

# Country to Classroom

VOLUME 3, ISSUE 1, FALL 2008

THE NEWSPAPER OF WYOMING AG IN THE CLASSROOM

## Learn from the land

Welcome to the new edition of *Country to Classroom*, where we'll learn all about agriculture, the land it thrives on and the people who work it. Read on!



Welcome to another informative and fun-packed issue of *Country to Classroom*. In an effort to be a leader in agriculture and natural resource education, Wyoming Agriculture in the Classroom has designed *Country to Classroom* to better meet the needs of students, teachers and parents across Wyoming.

Look for new and exciting changes in our web site. It is presently under construction. We will have an all new, user friendly layout, plus several new items.

We welcome your feedback on our programs and publications. Please contact us at (307) 777-6618, e-mail: [BGERKE@state.wy.us](mailto:BGERKE@state.wy.us), or by mail: WAIC, 2219 Carey Ave, Cheyenne, WY 82002. We hope you enjoy our newspaper and welcome your feedback.

Sincerely,

*Dennis Lee*  
Board President

### In this issue...



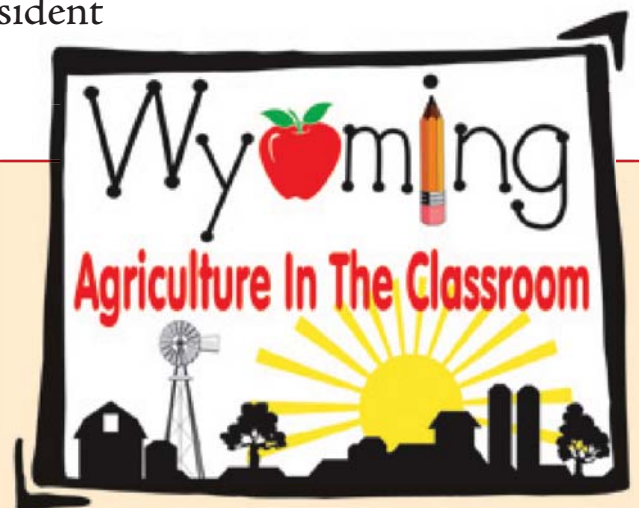
**Wow that dairy cow!**  
*How the cow produces the dairy we love.*  
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# EnCana Oil & Gas (USA) Inc.

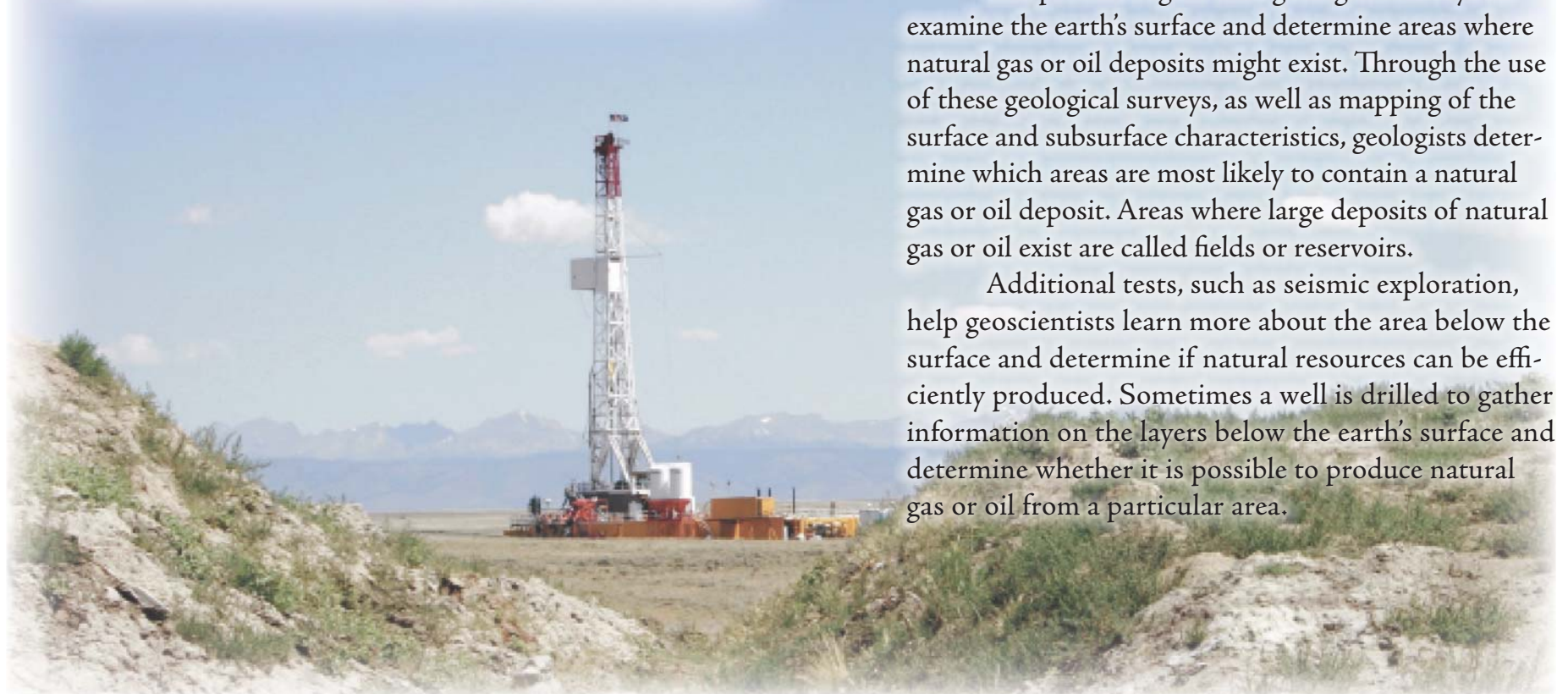
## A partnership with Wyoming Agriculture in the Classroom

**W** Wyoming is a unique and special place, a land where energy development, natural resources, agriculture and recreation coexist. As a steward of this land, EnCana places a high value on all Wyoming has to offer. We know agriculture and natural resources are the foundation of our society, the food we eat, the clothes we wear, the energy that heats our homes and fuels our cars.

Agriculture is one of Wyoming's most valuable industries and vital to our state's future. To help make sure this will always be a place where it thrives, EnCana is proud to support Wyoming Agriculture in the Classroom through a challenge grant of \$750,000. The grant is being used to create much-needed tools and educational programs about agriculture and natural resources for students throughout Wyoming. For the past three years, the Wyoming Community Foundation has been conducting a fund raising campaign to match EnCana's lead gift donation.

Through our partnership with Wyoming Agriculture in the Classroom, we enthusiastically shape the future of Wyoming by starting at the foundation – our students. EnCana believes students in every school district in the state deserve the chance to explore the value of natural resources and agriculture in the classroom, including energy development education and resource stewardship. We hope the following information is not only instructive and useful, but also a learning opportunity to achieve awareness and appreciation of all of Wyoming's natural resources.

## DRILLING 101: HOW IS NATURAL GAS & OIL FOUND?



**Land** - In the development phase, the area is assessed to ensure the company develops a plan that fully utilizes the area's potential, but minimizes the impact to the environment. The company collaborates with landowners where drilling will likely occur to reach a fair agreement on how the natural gas and oil will be developed. This increases understanding of the drilling process and allows the company to hear and address concerns. In addition, environmental scientists study the native plant and animal species to mitigate potential impacts and

conserve habitat diversity. With this knowledge, the company can identify the best way to reduce the impact of operations on the surrounding areas. In many cases, the company will install automated well-monitoring systems to minimize the number of vehicles and site visits necessary for a project.

To determine exactly where a well will be drilled depends on a number of issues, including the structure of the surrounding area and the estimated size of the natural gas and oil reservoir.

**Geology** - There are many steps in natural gas and oil production process that occur long before you turn on the lights in your home.

The process begins with geological surveys to examine the earth's surface and determine areas where natural gas or oil deposits might exist. Through the use of these geological surveys, as well as mapping of the surface and subsurface characteristics, geologists determine which areas are most likely to contain a natural gas or oil deposit. Areas where large deposits of natural gas or oil exist are called fields or reservoirs.

Additional tests, such as seismic exploration, help geoscientists learn more about the area below the surface and determine if natural resources can be efficiently produced. Sometimes a well is drilled to gather information on the layers below the earth's surface and determine whether it is possible to produce natural gas or oil from a particular area.



*One of Wyoming's leading independent energy producers, with operations in the Jonah Field, Green River Basin and Wind River Basin. For more information, email us at [askencana@encana.com](mailto:askencana@encana.com) or visit [www.encana.com](http://www.encana.com).*



## A Commitment to Clean Energy

**Drilling** - Drilling is how natural gas and oil are brought to the surface of the earth from an underground rock formation. Rock formations that store natural gas and oil are referred to as reservoirs or fields. Natural gas and oil companies use both conventional and new technology drilling rigs to improve drilling efficiencies, minimize surface impacts, mitigate noise and reduce emissions.

A drilling rig is the machine used to penetrate into the formations below the earth's surface to extract oil or natural gas. Rotary drills have a rotating bit on the end of the drill pipe that bores into the many layers of the earth. The hole is lined with casing that is cemented into place to maintain the integrity of the well and to protect shallow groundwater aquifers. Aquifers lie between 200 to 800 feet below the surface and are thousands of feet above the targeted formations. In most EnCana fields in Wyoming, drilling takes an average of 10 to 20 days per well, and well depths average 8,500 to 12,000 feet, depending on geology.

Drilling a well is a 24-hour-a-day operation and many methods are used to aid the process, including fit-for-purpose rigs that allow for a smaller footprint for multiple wells. Electromagnetic directional and downhole pressure tools are used to improve drilling. To increase the efficiency at which a drill operates, companies often use a polycrystalline diamond cutter (PDC) drill bit. A PDC bit also reduces the number of drilling days and decreases the overall costs. Once a drill reaches total depth, tests determine reservoir quality and geological zones to complete the well.

**Completion** - is installing equipment to facilitate the flow of natural gas and oil out of the well. Each well contains one or more geological zones of interest. To release the flow of natural gas and oil to the surface, each zone must be fracture stimulated or "fraced." This increases the natural gas and oil production of the well. After fracturing, a crew runs tubing into the well to enhance production by creating a more efficient path for natural gas and oil to travel to the surface. The natural gas or oil flow is controlled by a series of valves and instruments at the top of the well.

**Production** - In a natural gas well, when the gas rises through the tubing and is produced through the wellhead, it is separated to remove liquids at or near the wellsite. The natural gas is measured and then sent via pipeline to compressor stations, where any additional liquids are removed and the natural gas is compressed. Compressor stations deliver natural gas to a processing facility that separates it into components, primarily methane, ethane, propane and butane.

In an oil well, when the oil rises through the tubing, it is separated from the natural gas at the wellsite and is stored in oil tanks on or near the wellhead. After sufficient volumes of oil have accumulated, the oil is trucked to a refinery where it is separated into its constituent hydrocarbons. To ensure that the oil meets today's performance and environmental standards, additives are added to allow for cleaner burning fuel. Additional processing creates the products we use each day, including gasoline and plastic.

**Pipeline** - After natural gas and oil are extracted, these resources must move quickly to the regions where they are needed. Often, this means the natural gas and oil travel long distances from where they are produced to where they are used. This requires a complex and extensive transportation system. Natural gas and oil are transported through pipelines that are designed specifically to move them safely.

**Reclamation** - Natural gas and oil companies strive to minimize their environmental footprint, constructing drilling pads to be as small as possible. Once the well is producing, drilling equipment is removed, the pad is recontoured and the area is returned to its prior condition. Reseeding may occur at the request of the landowner or by Bureau of Land Management standards.



### THE ECONOMIC BENEFITS OF NATURAL GAS AND OIL:

As the nation's fastest-growing energy source, with demand forecast to increase by about 22 percent between now and 2030, natural gas supplies about 63 million residential customers and 5 million commercial and industrial customers. Americans used 22 trillion cubic feet of natural gas in 2005 to heat and cool homes, provide fuel for cooking and electricity, and to power buses, taxis, cars and other natural gas-powered vehicles. Natural gas meets 22 percent of U.S. energy requirements and provides the energy source or raw materials to make a wide range of products such as:

- |                   |                |
|-------------------|----------------|
| PLASTICS          | FERTILIZER     |
| STEEL             | ASPIRIN        |
| GLASS             | AUTOMOBILES    |
| SYNTHETIC FABRICS | PROCESSED FOOD |

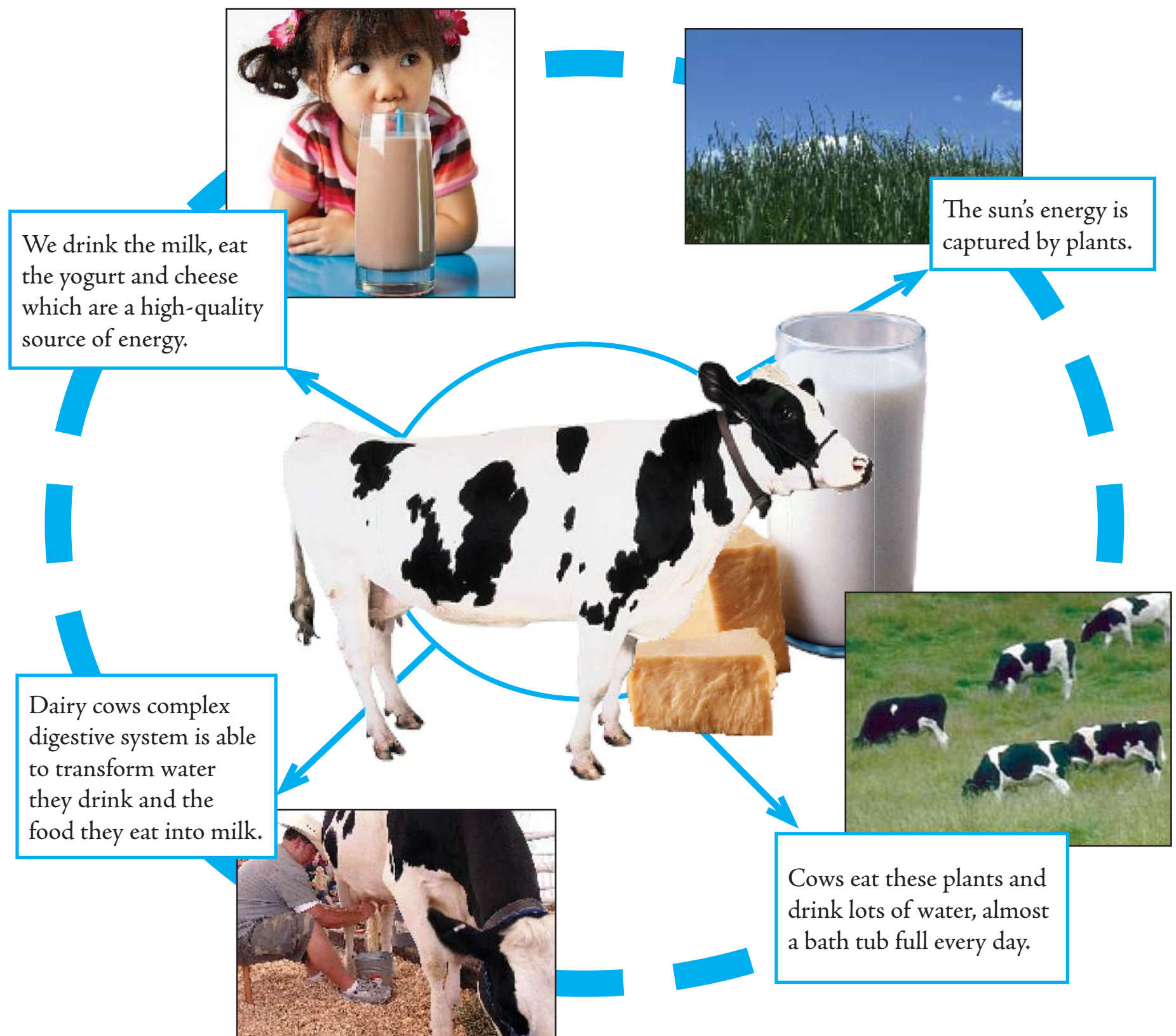
One 42-gallon barrel of oil creates 19.4 gallons of gasoline. The rest (over half) is used to make things like:

- |                  |              |
|------------------|--------------|
| BICYCLE TIRES    | TOOTHPASTE   |
| SKIS             | DEODORANT    |
| DENTURE ADHESIVE | SURFBOARDS   |
| ANTIFREEZE       | PANTY HOSE   |
| GOLF BALLS       | INSECTICIDES |



# Amazing dairy cows

The incredible dairy cow turns grass into milk, as a vital part of the “circle of life.”



## Making milk safe from the cow to your cup

Many people work hard to keep our milk safe. Within a few days, milk travels from the dairy farm to your table and is tested many times to make sure your dairy foods are wholesome and safe.

Dairy farmers care about their cows and the milk that is produced by providing them with healthy food and comfortable barns; keeping track of each cow's health and by milking them two to three times a day. By using modern milking machines, human hands never touch the milk. Plus, every piece of equipment and the milk cow's teats are sanitized often.

When the cow is milked, the milk is warm and must be chilled for freshness and safety. The dairy farmer uses a plate cooler to quickly cool the milk. A plate

cooler is two pipes that are next to each other, one with cold water and one with the warm milk. The cold water in the one pipe cools the milk in the other pipe to 35 - 40 degrees Fahrenheit. The cooled milk goes into a large refrigerated milk tank.

Before the milk leaves the dairy farm, the driver of a refrigerated milk truck tests and labels the milk as it is loaded into his tank. The truck delivers the milk to the processor, the company that packages milk, and also makes flavored milks, cheese, yogurt and other dairy products. At the processing plant technicians analyze the milk again to make sure it is safe and wholesome.

Before the milk is packaged or made into other foods, the milk is pasteurized.

Pasteurization is the process of heating the milk for a period of time sufficient to destroy certain microorganisms. This does not change the nutritional value or taste of the milk, but it does kill any harmful microorganisms and bacteria. All dairy products are shipped in refrigerated trucks from the processing plant to schools, stores, and restaurants.

Our government also helps keep our milk supply safe and wholesome. The USDA (United States Department of Agriculture), the FDA (Food and Drug Administration) make and keep rules for how milk is safely collected, shipped and stored. All rules must be followed and inspectors visit the farms, processors and stores to make sure everyone is doing their part to keep milk safe.



## Dairy does your bones good

Nutrition means feeding our bodies quality foods. It takes knowledge and good choices to feed our bodies well.

We can learn what choices to make by studying and learning from MyPyramid. MyPyramid is a model that shows how we should eat every day, including the types, amounts and variety of foods that will keep our bodies healthy. This model shows us that it takes many different foods to keep us healthy.

MyPyramid has six colors, each representing different categories of foods: grains (orange), fruits (red), vegetables (green),

meat and protein (purple), oils (yellow), and milk (blue). Our bodies need the nutrients from all the food categories to grow and be healthy.

The Milk group provides our body with calcium and eight other essential nutrients. Eating at least three servings (and striving for four servings) of milk, yogurt or cheese each day will provide the nutrients our bodies need from this group.

Ninety percent of the calcium in our bodies is used for bones and teeth. Growing children and teens need the calcium for making strong bones. Milk, cheese, and yogurt supply our bodies with calcium and other nutrients. The other nutrients in milk, cheese and yogurt also play an important

role in keeping our bodies healthy.

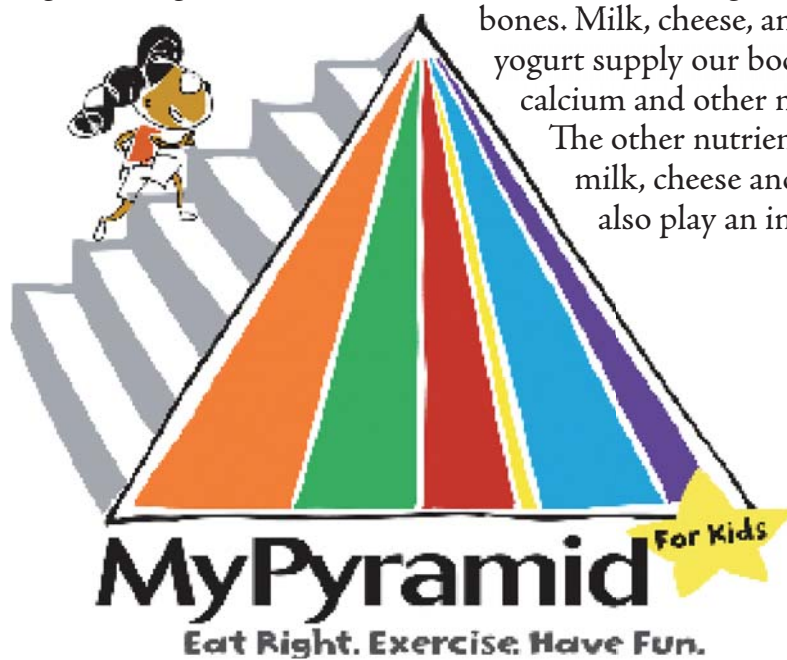
- Vitamin D helps bodies absorb and use calcium;
- Potassium assists in keeping blood pressure normal;
- Magnesium is used for dense bones and teeth;
- Phosphorus keeps bones and teeth strong;
- Protein helps build and repair our bodies;
- Riboflavin converts food into energy; and
- Vitamin B12 maintains red blood cells which carry oxygen in the blood.

There are many ways to enjoy milk, yogurt and cheese throughout the day. A glass of milk tastes great with any meal. A carton of yogurt or cheese cubes make an easy and quick breakfast or snack. Sprinkle cheese on top of a salad or

a bowl of soup, or add to a sandwich for more nutrition.

Our bones need daily physical activity to stay strong. We should do our best to exercise 60 minutes every day. Exercise that helps bones stay strong include walking, playing basketball, swimming, jumping rope and other activities that make your bones and muscles move. Walking for 10 minutes, jumping rope for 10 minutes, and participating in a running game at recess all add up to your 60 minutes of exercise.

By learning what our bodies need for good health and making good choices throughout the day, we can be responsible keepers of our bodies. Including milk and other dairy foods in your daily choices is a great start to responsible eating.



### Handling dairy

As a consumer, you are a part of the team to keep your milk and dairy foods safe. Always follow the three C's:

**C**lean – make sure the milk container is clean and free of dirt.

**C**overed – keep the lid on your milk and yogurt containers, and keep cheese wrapped to protect it from germs.

**C**old – to keep dairy products cold, they should be one of the last items you buy at the store, and your refrigerator should be set at 40 degrees.

We all have a part in keeping our milk safe: the farmer, the processing plant, the store and us!

**did you know?**

Every year, Wyoming's 7,100 dairy cows provide enough milk for approximately 249 million glasses of milk or 11 million gallons of ice cream

## Milk Math

Cows eat up to eight times a day, eating about 100 pounds of food every day! They eat a meal called a Total Mixed Ration (TMR), which is like a big tossed salad. This "salad" includes silage, hay, corn, soybean meal, vitamins and minerals. Silage is fermented mixture of variety of crops ; corn plants, wheat, or other grasses. Dairy cows also drink 25-50 gallons of water each day. Now, figure out how much feed it takes to produce the dairy products we love!

**If one cow eats 90 pounds of feed each day, how many pounds of feed would a cow eat in a year?**

**If one cow drinks 33 gallons of water each day, how many gallons of water would a cow drink in one week?**

**If a cow drinks 33 gallons of water a day, how many quarts of water did she drink?**



# Making a living in cattle country

American beef feeds the families of the world ... and it all begins on the farm. The beef you eat at home, at school or in a restaurant comes from cattle that spend most of their lives grazing in fields on family-owned ranches around the country. Farmers and ranchers that raise cattle are also called beef producers. People who eat beef are called beef consumers.

Today's beef producers are mostly families. Many of them have been raising cattle for decades. For most beef producers, raising cattle is a family tradition! Cattle farms and ranches are often handed down from generation to generation. In fact, a recent survey showed 60 percent of beef producers expect to pass their operation on to their children.

Beef producers are proud of what they do. They spend most of their days taking care of their animals and the land because it's the right thing to do and because it's the only way they can preserve their way of life for future generations.

### Animal Welfare:

Beef producers are committed to caring for their herds and producing safe, wholesome beef for consumers around the world. Cattlemen take care of their animal's health and ensure their well-being by providing a proper diet, access to water, veterinary care and medications when they are ill. These practices are based on research and years of practical experience and all help enhance the well-being of the herd, individual animals

and the overall productivity of the herd.

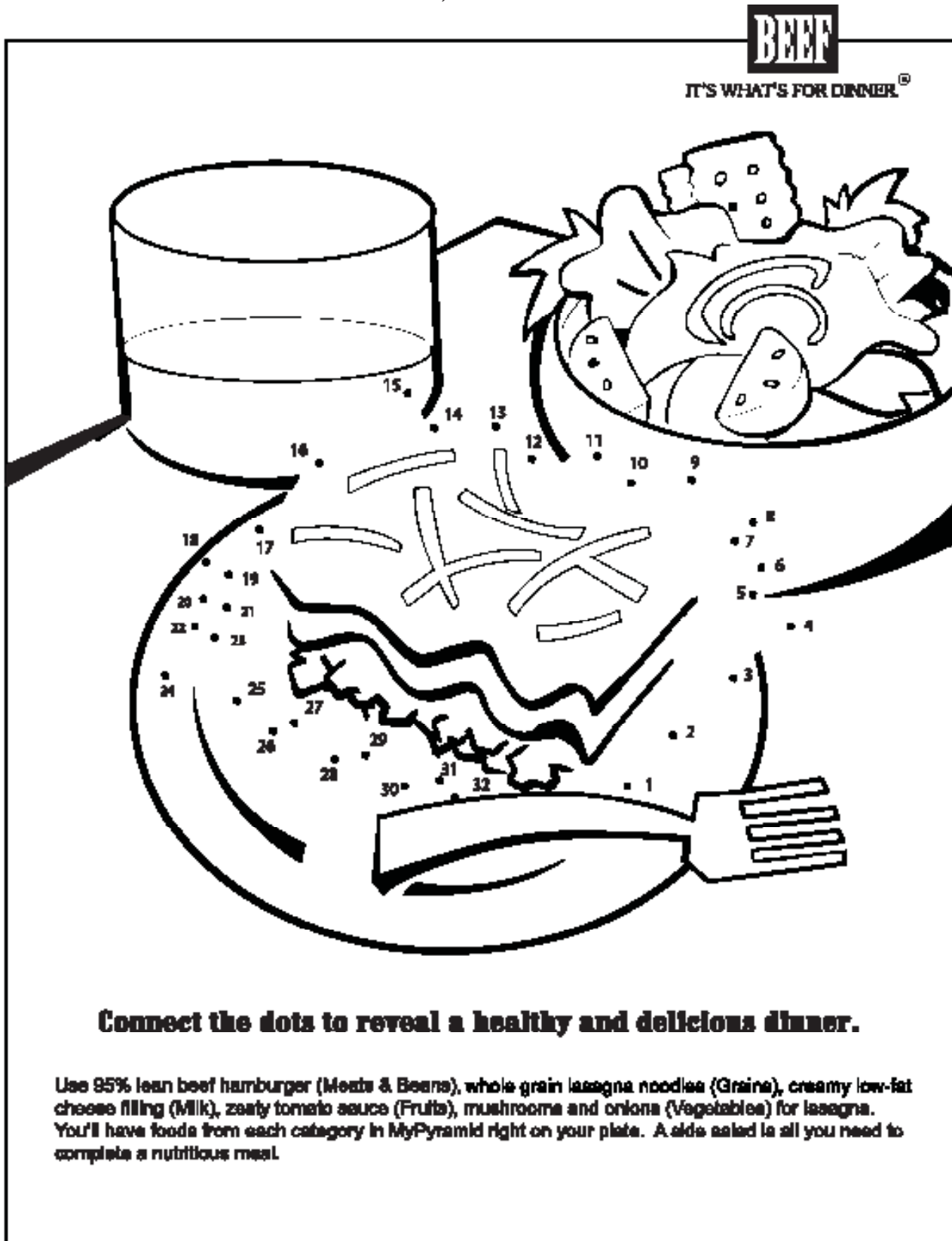
### Environment:

Farmers and ranchers are committed to caring for the nation's environmental resources. Ranchers depend on healthy, natural resources for their livelihood and therefore, place high value on stewardship of the land. Good environmental practices not only conserve and improve natural resources, but also enhance the productivity of the land.

Many beef cattle producers practice natural resource management activities including soil tests, brush and weed control, grazing management plans, and maintenance of clean water sources.

### Beef is Good for You

Beef is good for you and tastes good too. Consumers want healthy, nutritious, safe food, and beef provides all three. There are 29 different cuts of beef (including 15 of the 20 of the most popular cuts) that meet government guidelines for lean, such as tenderloin, sirloin and 95 percent lean ground beef. Beef is also a naturally nutrient rich food. Just one 3-ounce serving of lean beef contributes less than 10 percent of calories to a 2,000-calorie diet, yet it supplies more than 10 percent of the Daily Value for nine essential nutrients. And all beef goes through a rigorous inspection process using government regulations to ensure that U.S. beef remains the safest in the world.



## Fun cow herd facts

- ✦ Cattle are counted in heads. A farmer who has fifty cows has fifty head of cattle. More than head can also be referred to as a herd.
- ✦ There are more beef farms in America than any other type of farm.
- ✦ There are beef farmers and ranchers in all 50 states.
- ✦ There are about 800,000 beef producers in the United States, who are responsible for nearly 100 million beef cattle.
- ✦ There are about 6,000 beef producers in Wyoming who are responsible for more than 1 million head of beef cattle.
- ✦ There are cattle in all 23 counties in Wyoming.
- ✦ More than half of all beef producers plan to hand down their ranch or farm to the next generation.



*Serve up hot nutrition with beef, the*

# Powerhouse nutrient

**E**ating right is key to staying healthy and active. When it comes to nutrition, some foods just have more to offer.

Beef is a significant source of nine essential nutrients, including protein, zinc, iron, selenium, phosphorus and B-vitamins.

Every day, we choose to eat foods that can help make our bodies grow strong and healthy. Your parents and cafeteria cooks should make sure you get all the vitamins and nutrients you need to have energy and stay healthy. One way to make sure you get all your vitamins and nutrients, is to request beef for dinner. Beef is full of important nutrients that are hard to find in other foods.

Three of the most important nutrients you can get from eating beef are Zinc, Iron and Protein (**ZIP**). Eating enough of these nutrients every day actually helps your brain grow and develop too! While eating beef is one of the best ways to get the nutrients you need, it is also important to eat a lot of different foods to make sure you are getting all of the right vitamins and nutrients from your food. Check out the new MyPyramid to find out what foods you should eat to stay healthy.

**ZINC** helps you think and improves things like memory and attention span. At the same time, it's helping to increase your brain power; zinc helps heal our injuries and strengthens your body to fight colds.

**IRON** helps your brain by supplying oxygen. People with less iron in their diet score lower on problem-solving tests. You also need iron to fuel every day physical activity. Without enough iron in your diet, it's hard to perform your best on the field and in the classroom.

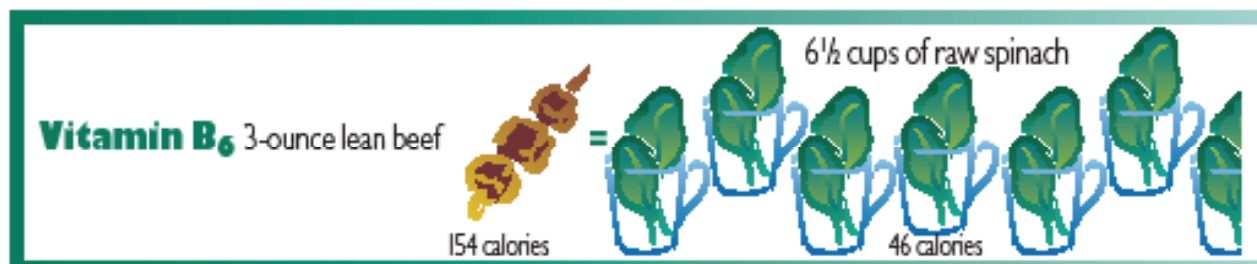
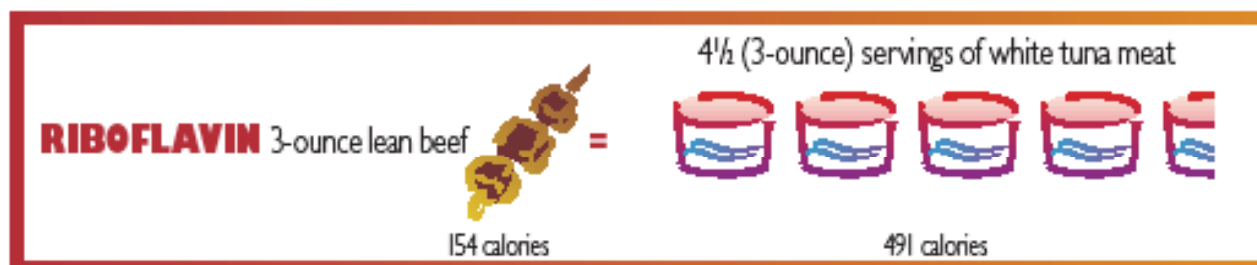
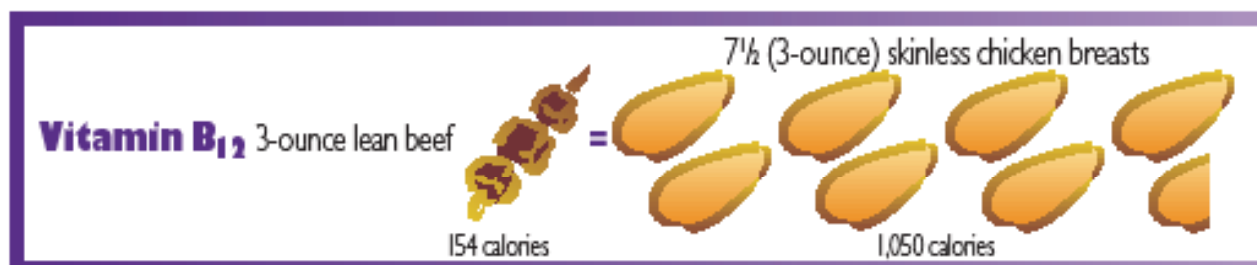
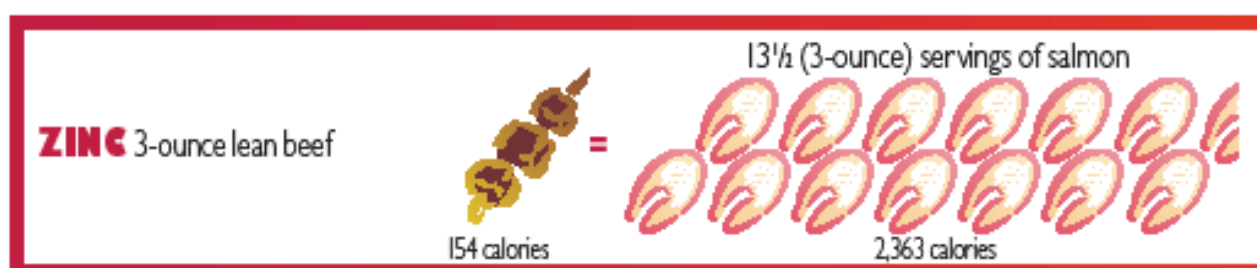
**PROTEIN** is a source of energy for your body. Protein builds and repairs all your body's tissue and keeps your muscles strong.

Beef is also packed full of other nutrients like B-vitamins. Your body needs B-vitamins to turn food into energy. Beef is a major supplier of many B-vitamins. Besides their role in turning food into energy, B-vitamins have some specific roles, too.

Vitamin B-12 helps form healthy red blood cells and keeps your nervous system healthy. Vitamin B-6 also helps keep your brain tissue healthy. Riboflavin, another B-Vitamin is needed by your body for healthy skin and good vision.



## Beef's Competitive Advantage



Source: US Department of Agriculture, Agricultural Research Service, 2005. USDA Nutrient Database for Standard Reference, Release 18. Based on a cooked serving of beef, visible fat trimmed.



# Un Managed Predators

**R**anchers work hard to make sure their animals are fed, watered, healthy, have home and are safe. Livestock producers can't eliminate all risks faced by their animals. Nature has many tricks in the book that keep producers constantly updating and improving their management systems. Weather, water supply, predators, and people are just a few of the challenges faced in livestock management. Predators are a highly discussed topic among producers.

**A** predator is defined as one who preys, destroys or devours other species as its primary source of food. In some instances predator consumption can reduce prey specie's rate of survival and reproduction or both. The predator-prey relationship acts as a natural management system; the biodiversity of communities is improved as specie type and population are kept in balance. Predatory consumption is a normal part of live and death for wildlife and livestock. However, when predation is excessive or when predators prey on livestock, management is implemented to prevent or reduce losses.

**W**yoming State Law designates certain animals as predators, thus allowing for the monitoring and management of said animals. Human interventions work to balance livestock, wildlife, and predators occupying both public and private lands.

## Predators in Wyoming:

- Coyotes
- Jack-rabbits
- Porcupines
- Raccoons
- Red foxes
- Skunks
- Stray cats
- Grey wolves
- Starlings
- English sparrows



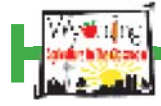
## Predators: A Natural Risk

**P**redators are a natural risk encountered by livestock producers. Livestock managers take many different approaches to maintaining the safety of their herd. Mothers with young offspring are often placed in pastures near the house and barn. In some instances birthing mothers, sick, or otherwise weakened animals are placed inside barns or corrals. Guard animals such as dogs, donkeys, llamas, and mules are also used as a protective measure.



**F**ences provide some protection, but livestock producers take care to protect the wildlife that may inhabit their lands as well. Free ranging livestock cannot be 100% protected from natural risks and predators. Baits, trapping, sounds, and decoys, and hunting can also be used decrease the risk of predator loss. Methods used by different livestock producers are specific to their herds and area. The adaptability of predators makes management a constant process of trial and error. Livestock, wildlife, and predators have utilized the same lands for years. Human intervention seeks only to keep communities healthy and balanced by protecting livestock and enhancing wildlife production.





## Can Cause Big Conflicts

**T**he state of Wyoming is home to a wide variety of ecosystems. As a result, Wyoming is also home to several large and small predators. A predator is an animal that relies and preys on another animal species for food and survival. This concept may sound like a negative outcome for animals considered as prey, but is the outcome really a negative thing? Let's look at a simple food chain and then at how food chains become a web of chains connecting and depending on one another for survival, species maintenance and reproduction.

### CONCEPTS AND TERMS

To understand the interconnectedness of organisms, it is necessary to study *ecosystems*, or biological communities interacting with one another and their environment. Ecosystems have many components that can be broken into two major categories, *biotic* and *abiotic*. The biotic or living parts of an ecosystem include species, populations and biological communities. The abiotic influences are non-living, such as temperature, light, soil and water.

A *species* is a group of similar organisms that can produce fertile offspring.

*Populations* are groups of individuals of the same species that occupy a given area at the same time.

All of the populations of different species occupying a particular ecosystem make up a *biological community*.

*Organisms* within ecosystems can be classified into two different categories: *producers*, or *autotrophs*, which make their own food, as green plants do; and consumers, or *heterotrophs*, which cannot make their own food and must eat producers or other consumers.

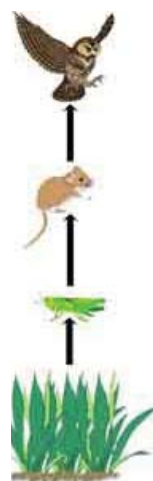
Consumers can be further divided into *herbivores*, which eat plants; *carnivores*, which eat animals; *omnivores*, which eat both plants and animals; and *detrivores* or decomposers, which feed off dead and decaying organisms.

The sequence of who eats whom in an ecosystem is called a *food chain*. *Predators* are those that feed on other animals for survival. The animals that are fed on by predators are called *prey*. All ecosystems have complex feeding networks, made up of many different food chains. This feeding network is called a *food web*.

**B**ecause of the wide variety of habitat, wildlife, predators, and human populations, Wyoming often faces disputes as to actions that are considered beneficial to the balance versus other actions deemed detrimental to Wyoming's diverse populations. While these issues can arouse several conflicting views, the basic structure of nature's own maintenance system allows the opportunity for wildlife, domestic livestock, predators, and people to not only reside in the same areas, but are essential to the health and survival of one another.

Wild animals inhabited Wyoming well before people. These critters survived with a typical producer/consumer or predator/prey cycle. In years with lots of rain, a good stand of grasses and other forage were available. Deer and other animal species were fat and healthy. The carnivorous animals were also doing well as the animals they preyed on provided good nutrition. Winter came and the snow covered the forage and trapped several animals. Predators flourished as their food sources were weak and easy to get to. Spring arrived and a new crop of forages began to show. Hungry predators lurked and stocked but found that the winter months had been hard on their food sources. Due to the deep snow many animals could not reach the underlying forage and became weakened and vulnerable. Taking advantage of the weakened state, predators had eaten well and kept their bellies full, thus the population of their food source was greatly reduced. The end of spring came and the predator species bore several healthy new families into the world. On the other side of the food chain, deer and other prey animals were scarcely seen and there were very few new babies born.

As the cycle continues, the predators are now facing decline in population as there is no longer a sufficient food supply. As the predator population diminishes, slow increases in the populations of their food sources can be seen. The life and death cycle continues, providing a natural balance in area ecosystems.



**FOOD CHAIN**  
(just one path of energy)



**FOOD WEB**  
(everything is connected)



# Path of the Pronghorn

Did you know there are as many pronghorn as people in Wyoming? It's true! There are approximately 500,000 pronghorn antelope living here. You can see pronghorn all over in Wyoming because they like big open spaces, sage brush, and grasslands. In fact, most of the pronghorn in the United States live in Wyoming and Montana.

Pronghorn are social animals that like to travel in herds. Each fall, one particular herd of about 200 pronghorn travel from their summer habitat in Grand Teton National Park near Jackson Hole, to their winter habitat in the southern Sublette County. And each spring, they migrate back to the Tetons. A migration is when animals travel from one place to another place due to seasonal

changes such as cold weather and snow. This pronghorn migration is the longest land mammal migration in the lower 48 states.

The Path of the Pronghorn is over 6,000 years old according to archeological findings. This means ancient pronghorn 6,000 years ago roamed around Wyoming at the same time as the saber-toothed tiger and woolly mammoths! The length and the ancient roots of the Path of the Pronghorn make this a very unique and special piece of natural history for Wyoming.

Many people in Wyoming want the Path of the Pronghorn to be present for generations to come and are making changes on their land to allow the pronghorn to move through without

difficulty. For example, the pronghorn are not built for jumping, unlike like deer, therefore they crawl underneath fences. Many ranchers, other landowners, and land managers are installing "wildlife friendly" fences with a higher bottom and un-barbed strand of wire. When pronghorn crawl under the fence, they have more room and are not as restricted. Other landowners and ranchers have conservation easements on their property. This type of conservation easement ensures that the future use of the land will remain an open path for the Pronghorn.

Thanks to the efforts of everyone involved, this passage remains the largest mammal migration in North America today.

## Wildlife and Agriculture

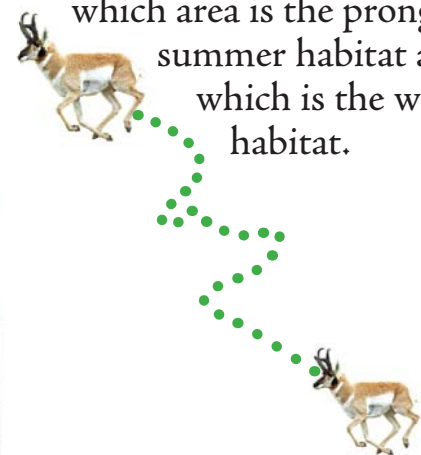
**M**igrations remind us that connected habitats are very important for the continued existence of wildlife in Wyoming. Ranchlands and other agricultural lands are important because they preserve large open spaces so that wildlife can move from one location to another. Conservationists refer to this as "connectivity" when different habitats are connected to each other and not broken up by development. Many credit the large agricultural community in Sublette County for the continuation of the Path of the Pronghorn.

**W**hat wildlife do you see on ranches and farm land in your community?

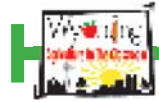
## Map their travel



Re-draw this path on the map to indicate where the pronghorns travel. Include a label of which area is the pronghorn's summer habitat and which is the winter habitat.



**did you know?**  
Pronghorns are between 31 and 40 inches tall and weigh between 75 and 130 pounds. They have a horn sheath, but this is different from either the antlers on deer or the true horns on cattle or bison.



# Identify Killer Weeds

Noxious weeds are highly invasive plants that have arrived in the U.S. mostly by accident. They use up the water, nutrients, and sunlight which help them to grow strong and spread fast, killing our native plants. Native plants are a very important food source

for wildlife to survive. These noxious weeds also do not have any "predators" or insects that feed on them to help keep them from spreading. We need your help to keep these plants from destroying our ecosystem. One thing you can do is to learn what they look like and stay away

from them so you don't spread their seeds.

Every county in Wyoming has noxious weeds that are bad. Study the photos and descriptions of each noxious weed to be able to answer the questions at the end of the activity.

### Leafy Spurge



- Perennial, creeping root system, 25-foot deep
- 2.5 inch long narrow leaves
- Can throw its seeds 15 feet from plant
- Yellowish-green flowers with heart shaped bracts
- Milky sap comes out of any broken part of plant
- Sap is poisonous to livestock, a skin irritant, and may cause blindness

### Dyer's Woad



- Winter annual, biennial, or short lived perennial, taproot
- Leaves are bluish-green with a white mid-vein
- Yellow flower cluster with a flat top
- Fruit pods turn purplish-brown and hang beneath the flowers

### Field Bindweed



- Perennial, creeping root system
- Arrowhead shaped leaves on a vine
- Trumpet-shaped white to pink flowers
- Seeds can still grow after sitting in the soil for up to 60 years

### Russian Knapweed



- Perennial, creeping root system
- Roots have a black coating and can grow to 23 feet long
- Deeply-lobed lower leaves and entire upper leaves
- Pink to purple single flowers

### Spotted Knapweed



- Biennial, or a short lived perennial, taproot
- Hairy, deeply lobed leaves
- Single, purple flowers at end of each branch
- Flower head has black tipped bracts
- Plant releases chemical that kills surrounding plants, also a skin irritant

### Dalmatian Toadflax



- Perennial, creeping root system - Blue/green, waxy, clasping leaves - Yellow snapdragon-like flowers
- Brought to the U.S. as a decorative flower

### Diffuse Knapweed



- Annual, or short lived perennial, taproot
- Rosette leaves are pinnately divided, stem leaves are entire and smaller
- Flowers are white to rose and appear mid-summer to fall
- Bracts are yellowish and spiny with teeth resembling a comb.

### Saltcedar



- Woody shrub, reaching 20 feet tall
- Feathery green cedar-like leaves that turn yellow in the fall - Branches are red
- Pink to white, 5 petaled flowers
- Drinks up to 200 gallons of water per day which can dry up ponds and small streams
- Brought to the U.S. as a decorative shrub

### Canada Thistle



- Perennial, creeping root system
- Spiny-tipped leaves with wavy edges
- Purple - white flower clusters blooming in mid-summer

### Perennial Pepperweed



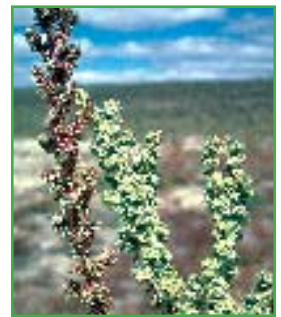
- Perennial, creeping roots
- 6-8 feet tall
- Spear head shaped, gray-green leaves
- Clusters of small white flowers that bloom in June

### Hoary Cress, Whitetop



- Perennial, creeping root system
- Arrowhead shaped, grayish-green leaves that clasp the stem
- White flower clusters with four petals, and have a flat-top appearance

### Halogeton



- Annual, spread by seed
- Tubular, fleshy, small leaves
- Plant is blue-green in spring and turns red or yellow by late summer
- Flowers are cream-colored and hard to see
- Plant produces a toxin that can poison livestock



## Wyoming Ag in the Classroom to Recognize 2008 Exemplary Educators

**2008 Advocate for Agriculture Award** - Joey Johnson has been an agriculture education instructor and FFA advisor for eleven years. Of that time, he has also taught animal science and coached the Northwest College Livestock Judging Team from 2001 to 2004. He started working at the Meeteetse schools in the fall of 2005 where the agriculture program only had nine active members. Within two years, he has built the program to 33 FFA members. This is impressive considering the town of Meeteetse only has a population of 351. Mr. Johnson has been invaluable in his creative approach to bringing in people from the community to teach students about real life applications of agriculture.

**2008 Teachers of the Year Awards** - Mrs. Virginia Wright is an educator at Niobrara County School District for two years. She teaches General Science, College Science, and Environmental Science as well as being a Special Educational Assistant. Virginia is also the faculty sponsor for the NCHS Chapter of the National Honor Society. For six years prior to her arrival in Lusk, she taught Physics, Chemistry, Environmental Chemistry, and Ecology at Wright Jr./Sr. High School. Prior to teaching, Virginia worked with her husband on the family ranch north of Douglas, WY. She is presently working on her Masters Degree in Natural Science, scheduled to be completed in 2008. Virginia continues to work with her husband on the ranch and share her love of the great outdoors with her grandchildren



"If you can imagine it, you can achieve it; if you dream it, you can become it." This is a very powerful quote that Danielle Cox-Kunkel, stresses to her students' every day. As a Laramie High School teacher and the Snowy Range FFA advisor, Danielle feels privileged to be able to educate and help prepare her students for the future. Her goal

is to educate students so they are able to intelligently talk about and address the many issues that agriculture faces in the world today and in the future.

A Wyoming native, Danielle grew up in Hillsdale WY. She attributes much of her success to her parents Kim and Therese Cox. They instilled in her, and her siblings, the value of hard work and a love for agriculture. A 1997 graduate of Burns High School, Danielle played a very active role in her school, community, and FFA Chapter.

In her free time, she enjoys reading books, cooking, spending time with family, and traveling with her husband Paul.



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