

- Two percent of the body weight of cattle may be fed daily as hay (roughage), or three times this amount for silage. (*Silage* is a fermented, moist feed.)
- For protein, feed 1 ½ to 2 pounds of oil meals, or three times this amount of alfalfa or other leguminous hay. Leguminous hays include vetch, clovers, and alfalfa.
- To fatten cattle, feed a ration of at least 60 percent concentrates (grains) and 40 percent roughages (hay, silage), in amounts equal to 3 percent of the body weight.
- With any ration, also provide needed mineral supplements. Many areas of the country have mineral deficiencies in their soils. To balance a feed, stockraisers may need to supplement with various extra minerals that are deficient in their area.

Suggested Beef Cattle Rations

The table shows some suggestions for basic rations in pounds per day.

	Supplementing a 1,000-pound cow	Fattening a 600-pound calf
1. Nonleguminous hay	20	10
Oil meal	2	2
Grain (shelled corn or ground grain sorghum)	—	6
2. Nonleguminous hay	—	3
Silage	60	20
Oil meal	2	1.5
Grain (corn or grain sorghum)	—	6
3. Nonleguminous hay	16	8
Leguminous hay	6	2
Oil meal	—	1.5
Grain (corn or grain sorghum)	—	6
4. Leguminous hay	6	10
Silage	48	—
Oil meal	—	1
Grain (corn or grain sorghum)	—	7

Feeding Horses

A horse's dietary needs depend on its age and how it is used. Working and race horses need more energy than idle ones. Mares with foals at their side need more protein than unbred mares. Young horses generally need a more nutritious diet than older horses.

Linseed oil meal is a popular protein feed for horses. It promotes a shiny coat. Grains—especially oats, and to a lesser degree corn, barley, and wheat—provide energy. An iodized, trace-mineral, free-choice salt block will prevent mineral deficiencies. Lush pastures will provide a horse with the necessary vitamins. If no pasture is available, green, leafy forages may be substituted.



Horses can use high-energy concentrate feeds but require some bulk (forage) to keep the food from becoming compacted in the digestive tract. Compaction can cause dangerous disorders such as *colic*. Oats are excellent grains for horses. They are high in nutrition, somewhat bulky, and horses like to eat them.

A horse kept for recreational riding should do well on a simple ration of 95 percent oats and 5 percent linseed meal, or half oats and half sweet feed (premixed corn, soybeans, linseed, wheat, and vitamin-mineral supplements), plus a bright, clean, leafy hay for roughage.

Feeding horses with rations that are too low in roughages can cause *colic*—acute abdominal pain.

Suggested Horse Rations

The table gives sample daily rations for horses doing light work and for stallions and mares used for breeding.

	1,000-pound saddle horse	1,200-pound broodmare and stallion in service
1. Alfalfa hay	10 pounds	14 to 16 pounds
Oats	4 pounds	10 pounds
Mineral supplement	—	2 ounces
2. Alfalfa hay	—	10 pounds
Grass hay	14 pounds	4 pounds
Oats	5 pounds	5 pounds
Corn	—	3 pounds
Barley	—	2 pounds
Wheat bran	—	2 pounds
3. Alfalfa hay	10 pounds	5 pounds
Grass hay	—	8 pounds
Oats	3 pounds	12 pounds
Barley	1 pound	—
Wheat germ oil	—	1 ounce
Mineral supplement	—	2 ounces



Do not feed livestock hay on the ground. That can lead to worm infestations and may cause "sand colic," a common digestive disorder in horses. Feed hay in bunks or hay nets. Keep feed boxes free of moldy feed, which often causes chronic coughing.

Points to remember: Feed and water horses at least twice a day. Do not let a horse drink its fill of water after vigorous exercise. Always walk a horse to cool it off before letting it drink.

Feeding Sheep

Rations for sheep are often mostly roughages. Sheep thrive on good pastures. Generally, ewes need 4½ to 5 pounds of dry feed or its equivalent each day. This may be made up of legume hay, grass hay, and silage, or merely a good pasture.

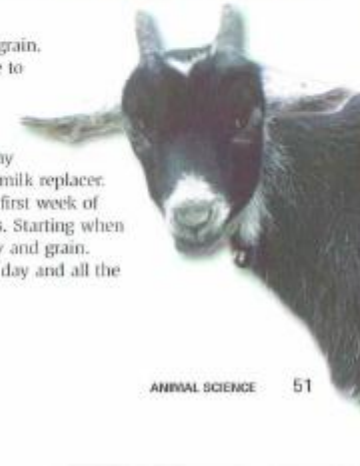
Often, ½ to 1½ pounds of grain are added to the daily diet of ewes during pregnancy, after lambing, and just before breeding. *Finishing* lambs (putting on weight) normally will require 3 to 4 pounds daily of a ration containing at least 70 percent grain.



Feeding Dairy Goats

Feed adult dairy goats good-quality hay and grain. Make plenty of clean water and salt available to them at all times.

Kids can either get milk from their mothers or be raised by hand using a bottle or pan. They should be fed 1 to 2 quarts a day of goat's milk, cow's milk, or goat- or sheep-milk replacer. They need milk three to four times daily the first week of life, then twice daily for three or four months. Starting when they are one week of age, offer kids leafy hay and grain. After weaning, they need 1 pound of grain a day and all the hay they will eat.



Feeding Hogs

Hogs are easy to feed if you use commercially available premixed, balanced feeds that contain all the necessary nutrients. It is possible to simply fill a self-feeding hopper once or twice a week, and check daily to see that the hopper is not clogged and to ensure that the hogs have fresh water available at all times.

Swine rations normally will contain only concentrates. The fiber content must be less than 5 percent. If you feed hogs roughages, feed only those of high quality, such as alfalfa leaf meal, legumes, or grazing cereal grains.



Three basic commercial premixed rations are available for feeder pigs. Weaned piglets younger than five weeks of age may be fed *prestarter rations*, which have 20 to 22 percent protein. Slowly switch the pigs, by the time they are five weeks old, to *starter rations*, which are up to 20 percent protein. At 65 to 70 pounds, switch them to a *grower ration* that provides about 16 percent protein. Continue this ration until slaughter, or put hogs weighing 120 pounds on *finisher rations* containing 14 percent protein.

Some swine producers use these rules:

- Give 1 pound of feed for each 30 pounds of body weight from 120 pounds to market weight.
- Feed only the amount eaten in 20 to 30 minutes.
- Finishing hogs (120 to 245 pounds), while on full feed, will eat 4 to 6 pounds of feed each day per 100 pounds of live weight.

A diet that is good for market hogs will not be nutritious enough for *gilts* (young females) that will grow up to rear litters of piglets. Breeding females need extra nutrients. Pregnant gilts and sows should receive 4 to 6 pounds a day of a special *gestation diet*. Females housed outside may need an extra pound or two of feed daily but should not be overfed during gestation to avoid gaining too much weight and fat.

After *farrowing* (giving birth), females require a nutrient-rich *lactation diet* of 16 to 17 percent protein. A lactating sow that is nursing produces 15 to 30 pounds of milk daily, making its nutrient requirements three times higher than during gestation. The average sow requires 4 to 6 pounds of feed per day plus 1 pound daily for each nursing piglet.

When the piglets are weaned at the end of the three-week lactation period, a sow's daily feed intake falls off dramatically as she stops producing milk. At this time, the "dry" sow goes back on a prebreeding or gestation diet containing 12 to 14 percent protein.

Feeding Chickens

Corn is the most important grain used in poultry rations, followed by sorghum (milo) and wheat. Soybean oil meal often is used as a protein supplement. Common calcium supplements include crushed oyster shells and ground limestone.



The high water content of the eggs and meat makes fresh, clean water doubly important for poultry. It should be available at all times.

The science of feeding chickens has become highly technical as our knowledge of nutrient requirements grows. Today, almost all commercial growers purchase their feed rather than mix their own.

Housing

Every kind of livestock needs protection against severe weather and predators, shelter for times of illness, and protection for its young. The type of shelter needed depends on the type of livestock, its size and feeding habits, and the climate.



Make sure barns or other living quarters for animals are clean and dry, with no sharp edges or nails that might cause injury. Good drainage is important. See that all waste material is removed regularly.

For range cattle in most areas, open shelters are adequate. Beef cattle on pastures with some natural windbreaks such as treelines or cliffs may not need buildings for shelter.

Sheep are hardy but should have shelter to protect them from cold or rain. A plain, open shed facing away from the wind will be enough in most areas.



An open shed facing away from the wind provides adequate shelter for hardy farm animals like sheep and goats.

Dairy goats need an exercise area and a sturdy shelter free of drafts. Goats are curious, active creatures and will try to escape from enclosures. The best way to keep them in is to use solid board fencing or electric fences.

Hogs do best in sanitary, cool, well-kept quarters. People should wear clean footwear when working in farrowing houses or other buildings where hogs are kept because small pigs are highly susceptible to disease. Sanitation is especially important in swine management because hogs normally are kept in large numbers in close confinement.



Contrary to popular belief, a hog does not prefer to live in a mud wallow. Swine actually are quite clean.

The landscape of farming continues to evolve. While the average size of a farm has more than doubled in the last 20 years—creating larger, industrialized operations—smaller specialty farms that produce goods from animals such as free-range chickens and turkeys, alpacas, and farm-raised fish have become profitable options.



Layer and broiler houses protect birds from the elements. Most houses today, such as this layer house, are well-ventilated and well-insulated and have controlled temperature and automatic lights, feeders, and waterers.

Layer houses provide nests, roosts, feeders, and waterers. Broiler chickens are housed in broiler houses, 30 to 40 feet wide and as long as necessary to hold the number of birds desired. Adequate space is important. Birds need enough room at the feeders so that all can comfortably eat at the same time. Overcrowding is dangerous for poultry flocks. Diseases can pass more easily between birds, and the stress of overcrowding makes birds more vulnerable to disease. Good housing reduces stress on the birds.



Grooming

Grooming helps keep animals clean, stimulates blood circulation, and helps prevent skin disease. A groomer may see blemishes that should be addressed. Clean, well-groomed animals are more comfortable and less likely to spread infections or parasites to other animals.

While the horse has only one hoof per foot, cattle, pigs, sheep, and goats have two toes (or claws) covered by a hoof on each foot. Trimming the feet of dairy cattle feet may be necessary to help keep them from growing abnormally. Abnormal claw growth can affect how a cow stands on its feet, causing pain that can affect eating habits—and thus affect the cow's milk production and body flesh.



Shoes protect a horse's feet and keep the hooves from cracking and splitting. To stay healthy, horses need their hooves trimmed regularly by an experienced farrier (a person who shoes horses). Cleaning a horse's hooves is part of regular care. A hoof pick is used to remove dirt, stones, and other debris.



Except for horses, most farm livestock are not groomed regularly unless they are show animals, such as this heifer.

Livestock Diseases and Prevention

Each time you buy an animal, ask for its vaccination record. Because mixing animals can spread diseases, always try to isolate incoming animals for one month to determine whether they are carrying a disease.

Ranchers and stockfarmers must be familiar with the diseases, parasites, and disorders that may afflict domestic stock, and constantly guard against them. This section describes some common diseases of livestock. Talk with your merit badge counselor, county agent, or veterinarian about the diseases common in your area. Study these and learn the most effective means of prevention.

Each year, losses from diseases and parasites run into the millions of dollars. Timely measures of prevention and control could probably avert many of these losses. The old saying that "an ounce of prevention is worth a pound of cure" certainly applies to the livestock industry.



Plan a health program for your animals. Find out what vaccines are given routinely in your area. Use a calendar to remind you of the best times to vaccinate against disease and to control parasites. Coordinate a year-round health plan for your herd or flock with your other management practices.

Diseases of Cattle

Dairy and beef cattle get the same types of diseases. A few diseases that affect the udder are, of course, especially serious in dairy cattle.

The first sign of illness in cattle often is high temperature. Normal temperature is 100.4 to 102.8 degrees Fahrenheit. An animal thermometer inserted into the rectum is used to take the temperature of cattle. Get instruction from an expert before trying to take an animal's temperature.

Some common or serious diseases of cattle, and their causes, symptoms, and methods of prevention, are described below. For treatments, consult a veterinarian.

Blackleg. Blackleg, caused by a microorganism, is contagious and often fatal. Most outbreaks occur in the warmer months of spring and autumn. The first symptom is lameness, and the upper parts of the leg swell. Temperature usually is high and the animal loses its appetite. Death occurs quickly; a cattle producer might not notice signs of a problem until one or more calves have died. Blackleg can be prevented through vaccination.



Blackleg most often strikes cattle between six months and 2 years of age.

Bloat. Bloat is not a disease but a painful and unhealthy condition that can kill cattle. It shows up as abnormal swelling of the left side of the animal that, in severe cases, puts pressure on the diaphragm and lungs and causes the animal to gasp for breath. To help prevent bloat, feed cattle dry hay before turning them out to graze legume pastures.

Bloat occurs when gas builds up in the first two compartments (rumen and reticulum) of the digestive tract of cattle and other ruminants. Legume pastures, alfalfa hay, and high-concentrate feeds can bring it on.

The Scoop About BSE, or Mad Cow Disease

You probably have heard a lot about bovine spongiform encephalopathy (BSE, also known as mad cow disease), a fatal disease of adult cattle that kills an animal's brain cells. BSE is caused by a class of infectious agents called *prions*, which are neither viruses nor bacteria. Symptoms of the disease may include skittishness or aggression, weight loss, abnormal posture, difficulty standing up, and paralysis. The infection may lie quiet in an animal's brain for years. Once the disease flares up, the animal dies quickly—usually in less than six months. No treatment is known.

Since BSE was first diagnosed in Great Britain in 1986, Europe has had more than 180,000 cases of infected cattle. BSE is not contagious and does not spread from one cow to another. Cattle become infected by eating contaminated feed.

However, people who eat meat containing the nervous tissues from BSE-infected cattle may die of a human brain disorder, a variation of a rare disease called Creutzfeldt-Jakob disease (CJD or, the variation, vCJD).

Strict rules in the United States keep the risk of contracting the disease extremely low here. Cattle can no longer be imported from Europe.

Brucellosis (Bang's Disease). The key sign of brucellosis is a cow that aborts after the fifth month of pregnancy. A microscopic organism is the cause. Testing involves checking a blood sample for signs of the organism's presence. All cattle that react positively to the test must be slaughtered to prevent the spread of the disease. Herds in which brucellosis is suspected are quarantined until they are tested and certified clean.

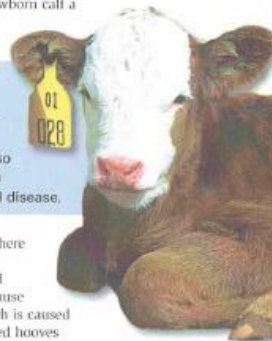
Through direct contact with infected cattle or contaminated grass, ground, or water, brucellosis easily spreads from one cow to another. It is not transmitted by marketing the meat or the by-products of an infected animal. It is spread through contact with unpasteurized milk—causing a condition in humans known as *undulant fever*.

A strict government program of eradication requires carriers of Bang's disease to be destroyed, reducing the incidence of brucellosis from 30 percent of the cattle herds in the United States years ago to less than 2 percent today.

Calf Scours (White Scours). Many newborn calves die from calf scours, or diarrhea, in the first month of their lives. Those that recover are often stunted for life. Scours kills through dehydration. Calves pass watery manure and lose weight. If 15 percent of the body weight is lost because of dehydration, the calf goes into a coma and dies.

Scours may be caused by bacteria and viruses and made worse by poor management. Overcrowding, overfeeding, vitamin A deficiency, and parasites may all contribute. To prevent scours, make sure cows have enough of vitamins A and D before calving. Keep calves in clean quarters, disinfect stalls, isolate infected calves, and give each newborn calf a full feed (about 2 quarts) of *colostrum* milk within one hour after birth.

To survive, the newborn needs *colostrum*, a special milk the cow produces during the first three days after calving. Colostrum contains high levels of energy, vitamins, and minerals, and also supplies antibodies (immunoglobulins) to protect the newborn against infection and disease.



Foot Rot. Foot rot is common in feedlots or where cattle are confined in muddy areas. The skin between the toes becomes swollen and red and sometimes breaks open. Cattle stop eating because of the pain and may run a fever. Foot rot, which is caused by an organism in the soil, can lead to deformed hooves and lameness. Prevent foot rot by keeping animals away from wet areas.

There are many more ailments that strike cattle than we can include here. For more about diseases of cattle, see the resources section at the back of this pamphlet, or visit your local library. With your parent's permission, search the Web. Some other diseases of interest include anaplasmosis, founder, grass tetany, ketosis, lumpy jaw, malignant edema, pneumonia, and red water disease.

Leptospirosis is transmitted mainly through water and can affect people as well as cattle and deer.

Leptospirosis. Leptospirosis affects the kidneys and may bring on various conditions including abortion, mastitis (an infection in the udder), high temperature, jaundice, wine-colored urine, and anemia. Although very young animals commonly die from the disease, older cattle may survive. The cause is a microorganism, and the disease can be diagnosed only through laboratory testing. Vaccinations are recommended for all cattle herds. Deer carry the disease and may infect cattle if herds are not immunized.



On dairy farms, milking parlors must be properly sanitized to prevent mastitis. Cleanliness is essential.

Mastitis. Mastitis, caused by a bacterial infection in the udder, results in milk that is lumpy and sometimes streaked with blood. The udder may become hot and hard; milk production is affected. Left untreated, the infection can spread through the cow's body, leading to fever and other signs of general sickness. A routine monthly test will detect the disease before symptoms become apparent. To prevent mastitis, keep milking machines well-maintained and take care during milking to avoid injury to the udder.

Milk Fever. Milk fever is a nutritionally related condition brought on by a calcium deficiency. It may occur at or shortly after calving. The cow is weak and wild-eyed, and often loses consciousness. Her body temperature will generally be below normal. A veterinarian can treat the condition. Untreated cows will likely die.

Pinkeye. A cow with pinkeye is sensitive to bright light, is teary eyed, and has reddened eye membranes. A milky film may cover the eyeballs, and an affected animal may be blinded. This bacterial infection seldom kills cattle but is economically serious because of the weight loss and decreased milk production in afflicted animals.

Pinkeye is more likely to develop when cattle's eyes are irritated by bright sunlight, dust, wind, flies, pollen, and weed and grass seeds. This disease is more common in pastured cattle than in feedlots. Prevention practices include controlling flies and dust, and clipping or mowing pastures to reduce weed-seed irritation.

Shipping Fever. Shipping fever is caused by a combination of stress, bacteria, and viruses. It may occur after a calf has been stressed by castration; vaccination; dehorning; weaning; exposure to cold, wet, or drafty conditions; or especially if it has traveled a long way to a new location. Stress can bring on the illness, but the actual cause is any number of various microorganisms. Symptoms include fever of 104 to 106 degrees Fahrenheit, not eating, difficulty breathing, coughing, runny eyes and nose, and diarrhea.

Stress is the major contributor to this disease, so avoid doing all of the tasks of weaning, dehorning, castrating, and vaccinating at one time. Work cattle gently over a period of time. As a precaution, vaccinate cattle for shipping fever before they are shipped.



Pinkeye spreads rapidly, carried by face flies from animal to animal.



Diseases of Horses

A healthy horse always wants to eat; a poor appetite or a refusal to eat is a first sign of illness. A rectal temperature above or below the average range of 99 to 100.8 degrees Fahrenheit (100.5 degrees average) will confirm the presence of a problem.

Call a veterinarian when a horse shows signs of illness. Some common diseases, injuries, and parasites of horses are described below.

Horse owners can help prevent disease by keeping stables and horses clean. Clean food boxes and change bedding regularly.



A horse with colic will be greatly agitated, constantly moving, sweating, and trying to roll. Rolling may lead to a twisted gut, which is fatal.

Colic. A digestive problem, colic may be brought on by a horse's overeating, drinking too much water while hot, or eating moldy feeds. The intestine is blocked or impacted, causing the horse much pain. Halt an afflicted horse to prevent rolling, and walk it until a veterinarian arrives. The veterinarian may give mineral oils by stomach tube to relieve the compaction in the intestine.

Equine Encephalomyelitis

(Sleeping Sickness). This disease causes inflammation of the brain and spinal cord. The two most common forms found in the United States are Eastern and Western equine encephalomyelitis. A third form, Venezuelan, has not occurred here for decades but is found in other countries. The cause of all forms is a virus transmitted by infected mosquitoes. Outbreaks are most common during the summer.

An infected horse generally has a fever and rapid heart rate, loses its appetite, and acts depressed. As the illness progresses, the animal may show muscle weakness, wall leaning, compulsive circling, and blindness, followed by convulsions and coma. Up to 90 percent of horses infected with EEE die. The mortality rate for WEE approaches 50 percent.

Annual vaccination is highly recommended. Vaccines for horses may come in a "three-way shot" that includes vaccination for EEE, WEE, and tetanus.



A collapsed colt suffering from equine encephalomyelitis

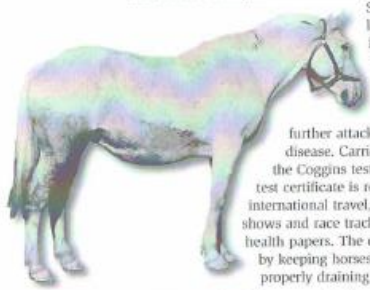
Humans also can contract equine encephalomyelitis from the bites of infected mosquitoes. Healthy adults who get the virus may show flu-like symptoms such as high fever and headache. The young, the elderly, and people with weakened immune systems can become severely ill or die from this disease.

Influenza. Symptoms of equine influenza, a respiratory disease much like the flu in humans, include coughing, nasal discharge, and high fever. A variety of different viruses may cause it, and vaccines that will give immunity are available for some of them.

Horses are susceptible to many different types of afflictions. Some others not discussed here include founder, horse bots, Monday morning disease, West Nile virus, and worms. Use the resources section in this pamphlet, visit your local library, and surf the Web (with your parent's permission).

Strangles (Equine Distemper). Strangles may strike horses between six months and five years of age. It is caused by a microorganism and is contagious. Symptoms include high fever, coughing, discharge of pus from the nose, and swelling of glands under the jaw. Eventually, the glands break open and discharge pus. Isolate an afflicted horse in a clean, well-ventilated stall, allow it to rest, and follow a veterinarian's orders. Strangles is seldom fatal, and once a horse has recovered, it usually is immune from further attacks.

Swamp Fever (Infectious Equine Anemia). The virus that causes swamp fever is carried by flies and mosquitoes.



Swellings on the abdomen can indicate swamp fever.

Tetanus (Lockjaw). Puncture wounds may be infected by the tetanus organism, which produces a powerful poison that causes muscle contractions. Stiff legs, noise sensitivity, and folding of the inner eyelid over the eye are the symptoms of a horse with lockjaw. Death may occur within 24 hours. A vaccine will prevent the disease.

Diseases of Sheep

As with other classes of livestock, body temperature often is the first sign of disease in sheep. The normal temperature range is from 100.9 to 103.8 degrees Fahrenheit, with an average of 102.3 degrees. For blackleg, bloat, foot rot, and pinkeye, the signs and prevention are the same as for cattle. **Bluebag** in sheep is the same disease as mastitis in cattle. Other common diseases of sheep are described below.

Bluetongue. Symptoms of bluetongue are depressed appetite, an inflamed nose and mouth lining that may turn blue, frothing at the mouth, and labored breathing. A red band may appear at the top of the hoof. Bluetongue is of most concern to sheep ranchers in the southwestern United States. It is caused by a virus transmitted by insects. A vaccine is recommended for prevention.



Taking a blood sample for testing

Circling Disease (Encephalitis). An animal afflicted with encephalitis walks in circles, staggers, and may be paralyzed. The disease usually is fatal. It is caused by a bacterial infection of the brain. Prevention is through good sanitation.

Sheep should be treated gently at all times, and especially when they are ill. Ill or injured sheep can easily slip into shock, followed by death.

Enterotoxemia (Overeating Disease). Enterotoxemia is a serious problem in feedlots. A high level of concentrate feeding can bring on a condition afflicting feedlot lambs with staggering and convulsions, which may lead to death. Toxins produced by bacteria in the digestive tract cause enterotoxemia. Vaccines for prevention are available.

Lamb Dysentery (Scours). Good sanitation and well-protected, dry shelters help prevent lamb dysentery, which can cause high death losses among lambs during the first few days after birth. Diarrhea and fever are the main symptoms. The cause is a microorganism. Lamb dysentery usually is a problem where sheep are in close confinement, seldom on open range.



Other ailments that can strike sheep include pregnancy disease, soremouth (contagious ecthyma), stiff lamb disease (white muscle disease), tetanus (lockjaw), wool maggots, ticks, mites, and worms. You can learn more about these by using the resources listed at the end of this pamphlet, visiting your local library, and searching the Web (with your parent's permission).

Scrapie. Sheep with scrapie will scrape off wool by rubbing against fences and other objects because of the unbearable itching. They usually have no fever but will walk with an unsteady, uncoordinated gait. Paralysis and death follow. Scrapie is caused by the same class of infectious agents called prions, which are neither viruses nor bacteria, that cause BSE in cattle. No treatment is known. To prevent the spread of this highly fatal disease, government regulations often require that infected flocks be destroyed.

Diseases of Goats

Soremouth, a highly contagious disease, causes sores on the mouths of goats. The virus **caprine arthritic encephalitis** causes arthritis in goats, can cause paralysis in goat kids, and may reduce milk production in does. Some three-quarters of goats tested in one herd had CAE, although many showed no symptoms. Check with a veterinarian for tips on prevention and treatment.

Most goatkeepers vaccinate their herds against two serious diseases—**tetanus**, which affects the muscles, and **enterotoxemia**, which affects the intestines. Goats should receive selenium shots in areas where this mineral is lacking. **Worms** are often a problem in goat herds, so regular deworming usually is necessary.



Diseases of Swine

Good sanitation of buildings and equipment and a planned immunization program go a long way toward keeping a swine herd free of disease and parasites. Sanitation is extremely important in swine management because hogs usually are kept in close confinement. Some common or serious illnesses of hogs are described below.

The normal rectal temperature of swine is 102 to 103.6 degrees Fahrenheit, with an average of 102.6 degrees. As with other livestock, any deviation from the normal temperature could be a sign of illness.

Injecting baby pigs at one to three days of age with an iron solution may easily prevent anemia. Providing fresh soil for pigs to root around in and swabbing the sow's udder with an iron sulfate solution may also be effective.



Anemia. A lack of iron causes anemia and is most common among hogs in confinement. Hogs kept outdoors are able to root around in the soil and pick up the needed iron. Anemia is particularly a problem of rapidly growing piglets. Sow's milk supplies only a fraction of a baby pig's daily iron requirement. Symptoms of a deficiency include rough hair coat, listlessness, and pale eye and mouth membranes. In the advanced stages, labored breathing and rapid heartbeat also appear.

Brucellosis. Similar to brucellosis in cattle but caused by different bacteria, this disease causes sows to abort. To prevent the spread of brucellosis, herds should be tested annually and hogs that carry it destroyed.

Cholera. Hog cholera is a highly contagious disease caused by a virus. The usual symptoms are lack of appetite, high temperature, diarrhea, and weight loss. There may be discharge from the eyes. Afflicted animals suffer dehydration and drink much water. They may walk with a wobbly gait. Infected herds are quarantined and destroyed.

Hog cholera is among the most serious diseases of swine. It was eradicated from the United States in 1978 but remains a problem elsewhere. To ensure pigs are free of the disease, swine from countries affected by hog cholera can enter the United States only after a 90-day quarantine.

Erysipelas. Pigs with the acute form of swine erysipelas may have fever, lose their appetite, develop sore muscles or tender feet, have an arched back, and walk with a shuffling gait or remain lying down. Red patches may appear on the skin. Some pigs die suddenly. Pigs affected with the chronic form may suffer from arthritis and swollen joints, and the tips of their ears or tail may blacken and fall off. The disease is caused by bacteria. Sanitation and vaccination are effective in prevention.

Mycoplasma Pneumonia. A dry, rasping, persistent cough is the most common sign of this pneumonia, which is caused by bacteria. Affected pigs grow slowly. Although the original infection is mild, secondary infections (those that happen as a result or consequence of the original infection) can cause severe losses. Swine producers should stock herds from sources free of this disease.

Transmissible Gastroenteritis (TGE). An infectious disease that causes many deaths among young pigs, TGE is signaled by poor appetite, vomiting, scours, and weight loss. Afflicted pigs pass whitish, yellowish, or greenish feces and soon die from dehydration. TGE is caused by a virus usually passed through the manure and the respiratory tract of infected swine. Prevention requires strict sanitation, disinfection, and vaccination.

To learn more about other ailments of swine such as atrophic rhinitis, dysentery, leptospirosis, and pseudorabies (mad itch), surf the Web (with your parent's permission), visit your local library, and use the resources listed at the end of this pamphlet.

Diseases of Chickens

Modern confinement methods of raising broilers and layers make disease outbreaks particularly serious. As always, think prevention rather than treatment. Good poultry management emphasizes sanitation, immunization, quarantine of sick birds, and proper housing that avoids overcrowding and other stresses on the birds.



A bird that eats and drinks little may be sick. Diarrhea, paralysis, breathing difficulties, skin conditions, and bloody or unusually wet droppings are other signs that something is wrong.

Each year, inspectors reject millions of pounds of poultry for human consumption because of diseased birds. In a laying flock, a 10 percent to 12 percent annual death rate may be expected. The normal annual death loss for broiler flocks is 4 percent or less. Losses greater than these signal a serious threat that demands prompt attention.

Some of the more common or serious problems are described below.

Some 80 separate diseases or parasite problems of poultry are recognized, among them avian tumor diseases, coccidiosis, infectious bursal disease, infectious coryza, and parasites. To learn more, visit your local library, explore the Web (with your parent's permission), and use the resources section of this pamphlet.

Chronic Respiratory Disease. Microorganisms cause chronic respiratory disease, which affects the air sacs. The sacs fill with fluid, the lungs harden, and breathing becomes difficult. The death rate may be high. Broilers that recover may be rejected at carcass inspection. Isolating sick birds and proper sanitation help prevent its spread.

Fowl Pox. Birds with fowl pox show black, raised scabs on the comb, wattles, face, shanks (legs), and feet. Egg production drops, growth slows, and egg fertility is reduced. The cause is a virus spread by infected birds and mosquitoes. Vaccinating against fowl pox gives chickens lifelong immunity.



Vaccinating for fowl pox

Hysteria. Birds subjected to loud noises, rapid light changes, or quick movements may panic. Broilers in open houses fly into a corner, and many may suffocate. Caged layers may try to fly and break their wings or necks. To prevent hysteria, take care not to frighten birds. Some poultry managers play a radio in houses to get the birds used to the sound of human voices and noise. Some knock before opening a door to the poultry house to draw the birds' attention so they won't be startled when humans enter.

Hysteria is a behavioral problem rather than a disease.

Infectious Bronchitis. Coughing, sneezing, and difficult breathing are common signs of infectious bronchitis, an extremely contagious viral infection of chickens. Young birds often die, and hens stop laying or lay defective eggs. A vaccine can provide control.

Newcastle Disease. Death losses can be high among broilers with Newcastle disease, and a laying flock that has it can fail to produce eggs. Symptoms include difficult breathing, gasping, and sneezing. This highly contagious disease is caused by a virus. Vaccination is recommended for prevention.

Salmonella bacteria attack many animals and can be a serious health threat. In chickens, these organisms cause pullorum disease and fowl typhoid.

Salmonellosis. Baby chicks with **pullorum disease** huddle together, lose their appetites, may show labored breathing, and often develop a whitish diarrhea. Although they do not show signs of it, adult birds that have recovered from pullorum carry the disease and may lay infected eggs. A poultry manager who suspects pullorum will commonly fumigate the incubator and eggs. Strict sanitation is important. Infected breeder birds should be eliminated from the flock.

Fowl typhoid, another salmonella-induced disease, has signs similar to those of pullorum. Good hatchery sanitation and elimination of infected birds are the recommended control methods.



What's Up With Bird Flu?

Avian influenza, or bird flu, has attracted a lot of attention lately. Bird flu viruses, which rarely infect people, strike domesticated birds, including chickens, ducks, and turkeys. Infected birds act depressed and stop laying eggs. Watery diarrhea is common. Chickens' heads may be darkened, and fluid may build up around the eyes and in the **wattle** and **comb** (fleshy areas around the neck and head).

Birds exposed to infected poultry, contaminated cages or dust, or soiled feed or water can catch the highly contagious virus. As of early 2006, HPAI had become a significant problem in Asia and was spreading into the Middle East and Europe. Proper biosecurity measures will help keep HPAI from spreading in those areas already affected and from entering North America.

Highly pathogenic avian influenza (HPAI) can wipe out an entire flock. Milder strains of bird flu, however, are responsible for most outbreaks in poultry. Infected birds shed flu virus in their saliva, nasal secretions, and droppings. To control an outbreak of bird flu, a flock is quarantined (or isolated), sick birds are destroyed, and the houses or cages are thoroughly cleaned and disinfected.



ATTENTION VISITORS

We need your help!
Foreign Avian Influenza presents a significant health risk to our animals.
If you have visited countries suffering from
Avian Influenza in the last 30 days,
please contact our manager or call
preventing the spread.

**FOR BIOSECURITY
PURPOSES
STEP INTO FOOT
BATH BEFORE
PROCEEDING**

The practice of being extremely careful not to spread disease between animals is called biosecurity. It is the key to keeping a healthy flock.

Production Notes

When livestock producers speak of *production*, they are talking about an animal's growth, fattening, milk or egg production, reproduction, or work. By choosing stock carefully; by managing the herd or flock properly to ensure that the animals have adequate food, water, shelter, and exercise; and by attending to the health-care needs of their animals, livestock producers can enhance their animals' productive ability.

This section gives a few guidelines to help you judge how well a herd or flock is doing. To better understand the level of production to be expected in your area, talk with your merit badge counselor, a local livestock producer, or your county agent.

Length of Estrous Cycle and Pregnancy in Farm Animals

Animal	Length of Estrous Cycle (Heat Period)	Length of Pregnancy
Cow	21 days	282 days
Sow	20 to 21 days	114 days
Ewe	16 to 17 days	150 days
Goat	19 to 20 days	150 days
Mare	19 to 23 days	338 days



Knowing the fertility (estrous) and pregnancy cycles of animals and length of pregnancy is basic to being able to judge their productivity potential.

Beef Cattle Performance

A cow's economic value is judged by its reproductive efficiency, mothering ability, rate and economy of gain, longevity, and carcass merit. High-producing cows should be fertile and have a record of regular pregnancies, live births, and good milk production. Their calves should be efficient in using feed to gain weight rapidly. A calf's growth from birth to weaning is a good reflection of a cow's milk production and the calf's inherited ability to gain.



Reproductive efficiency and mothering ability are two traits in cattle that contribute to high economic value.

Fattening Cattle

Cattle may be expected to gain weight over the winter on roughage. Calves weighing about 400 pounds when purchased in October or November can be expected to gain about 1.5 pounds per day over winter. In the spring and summer, they can be *finished*, or fattened to their best weight, on a combination of roughage and a high level of grain.

Cattle also can be finished quickly in a feedlot. Cattle weighing 750 pounds can be finished in 150 days or fewer in a feedlot on a full-feed program with high-concentrate rations. In a feedlot, cattle can be expected to gain about 1 pound of weight per 7 pounds of feed.

Carcass Grading

Beef carcass grades are based on the quality of the meat (USDA quality grades) and the quantity or yield of trimmed, boneless, major retail cuts of beef (USDA yield grades). Both grades are assigned to a beef carcass.

USDA quality grades are prime, choice, good, standard, commercial, utility, cutter, and canner, with prime being the "best." Quality grade is a prediction of the expected palatability (taste qualities) of the meat. It is based mostly on animal maturity and *marbling* (the amount of fat visible in a cross section of the rib muscle).

Yield grade measures the amount of salable meat on a carcass. It is based on the amount of external or back fat, the carcass weight immediately after slaughter (also known as hot carcass weight), the amount of fat surrounding the kidney and heart or in the pelvic area, and the area of a cross section of the rib muscle. USDA yield grades are expressed by a number, 1 through 5, with yield grade 1 having the highest yield of retail cuts, and yield grade 5 the lowest.

Performance Characteristics

Weight is just one of several factors considered when farm animals are judged for their economic value. There are important traits.

Carcass Merit. The fineness of a dressed meat animal, based on the *quality* of the meat (its taste, tenderness, and "eating" characteristics) and on the *yield* (the percentage of lean meat obtained from the carcass).

Feed Efficiency (or Feed Conversion). The number of pounds of feed needed to produce 1 pound of weight gain or product. For example, it takes about 9 pounds of feed to produce 1 pound of weight gain on a live cow and 4 pounds of feed to produce a pound of pork, but only 1.11 pounds of feed to produce 1 pound of milk.

Fertility (Reproductive Efficiency). An animal's ability to reproduce regularly; to produce vigorous, fast-growing offspring; and to produce multiple births (depending on the animal).

Longevity. How long the animal lives and can reproduce.

Mothering and Nursing Ability. A breeding female's ability to feed, protect, and care for her young. The survival of young animals and their weight at weaning depend largely on the mother's maternal and milking abilities.

Rate of Gain. How quickly the animal gains weight. *Rate of gain* and *economy of gain* in meat animals are related. For example, some cattle may gain only 1 pound a day, while others (in the same feedlot and on the same ration) may gain more than 3 pounds daily. Those that put on weight the fastest also show the most economical gains.



Milk cows must be cleaned and milked two or three times a day.

Dairy Cow Performance

A dairy cow normally will produce milk for 305 days, with a 60-day dry period. This may vary from a 270-day milking period or less, to a *lactation* of more than 400 days. Shorter periods normally are caused by the cow being bred again soon after calving, or because of illness. Longer periods are mainly due to breeding problems.

The average cow commonly produces 15,000 to 25,000 pounds of milk in a year or 50 or 100 pounds of milk per day. Many top cows produce more than 40,000 pounds per year. Producing such large amounts of milk places enormous demands on the cow's metabolism and requires careful nutritional management. A lactating dairy cow's diet is carefully formulated, often with the help of computer programs and specialized dairy nutrition consultants.

It is virtually impossible for a high-producing dairy cow to eat enough to satisfy her energy needs during the peak of her lactation period. As a result, a good dairy cow is expected to lose weight, or "condition," during peak production. This weight is replaced later in the lactation period.

Milk production is fairly high immediately after calving and increases until the cow reaches her maximum production. Daily lactation peaks 45 to 60 days after calving. Then the amount of milk produced declines gradually until the cow is dried up, to give her time to prepare to deliver her next calf.

The points of conformation judged ideal for various breeds of horses are beyond the scope of this pamphlet. Check with the appropriate breed association to find out more about a specific breed. (See the resources section.) Most associations have a list of standards available at no cost.



A horse, such as this jumper, must be built for the job it is to do.

Horse Performance

A direct relationship exists between a horse's conformation (build) and its type, and the work it is to do. A quarter horse, for example, should have a well-balanced, well-muscled body, firmly supported by strong, straight legs. A quarter horse viewed from the side should have a short back and long underline. This gives the horse the ability to stretch out underneath. It should have short, erect ears that often point forward. This indicates a horse that is in good condition, alert, and paying attention to its surroundings—essential qualities in a cutting horse, roping horse, or stock horse. The eyes should be prominent and set well apart so that the horse can see forward and backward without moving its head. This allows the horse to react quickly. The nostrils should be large to allow the intake of air necessary for a hard-working horse (horses do not breathe through the mouth).



Sheep Performance

Ewes of most sheep breeds can conceive (become pregnant) only during the fall. Unlike cattle that can be managed to calve in the spring, the fall, or all year round, sheep normally lamb in the spring. A few breeds do not follow this pattern and may produce out-of-season lambs. The Dorset is an example.

Ewes normally lamb in the spring.

Feeding extra grain or grazing ewes on lush pasture two or three weeks before the breeding season is recommended to make ewes more fertile and increase the chances of twins being conceived. A 110 to 150 percent lamb crop (an average of one or more lambs per ewe) in a flock is desirable. Feeding a half pound of oats or corn per head per day in the weeks before the breeding season may produce an increase in the lamb crop of 10 to 20 percent.

Producers judge individual ewes according to the birth weight of their lambs, how often they have lambs, how often they have twins, the weaning weight, weight gain, feed efficiency, fleece weight, and carcass merit.

Meat

Sheep produce meat and wool. In meat-type breeds, the emphasis is on carcass traits; wool generally is a minor concern. Sheep destined for slaughter should be well-muscled.

The carcass of a slaughtered sheep is classified as *lamb* for a young animal or *mutton* for a mature animal. A carcass will generally yield from 46 to 53 percent meat. The rest of the carcass produces by-products such as glue, soap, and fertilizer.

Wool

With sheep kept for wool production, producers put less emphasis on body traits and pay more attention to the weight and quality of the fleece. As a rule, wool-type sheep are larger, more angular, and less muscular but have heavier fleeces than meat breeds. Sheep are sheared for wool once a year, usually in the spring.

The fleece is examined, and undesirable wool (with stains or clumps of plant matter, for example) is removed. Wool that is shorter, coarser, or otherwise different from most of the fleece (such as the wool from the belly and hindquarters) is sorted out and bagged separately to keep from mixing wools of varying qualities within the same fleece.

Shearing is a skill that can be learned only through practice. A skilled shearer, using electric clippers, can shear a sheep in about five minutes, taking care to remove the fleece in one piece as if it were a blanket being unwrapped from the animal. If you want to learn, check into the possibility of attending a sheepshearing school or training with professional shearers.

One by-product, chamois skins, is unique to sheep. Cleaned of wool and tanned, sheepskins once were used for college diplomas. Now, chamois skins are most likely to be seen in gas stations and car washes.

Pieces are graded according to their fineness—the thickness (diameter) of individual wool fibers. The American or “blood” system of grading wool is based on comparing the quality with that of Merino wool. The grades, ranging from finest to coarsest, are *fine* (for full-blooded Merino), *half blood*, *three-eighths blood*, *quarter blood*, *low quarter blood*, *common*, and *brad*. Fineness is the main factor that determines the market value of raw wool. Fine wools are used to make lightweight fabrics for clothing, while coarser wools are used in blankets and carpets.

Another grading system, which is used internationally and is replacing the American blood system, is the micron system that measures individual fiber diameters in *microns* (a length equal to 1/25,400 of an inch). A wool graded half blood under the American blood system would have a fiber diameter of 22 to nearly 25 microns. The micron system is the most accurate measure for determining the grade of wools.

Dairy Goat Performance

Good dairy goats can produce up to 8 quarts of milk a day, averaging about 2 quarts a day over 10 months. A doe should be milked twice daily on a regular schedule.

The mating season of a goat depends on where it lives. In tropical areas near the equator, goats mate throughout the year, but in the temperate regions they breed only from late summer to late winter. They begin breeding as the days grow shorter. A doe gives birth to two or three kids about five months after mating.

Hog Production

Litter size and weight at birth, litter size and weight at weaning, conformation, rate and efficiency of weight gain, and carcass value are the traits that determine swine productivity. Sows have large litters at short intervals, making it possible to market large numbers of animals. An outstanding sow can produce more than two litters of 10 market pigs, or nearly 5,000 pounds of pigs for market, per year.

The usual litter size is eight or nine piglets. Gilts (young female hogs) usually are bred when they are eight months old or on their third heat period, which allows them to farrow (give birth) at about one year of age.



Sows have large litters at short intervals, sometimes producing more than two litters of 10 market pigs each year.

Pork and Carcass Grades

Market hogs are classified and sold in four market classes based on sex, the use to which the animal is best suited, and weight.

- Most finished market hogs are **barrows** and **gilts**—castrated male hogs and young females. They reach market weight at 200 to 250 pounds. Most pork for human consumption comes from this market class.
- **Sows**, usually weighing upward of 220 pounds, make up the second market class of swine. Pork from sows marketed for human consumption is mainly in the form of cured pork.
- **Stags** (castrated males that show some sexual development) and **boars** (intact males) are low in market value because little of the carcass is suitable for human consumption. Lubricants, fertilizers, hides, and other by-products are the main uses of these classes.

Carcass grades indicate the quality of an animal in its specific market class. The U.S. carcass grades for pork are U.S. No. 1, U.S. No. 2, U.S. No. 3, U.S. No. 4, and U.S. Utility. These grades are determined by inspecting the fat and the lean for quality, including firmness, color, backfat thickness, belly fatness, and loin marbling (the intermixture of fat and lean), and by the percentage of the four major wholesale cuts—hams, loins, picnic, and Boston butts. U.S. No. 1 carcasses have a high-quality lean, a high yield of lean cuts, and a low percentage of backfat. The poorest quality carcasses—those with unacceptable belly thickness and those that are soft or oily—are graded U.S. Utility.



Poultry Production

Commercial high-laying hens will produce 20 eggs a month. Layers are seldom kept for more than 19 months because production begins to drop by this age. With good management, it should take less than 4½ pounds of feed to produce a dozen eggs.

Eggs are graded according to weight and quality for three markets.

- **Consumer grades**—Grade AA or Fresh Fancy, Grade A, and Grade B, and Jumbo, Extra Large, Large, Medium, Small, and Pee wee
- **Wholesale grades**—U.S. Specials, U.S. Extras, U.S. Standards, U.S. Trades, U.S. Dirties, and U.S. Checks (used in wholesale trade; may be re-sorted to conform to consumer grades)
- **U.S. procurement grades**—Special designations for institutions and the armed forces

Broilers

A broiler should weigh about 5½ pounds at 50 days of age. Feed conversion should average 2 pounds of feed or less per pound of gain.

The U.S. Department of Agriculture has established the grades for broilers (fryers in the following chart). The grades are based on conformation, fleshing, fat covering, and presence or absence of defects.

Live Birds

- A or No. 1 Quality
- B or No. 2 Quality
- C or No. 3 Quality

Dressed Birds

- U.S. Grade A
- U.S. Grade B
- U.S. Grade C

Eggs should be collected frequently, cleaned immediately, and refrigerated.



Other classes of chicken meat include these.

- **Roaster**—a young chicken more mature than is acceptable for broilers
- **Capon**—a castrated male younger than eight months of age
- **Stag**—a male chicken younger than 10 months but showing developing sex characteristics
- **Cock or rooster**—a mature male
- **Hen or stewing chicken**—a mature hen, usually older than 10 months, often culled from laying operations



Male turkeys are called toms (left), and female turkeys are hens (right). Young or baby turkeys are poult.

The Rock Cornish or Cornish game hen is a five- to seven-week-old immature female weighing no more than 2 pounds ready to cook, selected from Cornish or Cornish-cross matings. These are popular at convention banquets and similar affairs.

Careers in Animal Science

Few professions are more important to American society than that of agricultural producer. Farmers and ranchers grow the crops and raise the livestock that provide the food we eat and the natural fibers we need for clothing and other items.



Agricultural producers are the first link in the vast chain that includes the raising, processing, transporting, and marketing of food and fiber. The whole chain is called *agribusiness*, and it is the nation's largest industry. People who are interested in animal science may pursue careers in livestock production or in many related fields in agribusiness, research, education, or veterinary medicine.

Stockraisers are involved in genetics, business and economics, advertising and merchandising, nutrition, animal health, and agronomy and range science. Many ranchers and stockfarmers raise crops as well as livestock, growing nearly all of the grains and forages their animals need.

Advances in agricultural production mean that fewer people are needed on farms and ranches than in years past. A hundred years ago, a farmer produced enough food and fiber for five people. Now, each farm worker supplies enough for more than 100 people.

Farm and Ranch Managers. The manager—whether the farm or ranch owner or an employee hired to oversee the business—plans the operation of the farm or ranch, supervises the work, sees that animals are properly cared for, and that barns, pens, and other farm buildings are kept clean and in good repair. Farm and ranch managers also make the business decisions, such as securing loans to finance the purchase of livestock, feed, and equipment. The financial records of the operation and the production records of the herd or flock are the manager's responsibility.



Ranch managers of small operations may do much of the work themselves. Those who oversee large spreads often have several employees. Large farms and ranches may have dozens of full-time workers.

Many farm laborers learn their responsibilities on the farm and need little or no outside training.



Farm Workers. Members of farm families and hired employees do most of the routine work required of modern farming and ranching. They maintain the facilities. They feed and water the animals, check stock regularly for signs of infection or disease, and often vaccinate livestock against diseases or spray them with insecticides for protection against parasites.

For many of their tasks, farm workers use machinery, such as tractors, hay balers, and milking machines. Farm workers must have basic skills as mechanics and be able to set up, operate, maintain, clean, and repair farm equipment. They also maintain and repair barns, fences, and other structures.

The greatest career opportunities in today's agriculture often lie in off-farm positions. However, don't overlook the many opportunities in the related fields of animal health, genetics, the meat industry, and agricultural education.

Off-Farm Occupations

Modern agriculture indirectly employs millions of people. The number and variety of off-farm positions have grown as the business and technical sides of agriculture have become more complex.

Two- and four-year colleges and universities in every state offer degree programs in the agricultural sciences, including animal science.



Animal science research is conducted by many universities and private industries and by the U.S. Department of Agriculture.

Researcher. Animal scientists study breeding, feeding, and marketing problems and develop improved methods of housing, sanitation, and disease control. Research technicians generally help scientists with their experimental work. Technicians have the training and skills needed to prepare animals for tests, use specialized equipment, and conduct experiments under a scientist's supervision.

Educator. Teachers are a vital link between researchers and those who use the knowledge gained in the laboratory or from the test herd. Vocational educators teach secondary school and adult education classes in farm and ranch management; agricultural production; agricultural supplies, services, and sales; and related areas.

This parasitologist checks water sources used by livestock and wild animals for signs of harmful organisms.



County Extension Agent. County extension agents are community teachers and provide information to individuals, families, and communities. They offer educational programs in agriculture, natural resources, youth groups, community development, and other areas of interest to local residents. They help improve people's lives, the local economy, and the environment.

This is a people career. Agents give educational workshops and seminars and spread information through radio programs, Web pages, printed materials, and other communications tools. Agricultural agents work mainly with farmers, ranchers, and agribusinesses. Youth development agents train adults, recruit volunteers, and work with young people through 4-H clubs, special projects, and school programs.

To be a county extension agent, you need a bachelor's or master's degree in agriculture or natural resources, education, science/technology, or related field, along with the desire to work with people of many backgrounds and contribute to the local community.

Production Services and Specialists. As farms and ranches become larger and agriculture grows more complex, producers increasingly rely on specialists for livestock and crop services. Veterinarians, for example, test animals for disease, supervise programs to eradicate certain diseases, and conduct research to develop vaccines. Ranchers may hire technicians to artificially inseminate cows.



The number and variety of off-farm positions have grown as the technical aspects of agriculture have become more complex.

Tasters employed by dairy herd improvement associations travel from farm to farm to test the milk from each cow for acidity and butterfat content. Sheep shearers shear wool. Poultry hatcheries employ animal caretakers to vaccinate birds, place eggs on trays in incubators, and care for baby chicks.



Inspectors. Meat and poultry inspectors work for the U.S. Department of Agriculture and for many state departments of agriculture. Working under the supervision of a veterinarian, they inspect meat and poultry slaughtering, processing, and packaging operations to ensure that proper sanitation is maintained. They also inspect meat additives and make sure that processed meats are correctly labeled.

Agricultural Commodity Graders. Graders inspect agricultural products to determine their quality and grade, and issue grading certificates. They generally specialize in a particular commodity, such as eggs or dairy products.



If you love animals and the outdoors, stockraising could suit you perfectly—but it is challenging. Animals must be fed and watered every day. Because of the demands of their work, farmers and ranchers rarely take vacation.

For off-farm occupations, working conditions vary. Researchers and educators generally work in offices and laboratories and have fairly regular hours. Veterinarians, however, may have to work in uncomfortable surroundings, and outdoors in all kinds of weather.

Preparing for a Career

Growing up on a family farm or ranch and taking part in programs for young people such as the National FFA Organization or 4-H is important training for prospective livestock producers. However, because of the scientific and business complexities of modern farming and ranching and the need to keep up with advances in farming methods, many young people who grow up on farms and ranches also attend a two- or four-year college of agriculture before launching their own careers in livestock production.

Colleges of agriculture offer four-year degree programs in general agriculture, agronomy (field crops), soil science, animal science, agricultural economics, agricultural business, food science, agricultural education, agricultural engineering, and related fields. Although a bachelor's degree usually is enough for a livestock producer, related positions in animal science, breeding, and research may require an advanced degree.



Colleges of veterinary medicine offer professional training leading to the doctor of veterinary medicine degree.

Many technical schools or junior colleges offer programs in agricultural production, agricultural supply and service, agricultural mechanics, and other specialties. The training may last only a few weeks, or students may enroll in a two-year degree program, depending on the subject.

Animal Science Resources

The **county extension office** is home base for your county agent. If possible, visit the county extension office before you start on requirement 6. High school **vocational agriculture teachers** are also good resources.

On the Internet (with your parent's permission) visit <http://www.csees.usda.gov>.

Scouting Literature

Manuals pocket guide; *Bird Study, Environmental Science, Farm Mechanics, Horseanship, Mammal Study, Plant Science, Public Health, Soil and Water Conservation, and Veterinary Medicine* merit badge pamphlets

For more information about or to order Scouting-related resources, see <http://www.scoutstuff.org>.

Books

Belanger, Jerry. *Storey's Guide to Raising Dairy Goats*. Storey Books, 2000.

Damerow, Cail. *Backyard in Your Backyard: A Beginner's Guide to Raising Chickens, Ducks, Geese, Rabbits, Goats, Sheep, and Cows*. Storey Books, 2002.

Dutson, Judith. *Getting Your First Horse*. Storey Books, 2003.

Ekarius, Carol, and Ken Ekarius.

How to Build Animal Housing: 60 Plans for Coops, Hutches, Barns, Sheds, Pens, Nestboxes, Feeders, Stanchions, and Much More. Storey Books, 2004.

Hayes, Karen. *Hands-On Horse Care*. Trafalgar Square Press, 1997.

Haynes, N. Bruce. *Keeping Livestock Healthy: A Veterinary Guide to Horses, Cattle, Pigs, Goats, and Sheep*. Storey Books, 2001.

Klober, Kelly. *Storey's Guide to Raising Pigs*. Storey Books, 2000.

Peck-Whiting, Jeanie. *Farm Animals: Your Guide to Raising Livestock*. On the Farm Press, 2003.

Simmons, Paula, and Carol Ekarius. *Storey's Guide to Raising Sheep*. Storey Books, 2000.

Thomas, Heather Smith. *Getting Started With Beef and Dairy Cattle*. Storey Books, 2005.

Organizations and Web Sites

AgNIC (Agriculture Network Information Center)
Web site: <http://www.agnic.org>

Agricola (National Agricultural Library)
Web site: <http://agricola.nal.usda.gov>

Agriculture in the Classroom
Web site: <http://www.agclassroom.org>

Agripedia (Encyclopedia of Agriculture)
Web site:
<http://www.ca.uky.edu/agripedia>

American Angus Association
Telephone: 816-383-5100
Web site: <http://www.angus.org>

American Bantam Association
Telephone: 973-383-6944
Web site: <http://www.bantamelub.com>

American Berkshire Association
Telephone: 765-497-3618
Web site:
<http://www.americanberkshire.com>

American Brahman Breeders Association
Telephone: 713-349-0854
Web site: <http://www.brahman.org>

American Cheviot Sheep Society
Telephone: 507-465-8474
Web site: <http://www.cheviots.org>

American Chianina Association
Telephone: 816-431-2808
Web site: <http://www.chicattle.org>

American Corriedale Association
Telephone: 618-676-1046
Web site:
<http://www.americancorriedale.com>

American Dairy Goat Association
Telephone: 828-286-3801
Web site: <http://www.adga.org>

American Delaine and Merino Record Association
Telephone: 641-942-6402
Web site: <http://www.admra.org>

American Farm Bureau Federation
600 Maryland Ave. SW, Suite 800
Washington, DC 20024
Telephone: 202-406-3600
Web site: <http://www.fb.org>

American Goat Society
Telephone: 830-535-4247
Web site:
<http://www.americangoatsociety.com>

American Guernsey Association
Telephone: 614-864-2409
Web site: <http://www.usguernsey.com>

American Hampshire Sheep Association
Telephone: 641-942-6402
Web site: <http://www.hampshires.com>

American Hereford Association
Telephone: 816-842-3757
Web site: <http://www.hereford.org>

American-International Charolais Association
Telephone: 816-464-5977
Web site: <http://www.charolaisusa.com>

American Jersey Cattle Association
Telephone: 614-861-3636
Web site: <http://www.usjersey.com>

American Milking Shorthorn Society
Telephone: 608-365-3332
Web site:
<http://www.milkingshorthorn.com>

American Morgan Horse Association Inc.
Telephone: 802-985-4944
Web site: <http://www.morganhorse.com>

American Paint Horse Association
Telephone: 817-834-2742
Web site: <http://www.apha.com>

American Poultry Association
Telephone: 513-598-4337
Web site: <http://www.amerypoultryassn.com>

American Quarter Horse Association
Telephone: 806-376-4811
Web site: <http://www.aqha.com>

American Rambouillet Sheep Breeders Association
Telephone: 806-894-3081
Web site: <http://rambouillet/sheep.org>

American Saddlebred Horse Association

Telephone: 859-259-2742
Web site: <http://www.asha.net>

American Sheep Industry Association

Web site: <http://www.sheepusa.org>

**American Shetland Pony Club/
American Miniature Horse Registry**

Telephone: 309-263-4044
Web site:

<http://www.shetlandminiature.com>

American Shorthorn Association

Telephone: 402-393-7200
Web site: <http://www.shorthorn.org>

American Simmental Association

Telephone: 406-587-4531
Web site: <http://www.simmental.org>

American Southdown Breeders' Association

Telephone: 325-429-6226
Web site:

<http://www.southdownsheep.org>

Appaloosa Horse Club

Telephone: 208-882-5578
Web site: <http://www.appaloosa.com>

Arabian Horse Association

Telephone: 303-696-4500
Web site: <http://www.arabianhorses.org>

Ayrshire Breeders Association

Telephone: 614-335-0020
Web site: <http://www.usayrshire.com>

Breeders' World

Web site:
<http://www.breedersworld.com>

Breeds of Livestock

Web site: <http://www.anst.okstate.edu/breeds>

Brown Swiss Association

Telephone: 608-365-4474
Web site: <http://www.brownswissusa.com>

Certified Pedigreed Swine

(Chester White, Poland China, and Spotted Swine Breed Associations)

Telephone: 309-691-0151
Web site: <http://www.cpswine.com>

Columbia Sheep Breeders' Association of America

Telephone: 740-482-2608
Web site: <http://www.columbiasheep.org>

Continental Dorset Club

Telephone: 401-647-4676
Web site: <http://www.dorsets.com>

The Coop

Web site: <http://www.the-coop.org>

Educating About Agriculture

Web site: <http://www.ageducate.org>

Holstein Association

Telephone: 802-254-4551
Web site: <http://www.holsteinusa.com>

National Cattlemen's Beef Association

Web site: <http://www.beef.org>

National 4-H Council

7100 Connecticut Ave.
Chevy Chase, MD 20815
Telephone: 301-961-2800
Web site: <http://www.fourhouncil.edu>

National FFA Organization

National FFA Center
6060 FFA Drive
Indianapolis, IN 46268-0960
Telephone: 317-802-6060
Web site: <http://www.ffa.org>

National Pork Producers Council

Web site: <http://www.nppc.org>

National Swine Registry

(American Landrace Association, American Yorkshire Club, Hampshire Swine Registry, and United Duroc Swine Registry)

Telephone: 765-463-3594
Web site: <http://www.nationalswine.com>

NetVet—Veterinary Resources

Web site: <http://netvet.unsl.edu/vet.htm>

North American Limousin Foundation

Telephone: 303-220-1693
Web site: <http://www.nalf.org>

Pony of the Americas Club Inc.

Telephone: 317-788-0107
Web site: <http://www.poc.org>

Poultry Science Virtual Library

Web site: <http://povsc.iamu.edu/library/dother.html>

Tennessee Walking Horse Breeders' and Exhibitors' Association

Telephone: 931-359-1574
Web site: <http://www.twhbea.com>

U.S. Department of Agriculture (USDA)

1400 Independence Ave. SW
Washington, DC 20250
Telephone: 202-720-2791
Web site: <http://www.usda.gov>

United Suffolk Sheep Association

Telephone: 435-563-6105
Web site: <http://u-s-s-a.org>

Virtual Livestock Library

Web site:
<http://www.anst.okstate.edu/library>

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