BUREAU

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(3-2020)

POULTRY CONNECTION

The Poultry Connection has been developed and produced by Texas Farm Bureau Agriculture in the Classroom

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NO ADDED HORMONES EVER!

Many of us have walked through the grocery store and seen a sign that reads, "Chicken with NO Hormones." Did you know that chickens never receive hormones? Hormones in chickens were outlawed by the United States government in the 1950s. Adding hormones in chickens or turkeys is still illegal in the United States.

Photo courtesy of National Chicken Council

WHO'S THAT BIRD?

Did you know that poultry have different names throughout their life cycle depending on their species?

CHICKENS

Male: Rooster
Young Male: Cockerel
Female: Hen
Young Female: Pullet

TURKEYS

Male: Tom
Young Male: Jake
Female: Hen
Young Female: Jennie

What are the crops that poultry eat?

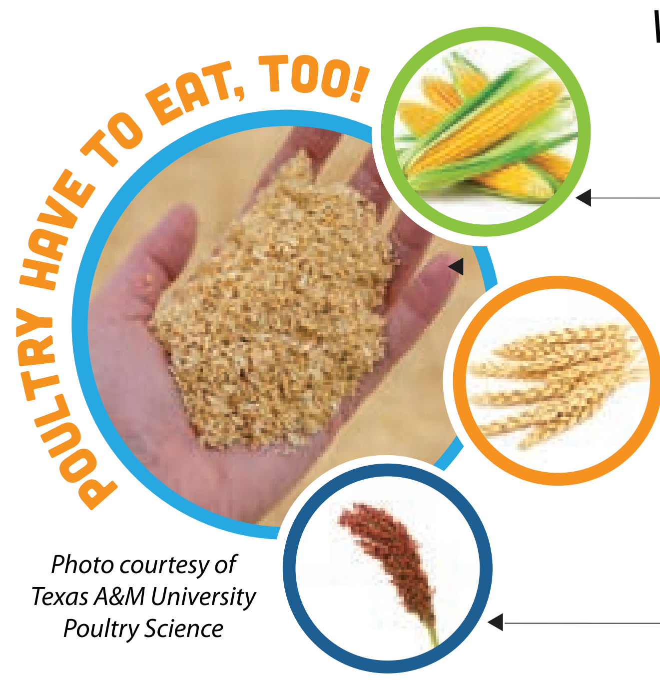
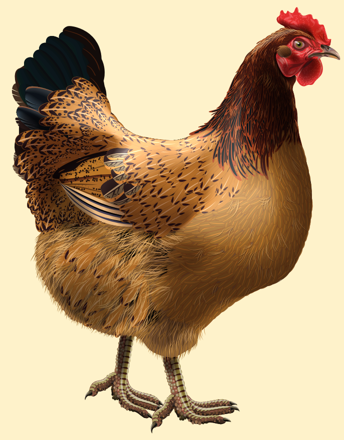


Photo courtesy of Texas A&M University Poultry Science

CHICKEN NUGGETS OR SCRAMBLED EGGS?

BROILER VS LAYER

Chickens that are raised specifically for meat are called broilers. Broilers gain more weight, and most broilers grow to full maturity (full grown) on poultry farms in just 48 days! The meat produced by broilers is a healthy source of protein for humans.



Chickens that lay eggs are smaller than broilers and are called layers. Most farmers raising laying hens use white layers, while backyard flocks usually have layers of other colors. Varied colored flocks produce varying colored eggs.

What differences do you observe in the two types of chickens?
Write your answers below.

____

____

____

____

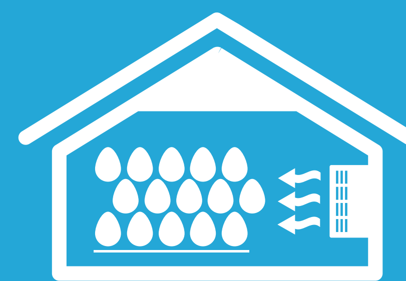
WORD SEARCH FUN!

Find the following words in the word search:

BROILER **LAYER** **HATCHERY** **POULTRY** **MEAT**
TURKEY **CORN** **WHEAT** **EGGS**

Y	B	R	O	I	L	E	R	T	A
H	E	E	W	H	E	A	T	C	G
A	E	C	K	R	B	S	T	D	R
T	V	P	O	U	L	T	R	Y	B
C	O	R	N	O	A	U	E	C	Q
H	E	F	Y	E	Y	W	U	R	E
E	A	O	M	H	E	G	G	S	R
R	E	W	T	U	R	K	E	Y	P
Y	W	D	O	U	B	E	D	T	E
R	O	Q	E	K	U	L	E	R	U

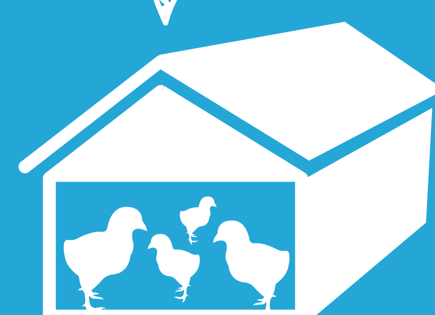
BROILER LIFE CYCLE



The Hatchery

A chicken's life begins in a hatchery where fertilized eggs are incubated and then hatched.

Once hatched, they are transported to farms where they are raised until sold for meat production.



The Broiler Farm

(Grow Out Farm)

- They grow to market weight in about 6-8 weeks.
- Unlimited feed and water is provided.
- Temperature, humidity and ventilation are carefully controlled.
- When the chickens are large enough to be sold for meat consumption, they are transported to the processing plant where they are harvested.

The chickens are taken to the processing plant to be harvested into the products that we regularly consume.

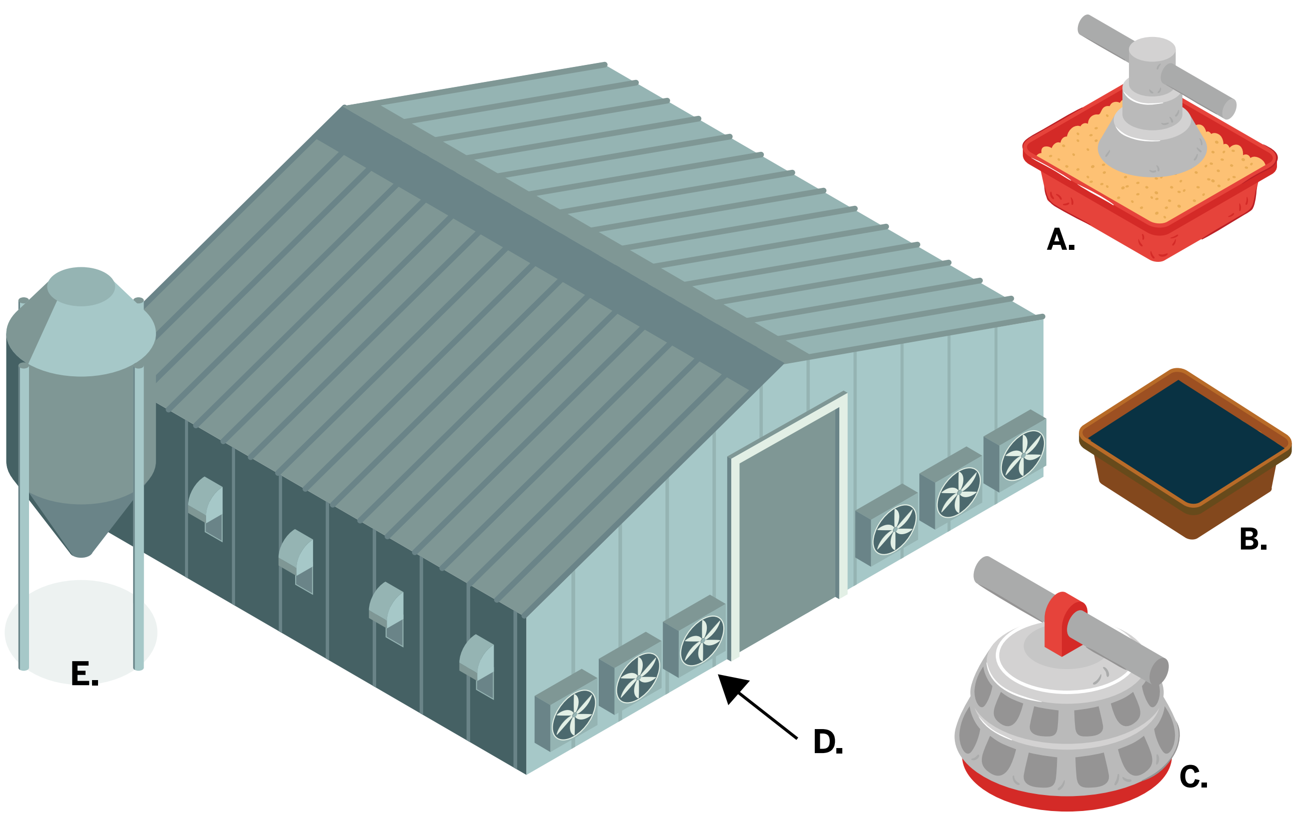
WHERE DO BROILERS LIVE?

Clean housing is very important for chickens to grow and be healthy. Modern-day chicken houses are very complex. The health and safety of chickens is of great importance, so there are many safety features present in today's chicken houses.

The houses are large and open for chickens to roam freely. Temperature is crucial and can affect how well the chickens grow. The houses are equipped with large tunnel fans that circulate air and keep the temperature exactly where it needs to be.

Feeders have a built-in sensor that detects when the feeders need to be filled up with nutrients that chickens need. Just like for humans, water is an essential nutrient for chickens. Clean water is provided to the chickens in water troughs throughout the house 24/7. Chickens also receive a very specific diet that aligns with their nutritional needs. Farmers have feed bins near the chicken houses that store the feed and allow farmers to have easy access to the exact feed and the proper amounts at all times.

Chickens are easily susceptible to disease if the proper steps are not taken. To help ensure diseases don't enter chicken houses, farmers must always step into a footbath that sanitizes their shoes before ever entering the houses. This is part of a biosecurity plan, and it is a top priority for chicken farmers.



Label the essential features of a chicken house

Tunnel Fans   Feeders

Water Troughs   Footbath   Feed Bins

A. ____________

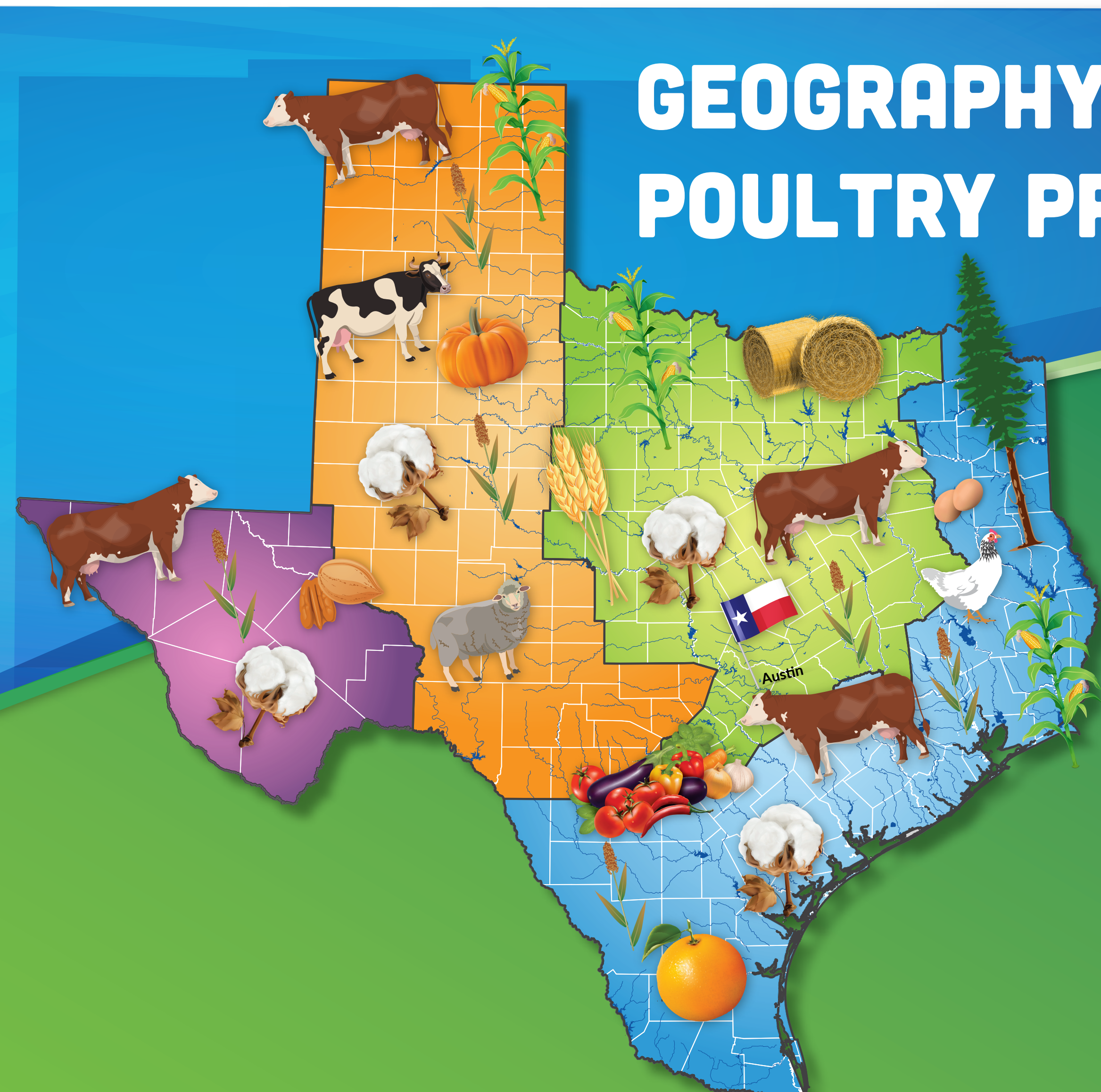
B ____________

C. ____________

D. ____________

E. ____________

GEOGRAPHY OF TEXAS POULTRY PRODUCTION

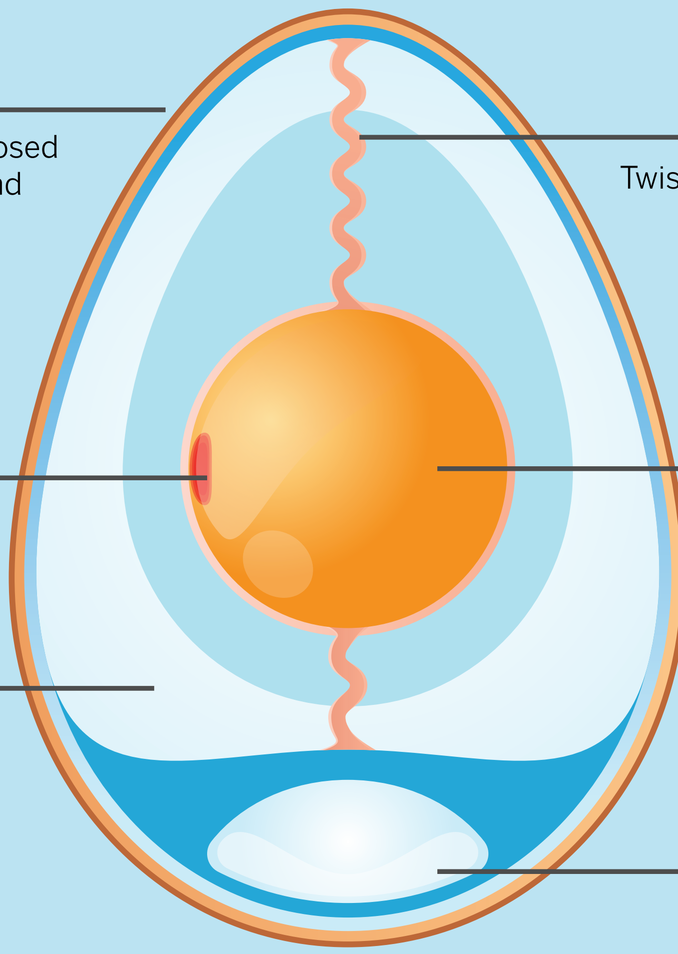


Do you see a difference in the number of areas that chickens are raised in the state compared to other crops? If you said yes, you are correct! Broiler and layer chickens are mostly *(but not exclusively)* produced in East Texas due to water availability, convenient transportation in relation to highways and railroads, and space to name a few.

PARTS OF AN EGG

Label the egg with the correct parts

chalazae	germinal disk	air cell
shell	yolk	albumen



EGG CANDLING

Some eggs are fertilized and will produce a chick, but other eggs are unfertilized. We call those table eggs, and they're what we eat for breakfast and use to make yummy treats like cake and cookies!

The poultry industry uses a technique called candling to analyze the quality of the egg. Candling helps you see the white, the yolk, and the air cell. The smaller the air cell, the better the quality of the egg.

TRY IT AT HOME!

What you need:

- **Eggs**
- **1 flashlight**

Hold the egg up and shine the flashlight on the bottom of the egg. The light should allow you to see right through the egg. If you look closely, you'll likely be able to identify some of the parts of the egg from the diagram! Candling also allows you to see the air cell size. If the air cell is large, that means the egg is less fresh than one with a smaller air cell.

Photo courtesy of Texas A&M University Poultry Science

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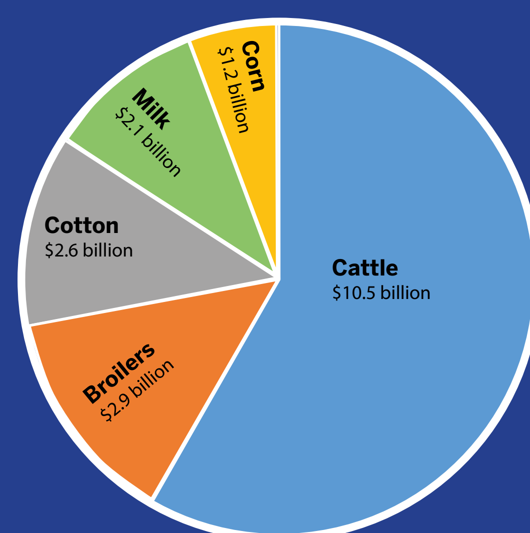
Fort Worth Stockyards/Cattle drives

Texas is famous for the iconic cowboy way of life. Due to the abundance of cattle in Texas, they were only worth a dollar or two. The northern and eastern states were demanding beef and would pay up to $20, much more than in Texas. Ranchers wanted higher prices, but the cattle had to be delivered to these states. This need created cattle drives. The two most famous Texas cattle drives are the Chisholm Trail and the Goodnight-Loving Trail. These trails first started in 1866 to take cattle to Kansas and Colorado, where there were railroads to ship the cattle further to buyers who would pay a higher price.

The Fort Worth Stockyards are also iconic to Texas cattlemen. Fort Worth was the last major stop for those following the Chisholm Trail. They could rest and gather supplies before leaving Texas. Between 1866 and 1890, more than 4 million head of cattle were trailed through Fort Worth, giving it the nickname "Cowtown." In 1876, the railroad arrived at Fort Worth. Cattle were now driven straight to Fort Worth to be shipped by railroad to northern and eastern states to be sold at higher prices.

Beef cattle production represents the largest single segment of Texas agriculture.



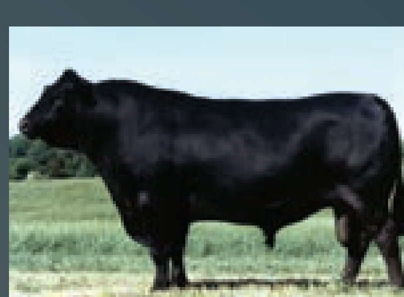
(Source: Texas Department of Agriculture)

Vaccines

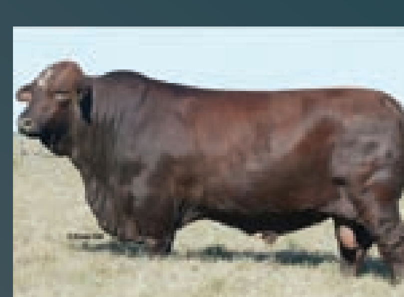
Ranchers care about their cattle. They monitor the cows to make sure they are getting enough feed and they are not sick. If any of the animals are ill, they are observed by the rancher and veterinarian. Together, they decide how to treat the animal. It will only be given just what it needs to get better. By giving their cattle proper care, nutrition and disease prevention, antibiotic usage decreases.

CATTLE BREEDS

Worldwide, there are more than 250 breeds of cattle. Over 60 of these breeds are present in the United States. However, a relatively small number of breeds (less than 20) are used for commercial beef production. Some of those breeds are:



ANGUS
Imported from Scotland in 1873



BEEFMASTER
Developed in early 1930s in Texas
Brahman-Hereford-Shorthorn cross

BRAHMAN
Imported from India in 1854

BRANGUS
Developed in 1932 in U.S.
Angus-Brahman cross

HEREFORD
Imported from England in 1817

CHAROLAIS
Imported from France in 1936

What does “chew their cud” mean?

Cattle have a four-chamber stomach. Every part of the stomach has a different function. Before the food can pass to certain sections, it must be rechewed.

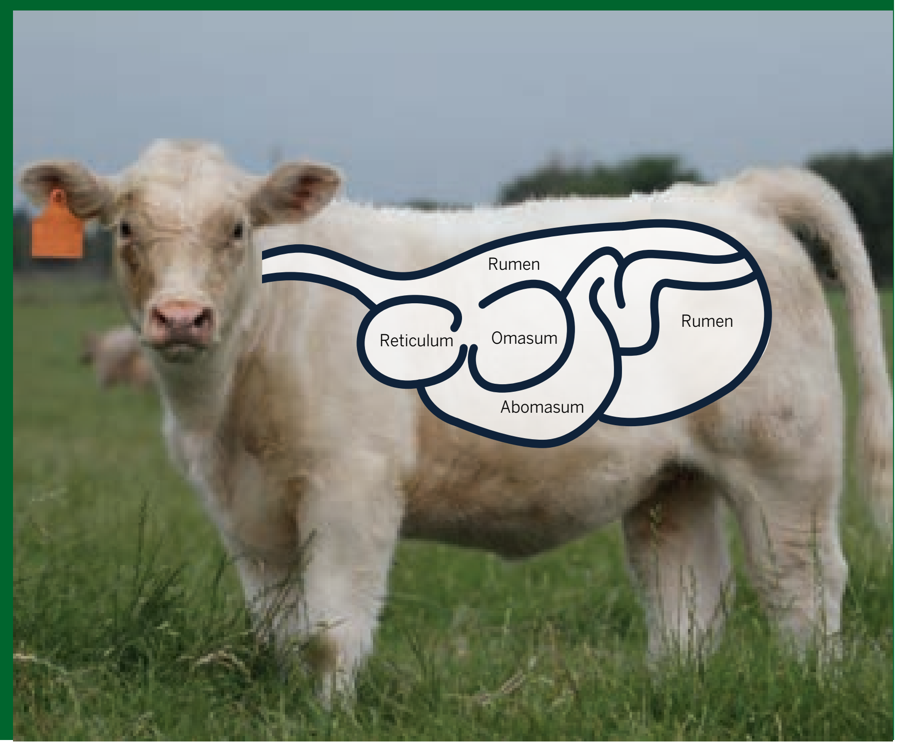
1) Cows swallow food.

2) The food first enters the biggest stomach compartment, the *rumen*. Here, the food is mixed with bacteria to break down into smaller pieces. This process is called fermentation.

3) Next, it moves on to the next compartment, the *reticulum*. Here, the nutrients from the food are absorbed into the bloodstream.

4) The cow now burps up a small amount of food (cud) to chew again.

5) After chewing her cud, she swallows again and her cud goes into the third and fourth stomach compartments, the *omasum* and *abomasum*, where additional digestion occurs and more nutrients are absorbed into the bloodstream.



Reading a brand

Before fences weaved across Texas, ranchers used brands to tell their cattle apart. Cattle were allowed to roam free and graze, unlike today. Hot irons were used to form letters, shapes or pictures to mark ownership of the cattle. Brands are still used today, but ear tags are also common.

Brands have their own language. Read below to learn how to read brands and make your own.

R “R”

Tumbling R

Lazy R

Reverse R

Walking R

Flying R

Running R

Quarter Circle R

Half Diamond R

Rafter R

Bar R

Circle R

Diamond R

Box R

Name the Brand

1. ____________________

2. ____________________

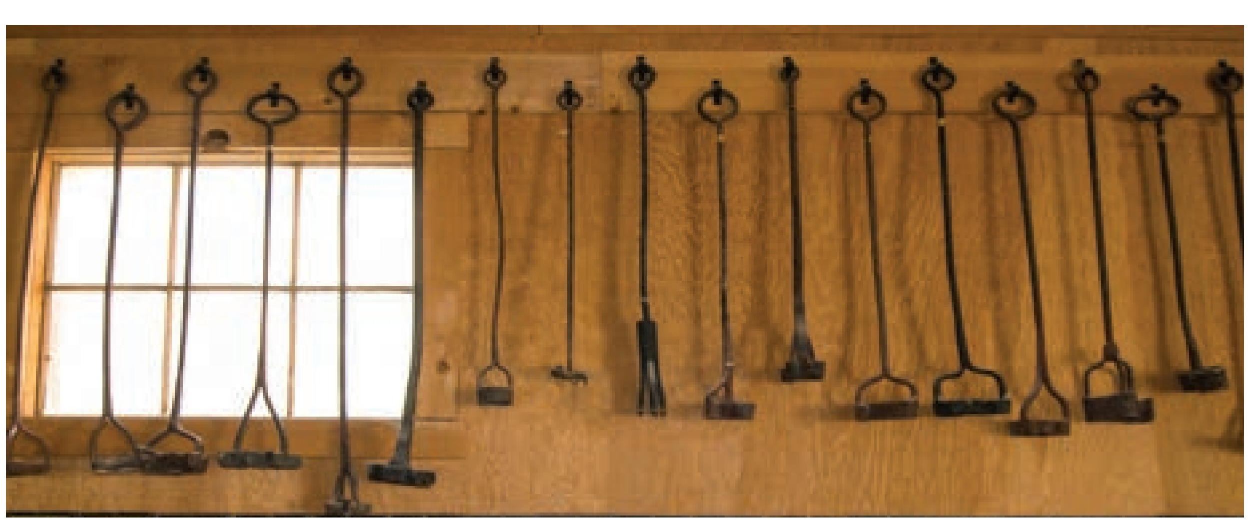
3. ____________________

4. ____________________

5. ____________________

BEEF ON THE ROAD

Tires contain stearic acid, a byproduct of animal fat that makes the rubber hold its shape under continuous surface friction. Even the asphalt on the road has a binding agent from fat. Other byproducts used in the automobile industry include antifreeze, car polishes and wax and brake fluid.



DID YOU KNOW?

The hide from one beef animal can be made into:

Cows have 32 teeth, just like humans, but do not have any top front teeth!

Cattle chew 50 times per minute.

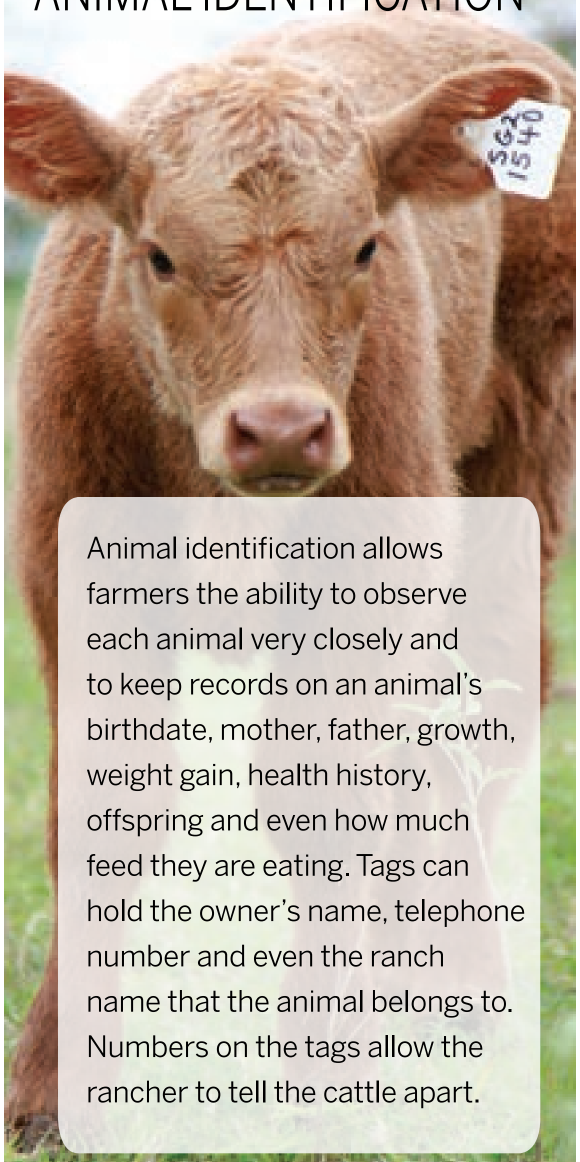
They can drink between 30 to 50 gallons of water a day—that's a bathtub full!

Cattle need the correct mixture of protein, carbohydrates, fats, minerals and vitamins to grow, just like humans!

What's in a name?

Cow—female beef animal that has had a calf
Heifer—female beef animal that has not had a calf
Bull—male beef animal used to breed cows and heifers
Steer—male beef animal that cannot reproduce
Calf—young beef animal

ANIMAL IDENTIFICATION



Animal identification allows farmers the ability to observe each animal very closely and to keep records on an animal's birthdate, mother, father, growth, weight gain, health history, offspring and even how much feed they are eating. Tags can hold the owner's name, telephone number and even the ranch name that the animal belongs to. Numbers on the tags allow the rancher to tell the cattle apart.

Did you know—
Some counties in Texas have more cattle than people?

BEEF LIFE CYCLE

1 COW-CALF RANCH

Cows and young cows, called heifers, give birth to baby cows, called calves. This happens once a year. Calves drink milk from their mothers the first few months of their lives.

2 WEANING

Calves are weaned, or kept from their mothers, when they are about eight months old and weigh about 500 pounds.

3 STOCKERS AND BACKGROUNDERS

Men and women called stockers or backgrounders then buy calves after they are weaned. The calves are placed in a new pasture with other calves their age. The calves grow as they turn grass, hay and grain into muscle and fat.

4 FEEDYARD

Most cattle then move to feedyards. They spend three to five months at the feedyard. At the feedyard, cattle do not graze on pasture. Instead, they are given a balanced, nutritious diet of grasses, corn plant silage and hay. They also eat grains like corn and wheat. Some cattle stay on pasture for their entire lives. The meat from these cattle is called grass-fed or grass-finished.

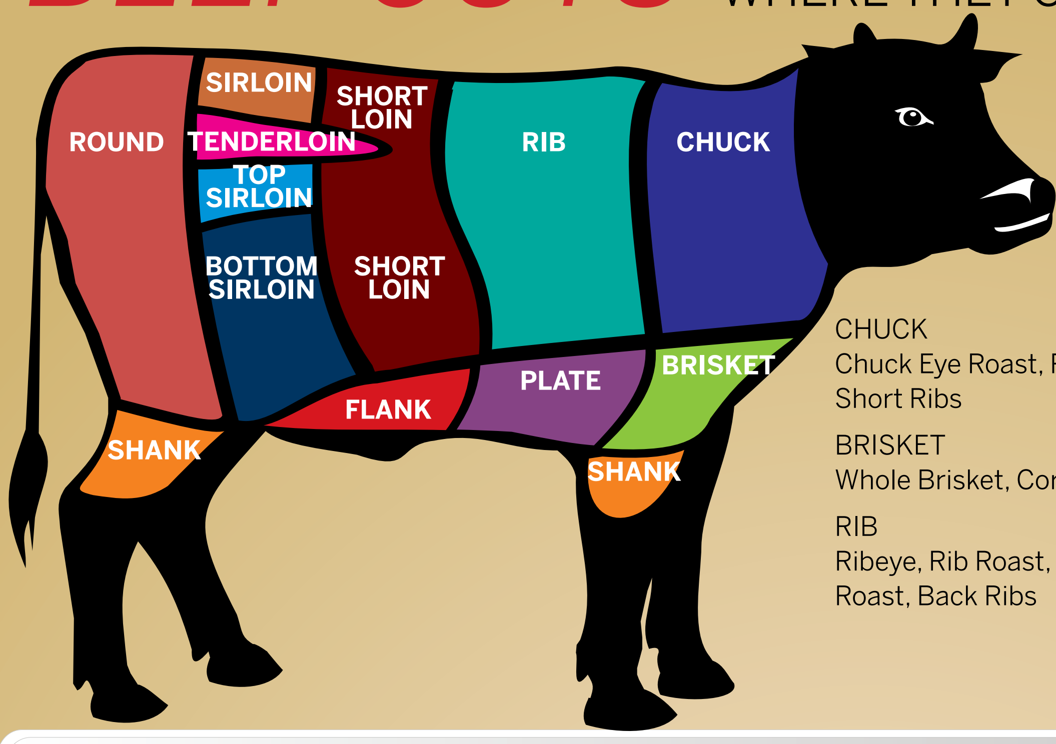
5 PACKING PLANT

Cattle are harvested in packing plants where workers break down the carcasses, or meat, into popular beef cuts. The process of harvesting beef is done so the cattle are treated in an approved way and the food is produced safely.

6 FOOD SERVICE AND RETAIL

Beef moves from the packing plant to other processing facilities that send individual steaks, roasts and other cuts to grocery stores and restaurants. About 90 percent of the beef raised in the United States is eaten in the United States.

BEEF CUTS WHERE THEY COME FROM—



CHUCK
Chuck Eye Roast, Pot Roast, Short Ribs

BRISKET
Whole Brisket, Corned Brisket

RIB
Ribeye, Rib Roast, Rib Steak, Roast, Back Ribs

SHANK
Shank Cross Cut

SHORT LOIN
T-Bone Steak, Porterhouse Steak, Top Loin Steak, Tenderloin Roast/Steak

PLATE
Skirt Steak (fajitas)

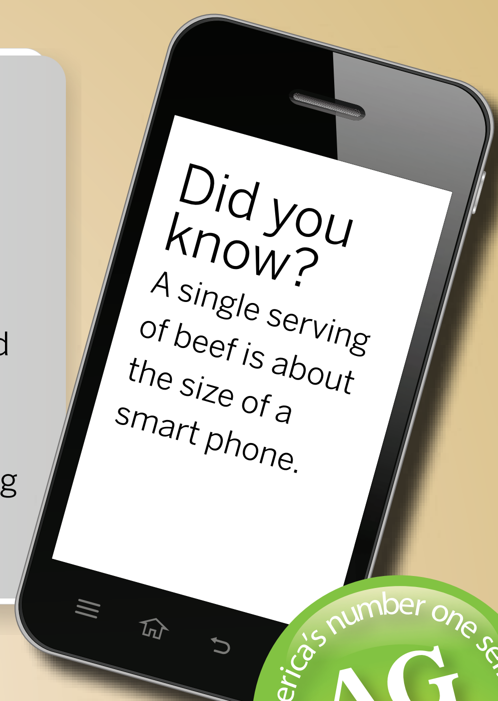
FLANK
Flank Steak, Flank Steak Rolls

SIRLOIN
Sirloin Steak, Top Sirloin Steak, Beef Tri-Tip

ROUND
Round Steak, Top Round Steak, Bottom Round Roast, Eye Round Roast, Tip Steak, Boneless Rump Roast

BEEF NUTRITION

Beef is a very important component of our diet. Beef provides us with three essential nutrients: protein, iron and zinc. Protein builds, maintains and repairs body tissues. Iron helps red blood cells carry oxygen to body cells and tissues. Zinc helps with growth and maintaining the immune system. Beef also provides B-vitamins, which promote healthy skin, a healthy nervous system and are important for digestion and metabolism. One 3-ounce serving of lean beef provides 50% of the daily value of our need for protein.



WORD SEARCH FUN!

ANTIFREEZE
BELTS
CANDLES
CRAYONS
FOOTBALLS
MARSHMALLOW
PAPER
PURSES
TOOTHPASTE
BANDAGES
BOOTS
CHEWING GUM
CREAM
GLOVES
MEDICINES
PASTA
SHOE POLISH
BASEBALLS
CAKE MIX
COSMETICS
DEODORANT
ICE CREAM
PAINT
PLASTICS
TIRES

C	B	E	L	T	S	Y	I	T	S	P	W	G	C	O
R	R	H	O	E	U	C	N	H	H	O	A	U	H	M
Y	X	A	V	W	E	A	O	L	L	T	G	P	C	A
N	M	O	Y	C	R	E	E	L	F	O	I	Y	E	E
T	L	F	R	O	P	B	A	N	D	A	G	E	S	R
G	O	E	D	O	N	M	G	K	S	T	O	O	B	C
S	A	O	L	E	H	S	C	I	T	S	A	L	P	H
M	E	I	T	S	A	N	T	I	F	R	E	E	Z	E
D	S	N	R	H	S	L	L	A	B	T	O	O	F	W
H	N	A	I	Z	P	E	C	A	N	D	L	E	S	I
X	M	Z	F	C	B	A	S	E	B	A	L	L	S	N
P	A	S	T	A	I	R	S	R	T	N	I	A	P	G
T	I	R	E	S	L	D	S	T	U	H	W	C	I	G
X	I	M	E	K	A	C	E	B	E	P	C	T	O	U
D	Q	H	S	C	I	T	E	M	S	O	C	Y	F	M

Humans cannot digest grass but cattle can! Grazing animals more than doubles the area that food can be produced from by using land that isn't suitable for crop production.

TEXAS FARM BUREAU

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