

2024 THEME

Vet-Bot Challenge: Operation Animal Care

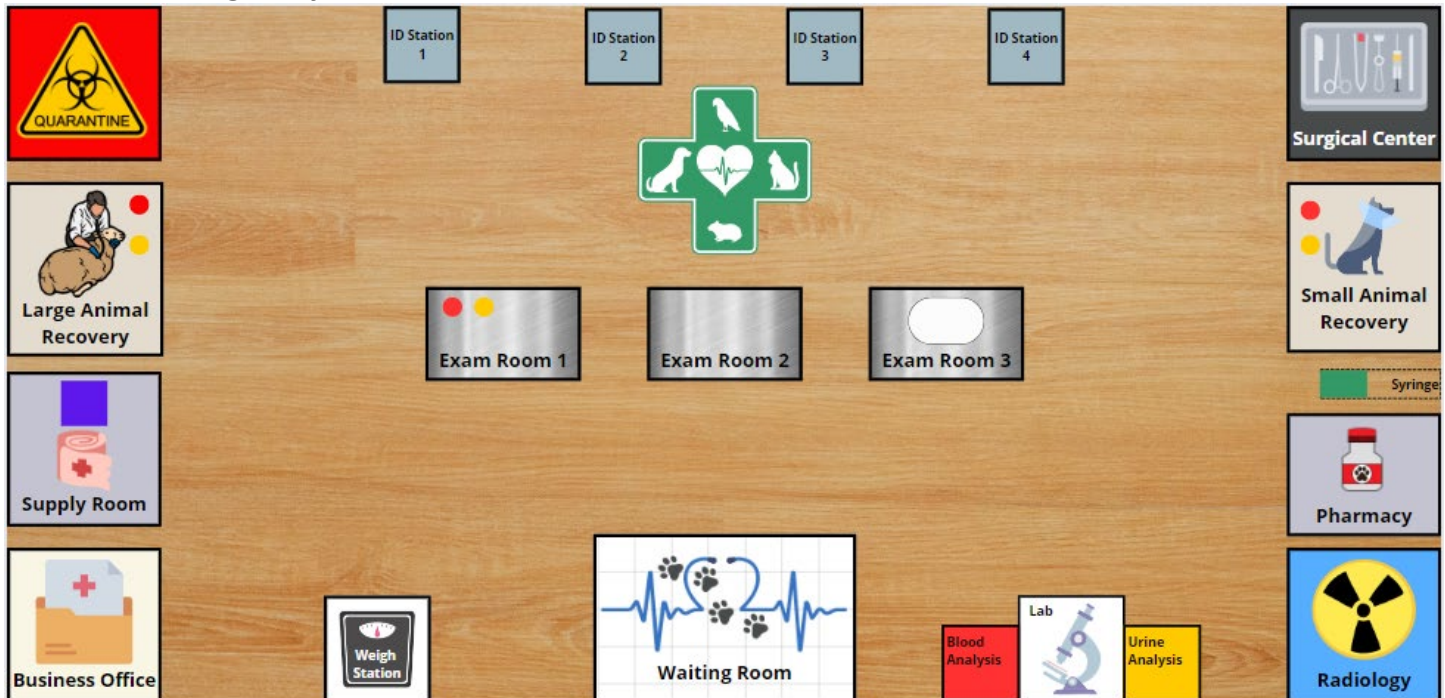
Introduction

Welcome to the Vet-Bot Challenge! In this exciting contest, you'll step into the shoes of a veterinary team, using your robotic companion to navigate the bustling environment of a high-tech animal clinic. From the clucking of chickens to the belling of cattle, the bleating of sheep, and the grunting of pigs, the clinic is a symphony of sounds, a testament to the variety of patients needing your care. Your mission is to use your robot to perform critical tasks like administering medicine, delivering feed, conducting diagnostic tests, and even transporting animals. Each challenge is designed to mimic real-world veterinary tasks, giving you a glimpse into the life-saving work that veterinarians do every day. So, gear up, program your robot, and get ready to dive into the thrilling world of veterinary medicine!

Known Objectives

- Transport the canine patient to the weigh station to be weighed.
- Transport the caprine patient to the assigned exam room.
- Retrieve and deliver blood and urine samples to the lab.
- Retrieve the bovine patient from an exam room and transport it to the surgical center.
- Help the intern identify and properly label four livestock breeds.
- Administer medication.
- Store medical supplies.

Game Mat Design/Layout






The game mat image shown above is available for teams to download (as a PDF) and printed at a source of your choosing. It will also be available to order at [Geyer Instructional Products](#) (search "AgRobotics").

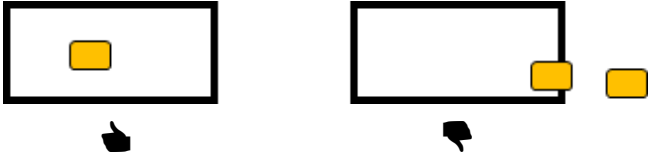

The Player Zone for this game is the Waiting Room. Everything outside of that is the Robot Zone, which consists of the following areas:

- Weigh Station
- Business Office
- Supply Room
- Large Animal Recovery
- Quarantine
- 4 Identification Stations
- 3 Exam Rooms
- Surgical Center
- Small Animal Recovery
- Pharmacy
- Radiology
- Lab with blood and urine analysis zones

Challenge Descriptions and Score Values

Obj . #	Objective	Description	Scoring Rules	Point Value
1	Transport the canine patient to the weigh station to be weighed.	<p>Transport Canine Patient from the Waiting Room to the Weigh Station.</p> <p>The animal will be in the resource tray at the beginning of the match.</p>	<p>The robot must place the animal in an upright, freestanding position (no Lego frame/structure of any type can be left behind to assist the animal's stance). To score full points, the animal must be standing in an upright position with all 4 feet inside the outer edge of the Weight Station boundary. Partial points will be awarded if the animal is inside the boundary but not standing on its feet (example: laying on its side). The animal cannot touch the game mat while being transported by the robot until it is being placed inside the boundary of the Weigh Station.</p> <p>Points will be awarded once the robot has returned to the Waiting Room.</p> 	<p>50 Full Points 25 Partial Points</p>
2	Transport the caprine patient to the assigned exam room.	<p>Transport Caprine Patient from the Waiting Room to the Exam Room 2.</p> <p>The animal will be in the resource tray at the beginning of the match.</p>	<p>The robot must place the animal in an upright, freestanding position (no Lego frame/structure of any type can be left behind to assist the animal's stance). To score full points, the animal must be standing in an upright position with all</p>	<p>50 Full Points 25 Partial Points</p>

			<p>4 feet inside the outer edge of the Weight Station boundary. Partial points will be awarded if the animal is inside the boundary but not standing on its feet (example: laying on its side). The animal cannot touch the game mat while being transported by the robot until it is being placed inside the boundary of the Exam Room 2.</p> <p>Points will be awarded once the robot has returned to the Waiting Room.</p> 	
3	Retrieve and deliver blood and urine samples to the lab.	Retrieve Blood and Urine Canisters from Exam Room 1, Large Animal Recovery , and Small Animal Recovery , then deliver to the appropriate Lab bin for diagnostics. Blood Canisters will be located in designated red circles marked on the game mat. Urine Canisters will be located in designated yellow circles marked on the game mat. Bottles will be half-filled with corresponding red and yellow play dough.	<p>The samples must be placed fully within the boundary of the corresponding color lab bin (colored box). Canisters cannot touch the black boundary. Bottles must be placed in an upright (lid on top) position.</p> <p>Points will be awarded at the time of completion.</p> 	<p>25 per bottle</p> <p>100 point bonus for all 6 canisters placed correctly.</p>
4	Retrieve the bovine patient from an exam room and transport it to the surgical center.	<p>Retrieve Bovine Patient from Exam Room 3 and transport it to the Surgical Center.</p> <p>The animal will be standing and located in the designated white oval marked on the game mat inside Exam Room 3 at the beginning of</p>	<p>The animal must be transported directly to the Surgical Center and placed onto the game mat fully inside the outer boundary of the square border. The animal cannot touch the game mat while being transported. The animal can either be placed standing upright or laying on its side.</p>	100 points

		<p>the match. Its head will be facing the Small Animal Recovery room.</p>	<p>Points will be awarded at the time of completion.</p> 	
5	<p>Help the intern identify and properly label four livestock breeds.</p>	<p>Photos of livestock breeds will be mounted onto the inside wall of the game table and centered above the four breed ID stations.</p> <p>Four colored blocks (found in the resource tray at the beginning of the match) will have a written livestock breed name that corresponds with each of the four photos.</p> <p>Breed names and photos are outlined in the Breed Identification Study Resource section of these game rules.</p>	<p>The breed name block that matches the breed photo must be delivered and placed into the ID station box (on the game mat) below the photo. The block must be placed completely inside the black boundary of the ID station.</p> <p>Points will be awarded at the time of completion.</p> 	<p>50 points per correct station</p> <p>100 points for all four correctly placed blocks.</p>
6	<p>Administer medication</p>	<p>Using the mounted syringe, the robot must administer the medicine into the patient by fully pushing the plunger into the barrel of the syringe.</p> <p>The syringe is represented by a small air pump that will be mounted to the game mat using velcro (for practice setup, teams may elect to reinforce how the pump is attached to the game mat to increase stability). The needle will not be attached to the pump. The plunger is the handle of the air pump.</p>	<p>The robot must push in the plunger to where the leading edge of the black handle breaks the plane of the black electrical tape. See photos below.</p> <p>Points will be awarded at the time of completion.</p>	<p>150 points</p>

At the beginning of the match, the handle will be fully extended and horizontal in orientation (parallel with the game table).

The body of the air pump will be placed even with the outer green edge of the box outlined on the game mat (pictured below).



Other modifications include: the handle will have two Lego T's hot glued to the handle so that the handle does not rest on the game mat when fully extended. See picture below.






(how it will be affixed to the handle)






(how it will be oriented during game play)

		<p>Black electrical tape will be placed on the game mat as shown in the photo below. This will provide new marks for scoring purposes. See the modified scoring rules for this challenge.</p> 		
7	Store medical supplies	<p>The robot must transport and stack medical crates/boxes in the Supply room. One crate will be in place and secured to the game mat at the beginning of the match. The location is the blue square in the Supply Room. All other crates must be stacked on top of this crate.</p> <p>Crates are represented by plastic storage containers with lids. Three containers will be half-filled with play dough and will be located in the resource tray at the beginning of the match.</p>	<p>The robot can only transport one container at a time. Each container must be stacked on top of the previous container.</p> <p>Points will be awarded at the end of the match.</p>	<p>1st crate - 50 points 2nd crate - 100 points 3rd crate - 150 points</p>

Game Piece Supply List

Product Description	Number of Pieces Used in Game	Suggested Purchase Link
Toy animals	1 Canine, 1 Caprine, 1 Bovine	Link
Film canister	3 Blood and 3 Urine Sample Containers	Link
Play dough	Red/Yellow; enough to half-fill canisters	Purchase locally
Foam blocks	4	Link
Air pump	1	Link
Plastic storage containers	4	Link

BREED ID STUDY GUIDE RESOURCE

SWINE STUDY LINKS Pork Checkoff Major Swine Breeds OSU Swine Breeds	BREED ID PICTURES
<p>Hampshire - The hogs with “the belt,” Hampshires are the fourth-most recorded breed in the United States. Most popular in the Corn Belt, Hampshires are known for producing lean muscle, high carcass quality, minimal backfat and large loin eyes. Females also are known for their mothering ability, with longevity in the sow herd.</p>	 <p><i>Image Credit: porkcheckoff.org</i></p>
<p>Yorkshire - The most-recorded breed of swine in North America, Yorkshires are white with erect ears. They are found in almost every state, with the highest populations being in Illinois, Indiana, Iowa, Nebraska and Ohio. Yorkshires are known for their muscle, with a high proportion of lean meat and low backfat. Soundness and durability are additional strengths.</p>	 <p><i>Image Credit: porkcheckoff.org</i></p>
<p>Duroc - The second-most recorded breed of swine in the United States, the red pigs with the drooping ears are valued for their product quality, carcass yield, fast growth and lean-gain efficiency. They also add value through their prolificacy and longevity in the female line. Much of the U.S. breed improvement has occurred in Ohio, Kentucky, Illinois, Indiana, Iowa and Nebraska.</p>	 <p><i>Image Credit: porkcheckoff.org</i></p>

Poland China - In the early 1800s, Poland China hogs originated in Ohio. Today, Poland China hogs are known for their large frame, length of body, leanness and muscle. They also are excellent feeders, gaining well under good care and management. They also are quiet in their disposition.



Image Credit: porkcheckoff.org

Berkshire - The third-most recorded breed of swine in the United States, Berkshires are known for fast and efficient growth, reproductive efficiency, cleanness and meat flavor and value. The first U.S. meeting of Berkshire breeders and importers was held in 1875, with the American Berkshire Association formed shortly after – making it the oldest swine registry in the world.



Image Credit: porkcheckoff.org

Spotted - The Spotted swine breed is characterized by large, black-and-white spots. Many breeders in central Indiana specialized in breeding Spotted hogs through the years. Today, Spots are known for their feed efficiency, rate of gain and carcass quality. In addition, commercial producers appreciate Spotted females for their productivity, docility and durability.



Image Credit: porkcheckoff.org

CATTLE STUDY LINKS
[OSU American Cattle Breeds](#)

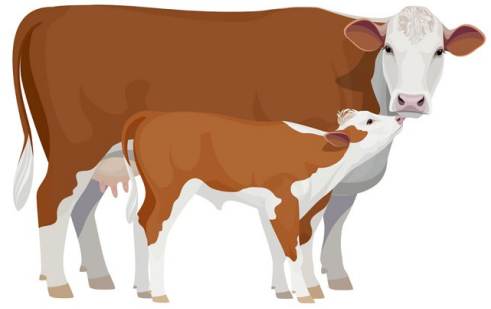
BREED ID PICTURES

Black Angus - The characteristic features of the breed are black color, polled head, compact and low-set body, fine quality of flesh, and high dressing percentage. This breed was introduced into the United States in 1873, and after that date its influence spread widely there and in other countries.



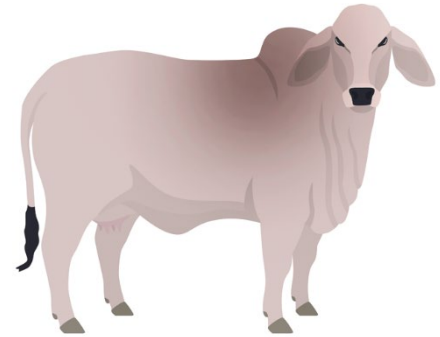
Shutterstock Stock Image

Hereford - Popular breed of beef cattle developed in Herefordshire, England. Hereford was bred for beef and draft purposes. The characteristic features of the breed are red coat with a white face and white markings. The outstanding characteristics of the breed are uniformity of color, early maturity, and ability to thrive under adverse conditions.



Shutterstock Stock Image

Brahman - Varieties of cattle originating in India and crossbred in the United States with improved beef breeds, producing the hardy beef animal known as the American Brahman. The Brahman is characterized by a pronounced hump over the shoulder and neck, horns that usually curve up and back, and drooping ears. Gray is the prevalent color; a solid red strain has also been developed.



Shutterstock Stock Image

Charolais - Breed of large light-coloured cattle developed in France for draft purposes but now kept for beef production and used for crossbreeding. Charolais are medium to large framed beef cattle with a very deep and broad body. They have a short, broad head and heavily muscled loins and haunches. Charolais have demonstrated growth ability, efficient feedlot gains and in carcass cut-out values. A typical Charolais is cream-coloured or slightly darker.

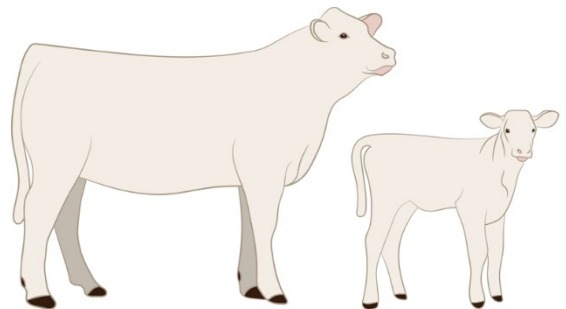
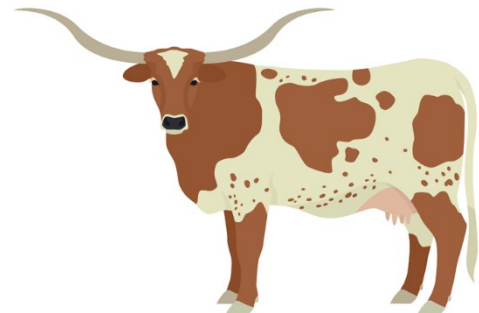


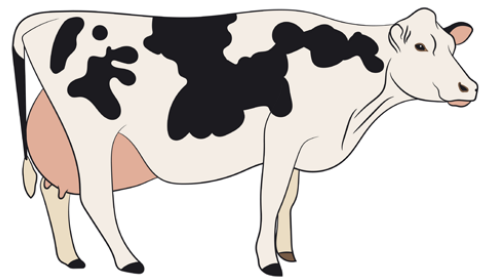
Image Credit: Freepik Stock Image

Texas Longhorn - The Texas Longhorn is an American breed of beef cattle, characterized by its long horns, which can span more than 8 ft from tip to tip. It derives from cattle brought by Spanish conquistadors circa 1512. Longhorns have a higher tolerance of heat and drought than most European breeds. They can be of any color or mix of colors. In some 40% of the cattle it is some shade of red, often a light red.



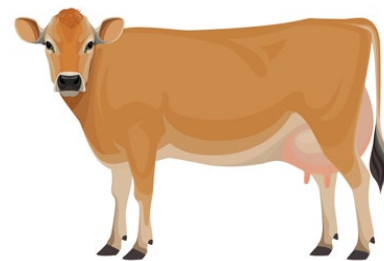
Shutterstock Stock Image

Holstein - Breed of large dairy cattle, its chief characteristics are its large size and black and white spotted markings, sharply defined rather than blended. These cattle are believed to have been selected for dairy qualities for about 2,000 years. In the United States the Holstein breed outnumber all other dairy breeds and produce nine-tenths of the milk supply. The milk, however, has a relatively low butterfat content.



Shutterstock Stock Image

Jersey - Breed of small short-horned dairy cattle; it is believed to have descended from French cattle. The color of the Jersey is usually a shade of fawn or cream, but darker shades are common. The Jersey is adaptable to a wide range of conditions, and its distribution is worldwide. Jersey milk is remarkably rich in butterfat, and for that reason animals of this breed help produce a variety of creams, cheeses & desserts.



Shutterstock Stock Image

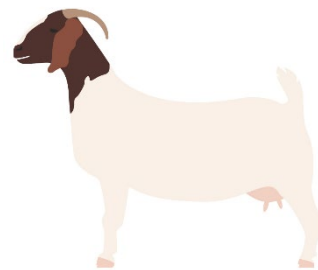
GOATS

[OSU Goat Breeds](#)

[Texas Sheep & Goat Raisers Association](#)

BREED ID PICTURES

Boer - Boer goats commonly have white bodies and distinctive brown heads. Originally bred in South Africa, Boers are now one of the principal meat goat breeds in the U.S. It has been exported to many countries, and has been used to improve the meat qualities of other breeds. It is well adapted to grazing on a wide variety of local biomes. It has a fast growth rate and good carcass qualities, good resistance to disease and good adaptation to hot, dry semi-desert conditions



Shutterstock Stock Image

Angora - Turkish breed of domesticated goat. It produces the lustrous fiber known as mohair. It is widespread in many countries of the world. The Angora is a moderately small goat. It is slender, elegant and light-framed. The head is small, with semi-lop ears. It is usually horned; in billies the horns are commonly long, twisted and strong. The animal is entirely covered in a coat of long ringlets of fine and lustrous mohair.



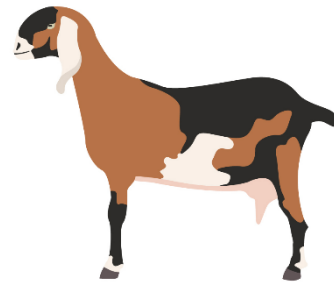
Shutterstock Stock Image

Spanish - Also called the brush goat or scrub goat, came originally from Spain via Mexico to the USA. It is now a meat and brush-clearing type found widely in the United States. Until recently, these goats were kept mainly for clearing brush & other undesirable plant species from pasture lands. Size varies greatly due to climate, terrain and available breeding stock. Body shape, ear shape, horns, hair and color are non consistent.



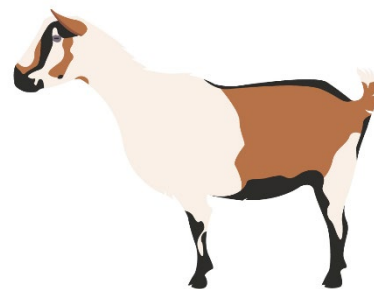
Shutterstock Stock Image

Nubian - Nubian goats are easily recognizable due to their long, floppy ears, and convex "Roman nose" muzzle. Because of their Middle Eastern heritage, this breed can thrive in hotter climates than other dairy goats, and they have a longer breeding season. Although they don't produce as much milk per goat as other breeds, Nubian milk is very high in fat content. This breed is also raised for meat.



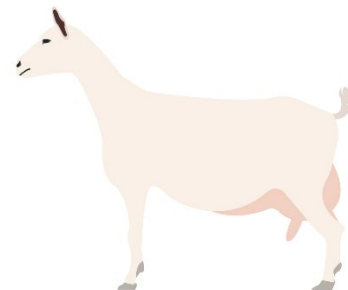
Shutterstock Stock Image

Alpine - This dairy breed originated in the French Alps, and can thrive in nearly any climate. They are the highest producing milkers, with top goats producing up to two gallons per day. Because of the amount of milk they produce, these goats have high nutritional needs and their diets must be monitored closely. They have erect ears and come in many colors and color combinations. The hair is medium to short and the bridge of the nose is straight.



Shutterstock Stock Image

Saanen - Saanen goats are the largest breed of dairy goat, and are second in milk production only to Alpine goats. These popular goats have short, white hair and upright ears, and are known for their easy-going temperament.



Shutterstock Stock Image

CHICKENS

[OSU Chicken Breeds](#)

Leghorns - Leghorns are good layers of white eggs, laying an average of 280 per year and sometimes reaching 300 or even 320. They are efficient at turning the feed they eat into lots of eggs. Leghorns are also active and efficient foragers, which is great for backyard chicken raising. The Leghorn is a light breed that matures quickly. The Leghorn has red wattle, white earlobes, and has either a single or rose comb.



iStock Stock Image

Barred Plymouth Rock - Barred Rocks are large, long-lived chickens. They are very cold tolerant. Both roosters and hens are calm and will get along well with people and other animals. Since they are used for both meat and eggs, they lay fewer eggs in a year than hens bred specifically for laying. Barred Rocks have characteristic thin white bars on their barring pattern. Eggs are a light to medium brown with a touch of pink.



Shutterstock Stock Image

Rhode Island Red - Rhode Island Reds are friendly, good natured chickens that can be raised as pets as well as egg and meat producers. They are also tough birds, resistant to illness, and good at foraging and free ranging. The color of the plumage of the Rhode Island red ranges from a lustrous deep red to almost black. Rhode Island Reds have red-orange eyes, reddish-brown beaks, and yellow feet and legs. Egg color of Rhode Island Reds are brown.



Adobe Stock Image

White Silkie - This unique breed is named for its fluffy plumage, which is said to feel like silk. The breed has several other unusual qualities, such as dark blue meat and bones, blue earlobes, and five toes on each foot (most chickens only have four). This breed is one of the most calm and relaxed, making it the ideal pet chicken. Egg is a creamy color and sometimes speckled.



iStock Stock Image

Buff Orpington - Buff Orpington's size makes them good dual-purpose chickens for meat and egg production. The main traits of the Buff Orpington are its buff color plumage, fast growth rate, high egg yield, and suitability for the table as a meat bird. Many people favor them for their friendly personalities and because heritage breeds tend to be hardier and healthier than industrial hybrids with a lifespan of 5 to 10 years. Egg color is light brown in color.



iStock Stock Image

Ameraucana - Ameraucanas are exceptional egg layers, laying about 250 eggs a year, and they start laying at about five or six months old. They are cold tolerant and do well in winter. They also do well on free range because they are curious birds. Ameraucanas lay blue eggs. Other traits include a pea comb, white skin, full tails, and muffs and beards (always together). They come in a variety of colors such as black, blue, brown-red, silver and white.



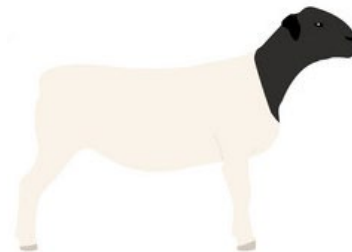
iStock Stock Image

SHEEP

[OSU Sheep Breeds](#)

[Texas Sheep & Goat Raisers Association](#)

Dorper - The Dorper was developed in South Africa. The breed has the characteristic black head. The Dorper is primarily a mutton sheep that was developed for the arid extensive regions of South Africa. They are hornless and have a short, light covering of hair and wool that will shed off so they do not have to be shorn. They are exceptional in terms of adaptability, hardiness, reproduction, mothering ability, & growth rate.



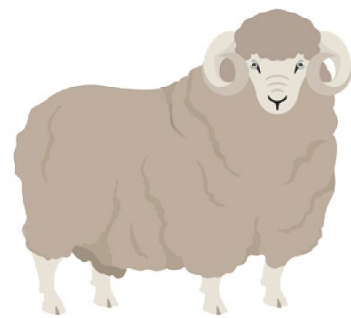
VectorStock Stock Image

Hampshire - The Hampshire was developed in England and imported into the U.S. in the 1880's. Hampshires are large sized with black faces and the ears should be moderate in length, thick, covered with a coarse dark brown or black hair and free from wool. Adaptable to varied and wet climates, used in farm flock production, and prolific with good maternal instincts and milking ability. The fast-growing breed has excellent carcass merit and a medium, easy-to-spin wool.



VectorStock Stock Image

Rambouillet - Developed from the Spanish Merino in France, the Rambouillet is the foundation of most western range flocks. The Rambouillet is large, white-faced with wool on the legs, fast-growing, long-live, adaptable to various climatic and forage conditions, considered one of the best sheep for breeding year round, and produces a high quality, fine-wool fleece.



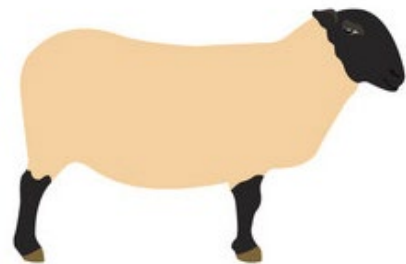
Shutterstock Stock Image

Southdown - One of the oldest breeds of sheep, the Southdown originated in England where it contributed to the development of other breeds. It is medium to small sized with gray to mouse-brown face and wool on the legs. This early maturing breed has good lambing ability and excellent crossing ability to produce meaty lamb carcasses at light weights. The Southdown is adaptable to varied and wet climates, and yields a medium, easy-to-spin wool.



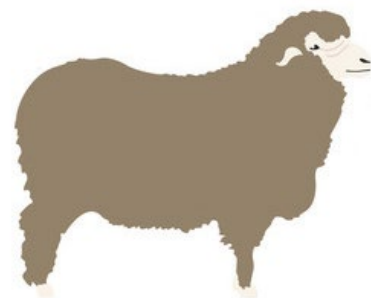
Shutterstock Stock Image

Suffolk - The Suffolk originated in England and was imported into the U.S. in 1888. The breed is highly adapted to farm flock production and crossbred with commercial white-faced ewes for market lamb production. The Suffolk is large sized with bare black head, black face and bare, black legs. Hardy, Suffolks have excellent growth rates, milking ability and lambing ability, adapt well to heat and cold, and produce high quality meat carcasses and a medium, easy-to-spin wool.



VectorStock Stock Image

Delaine-Merino - Developed from the Spanish Merino having an unbroken line of breeding 1200 years old. The modern Delaine-Merinos are relatively smooth-bodied, intermediate sized, white-faced with wool on the legs, hardy, long-lived, adapted for unassisted lambing, produce well in extremely warm climates under relatively poor feed conditions, breed year round, and produce a high quality fine-wool fleece.



VectorStock Stock Image