# AgRobotics Rules

Last revised: February 2, 2024

## CONTEST OVERVIEW

The AgRobotics contest is a robotics competition where teams design, build, and program a Lego robot to complete challenges autonomously and score points in a 3-minute match. The theme and challenges change each year, but all are focused on some aspect of agriculture.

Each team will decide on their challenge strategy and will launch their robot from a designated home base. The robot will be programmed to move outside of that base and attempt to complete challenges within the given timeframe.

## RULES

NOTE: Please refer to each contest host for eligibility and additional rules not outlined in this document. For contests that take place at a major livestock show, please refer to their respective premium list (aka exhibitor handbook) for additional rules. Your County Extension Agent or Ag Science Teacher can assist you. Please relay any questions you have about this contest through those channels.

The remainder of this document includes general contest rules as well as the current theme challenge rules.

Contest officials reserve the right to make updates to these rules throughout the year as needed and without advance notice. Please reference the "last revised" date at the top of this document to ensure you have the latest version. Contest officials may clarify rules during the contest in order to maintain the intent, objectives, and integrity of the game.

## CONTEST FORMAT AND SCORING

Each year, a new agricultural theme for this contest series is released in September. The contest will consist of a set of known and unknown challenges that the robot must be programmed to complete autonomously. This adds an element of unpredictability that mimics real-world conditions, where farmers and agricultural technologists must often adapt to unexpected circumstances.

The design of the game and designated number of challenges will be released in September each year. There will be approximately 5-8 known challenges and 1-4 unknown challenges.

Known challenges will be released in September, and the unknowns will be released on the day of the contest. Unknowns may be different from contest to contest; however, knowns will remain the same throughout the school year.

Teams must build and program their robot for known challenges prior to the contest. On contest day, the unknown challenges will be revealed, and teams will be given 90 minutes to build, program, and test the robot for known and unknown challenges.

Any updates and rule clarifications will be posted on the same website. Teams are encouraged to check the website prior to each contest. Modifications or clarifications will be highlighted and dated.

Below is an example of a typical contest schedule:

- Team check-in
- Orientation (30 min)
- Coach Time (10 min)
- Build Time (90 min)
- Match Play
- Announcement of Finalists
- Finals
- Awards

On the day of the contest, teams will practice and compete on the same game table. If a team has to be relocated for finals or some other reason, time will be given to the team to test their robot on the new table.

Point values for each game challenge may vary, depending on the level of difficulty. Penalties will also depend upon challenge design, but examples may include: knocking over pieces, restricted human interaction with robot or game pieces, excessive retrievals, etc.

Teams will have two preliminary matches, and points from both will be added together. Additionally, teamwork score(s) will be assessed by judges throughout the competition (2/2/24) and added to the match total to form the preliminary team score. The preliminary team score determines qualifiers for finals.

The preliminary team score will be carried over to the finals where teams will compete in two additional matches. Those 2 match scores will be added to form the final team score. The top five teams in each age division will advance to the final match. If there are fewer than five teams in an age division, no finals will take place. Places 6 and beyond are determined by the total preliminary team scores.

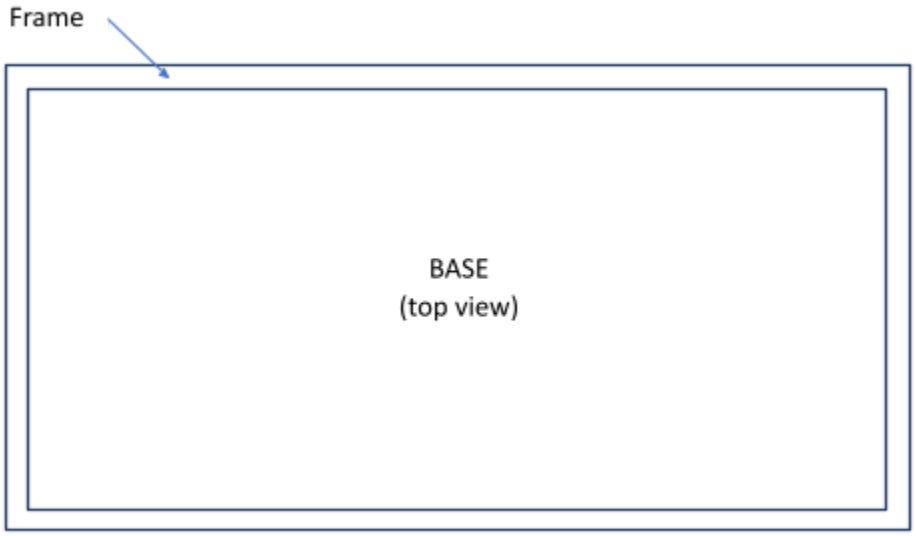
After each match, the team captain will initial the score sheet, indicating agreement to the points awarded. Once signed, the match score is final and cannot be challenged. Scoresheets will be delivered to the contest tabulator who will review the score sheet, correct any mathematical inaccuracies, and record the match score. (2/2/24) Video review (from any source) is not allowed.

The contest results, as announced, will be final.

## GAME TABLE

The game table consists of two parts:

- Base – made of 4’x8’ sheet of plywood or comparable material.
- Rectangular Frame – made of 2”x4” (actual dimensions are 1.5” x 3.5”) lumber attached on top of the base. The inner dimensions of the frame are 45” x 93”.




(not to scale)

A resource tray will be located outside and next to the game table. This is one or more plastic trays that will hold additional game pieces used during the match. Contestants can pick up or place game items into the resource tray once the match begins. Teams may place those game pieces onto their robot or in the Player Zone (see definition below) as allowed. Neither the tray(s) nor the game pieces it holds are part of the playing field.

## GAME MAT

1. A vinyl game mat will be placed flat inside the frame of the game table. The game mat will be approximately 45” x 93”. It will generally consist of the following areas:
    i. Player Zone – the area where the robot must launch from. There is typically only one player zone, but there may be more depending on the game theme. This is an area where game pieces may be collected from and/or placed upon the robot for retrieval/delivery.
    ii. Robot Zone – the area outside of the player zone where the robot performs its tasks autonomously.

## THE ROBOT EQUIPMENT

1. Each team must supply their own equipment. Each team may only bring the items and respective maximum quantity listed in the table below. Any extra equipment or item that does not meet specifications will be returned to the team coach. No infrared beacons (remote) or sensors allowed.

| ITEM | MAXIMUM QUANTITY |
|---|---|
| Lego® Mindstorm® EV3, Spike Prime, or Inventor brick/hub | 1 |
| Lego® Mindstorm® EV3, Spike Prime, or Inventor:<br>● Building pieces (excludes brick/hub)<br>● Battery<br>● Motors<br>● Ultrasonic sensor<br>● Touch sensor<br>● Light/color sensor<br>● Gyro sensor | Unlimited |
| Laptop computer or tablet with programming software (Lego® or non- Lego® is acceptable) | 2 |
| Backup laptop battery | Unlimited |
| Portable, battery powered AC power station (must fit under table work station) | 1 |
| 3-pronged extension cord (up to 25')<br>(power is not provided at SALE) | 1 |
| USB cables | Unlimited |
| Build plans (paper or digital) | Unlimited |
| Plastic container or cardboard box for transporting robot to and from game area | 1 |
| Ruler or tape measure | Unlimited |
| Pencil/pen and notepad for design and note-taking purposes | Unlimited |
| Protractor (for measuring angles) | 1 |
| Digital or printed game rules and study guide (may not be used during match play) (2/2/24) | Unlimited |

2. All Lego® Mindstorm pieces must be in their original factory condition.
3. No 3D printed pieces are allowed.
4. Teams may use any software that facilitates autonomous movement of the robot, so long as the robot is solely controlled by the programs stored on the HUB or microSD card.
5. No remote controllers of any type are allowed.
6. No computers or tablets may be brought up to the game tables during any matches. It can be during build time.
7. Note paper may only be used for note-taking purposes only. Teams may bring notes to the game table during matches. The paper is not allowed to be used for any other purpose (used

on the robot for example).

8. Teams are not allowed to bring their own game mat and/or pieces.

## BLUETOOTH AND INTERNET CONNECTIVITY

1. Bluetooth connections can be made and utilized during Build Time. It is not allowed during the Match Play or Finals while the robot is on the playing field.
2. No internet connectivity will be provided.
3. Teams are HIGHLY encouraged to ensure their computers' operating system, software/app, and robot firmware are up to date prior to the contest.
4. When teams check-in and are assigned to their "pit", members and their coach should test and resolve any connectivity/pairing issues.
5. Contestants should be well-trained on how to resolve Bluetooth or USB connection issues.
6. Teams are encouraged to create a unique name for their hub so that pairing is less confusing and will minimize any mistaken pairings with other robots/computers.

## MATCH SETUP AND INSPECTION

1. Before the match begins, the robot and all its attachments must be placed and fit into the boundary of the Player Zone for inspection by a contest official.
2. The Player Zone is 11"x17"x12" (length/width/height).
3. To pass inspection, the robot and ALL attachments may not break the plane of the Player Zone boundary nor be taller than 12 inches from the surface of the game mat.
4. Once the official inspects and approves the size of the robot, team members may set up their robot to prepare for the match.
5. **At all times during the match**, the robot (including attachments) must not exceed the 11"x17"x12" (length/width/height).
6. No game pieces found in the Resource Tray may be touched until the match begins. The tray may not be used by the robot nor placed on the game table for any reason.
7. Contest officials reserve the right to remeasure the robot after a match. Any robot deemed to exceed the dimensions will forfeit the match.

TIP: Build designs that use fewer parts can not only save you space for maneuvering but may also save you time and present fewer mechanical/programming problems.

## RULES OF PLAY

1. The robot must be programmed to perform all challenges autonomously.
2. All parts of the robot, attachments, and game pieces must **completely fit** within the Player Zone each time the robot is launched from the Player Zone.
3. Teams must pre-build and program a robot prior to the competition.
4. Teams will report to the designated location and time for check-in and submit their robot and additional pieces/equipment for initial inspection.
5. After check-in, each team will be directed to a team pit (table and chairs) where they can work on their robot and programming. In some cases, teams may have to share a table with another team.

6. In some contests, electricity will be available. San Antonio will not have power available. Teams are encouraged to bring a portable battery powered AC power station.
7. An orientation will be provided for all participants where superintendents will review the challenges, rules and scoring.
8. After orientation, each team will have 90 minutes of Build Time for additional designing, building, programming and testing of their robot.
9. Teams will practice and compete on the same game table.
    a. In the case where a team has to move tables (example: for finals), teams will be given a designated amount of time to practice on the new table.
10. If time permits, teams are allowed to make alterations to their robot design and/or program between matches.
11. When match play begins, teams must report immediately to the game table when called. The robot must be powered up and ready for inspection when they arrive at the game table. Failure to report to the game table in a timely manner may result in the team forfeiting the match.
12. Contestants may retrieve their robot at any time during the match without penalty. When retrieved, the robot must be returned to the PLAYER ZONE.
13. Contest officials will not assist with any retrievals.
14. When the contestant is retrieving the robot, he/she may do so any time during the match in order to start/re-attempt challenges, but must not manipulate, interfere, or intercept game pieces on the board during retrieval *unless game piece is in robot's possession - see Rules of Play #15-18. If contestants physically alter where game pieces sit or land on the game board during retrieval, they may be subject to penalties or disqualification from the match.
15. Possession is defined as a game piece that is not touching the playing surface and is under the control of the robot. Items in possession of a robot may be retrieved once any part/piece of the robot has broken the plane of the PLAYER ZONE boundary.
16. If the robot is in possession of a game piece in the GAME ZONE, and the robot is retrieved by the player, the game official will return the game piece(s) to its original location/state.
17. A robot that has possession of a game piece may be retrieved during the match. A robot that loses possession of a game piece during the match (ie - robot drops piece outside of the player zone) the piece can no longer be retrieved by contestants.
18. A player is not allowed to touch any game piece except when the piece is completely inside the PLAYER ZONE boundary, OR if the robot is deemed in the PLAYER ZONE AND in full possession of a game piece(s). Once the piece is deemed inside the PLAYER ZONE, contestants may remove the game piece from the game table/robot and store it in the RESOURCE TRAY.
19. If a contestant intentionally touches a game piece in the GAME ZONE, the team will be given a 100-point penalty per occurrence. In such cases, the piece will be returned to its original starting position by contest officials as quickly as possible.
20. All competing team members are allowed around the game table during competition, and any member may touch the robot when necessary.
21. Teams not competing must remain at their tables or staging area.
22. Good sportsmanship is always expected. This is crucial during practice times. Practice time on the game table may be limited as build time progresses.

23. Only registered contestants and designated contest officials will be allowed in the robot Challenge pit areas.
    a. Due to space limitations, parents and other spectators must remain outside the designated contest area.
    b. Spectators will be allowed to enter the contest area during finals.
24. Teams that experience equipment malfunction(s) may not replace the equipment with supplies outside the contest area (from leaders, volunteers, CEA, AST, or contest officials). Instead, team members must work together and be creative in completing preparations without the malfunctioning/missing equipment or visit with other teams to borrow the needed part.
25. Depending on the challenges, contest officials may allow or require teams to use non-lego items in the design of the robot. In such cases, details will be outlined in the game release and/or orientation.
26. Coaches will be permitted to meet with their team for a 10-minute time period prior to build time and following orientation. This time should be used to help team members develop a plan and foster positive youth development and to ensure proper bluetooth/USB connections.
27. No cell phones or other types of communication devices are allowed in the pit or contest areas. Exceptions include medical devices.
28. During Build Time and Match Play, contestants are not allowed to communicate with anyone outside of the contest (coaches, parents, siblings, etc.). Exceptions include medical emergencies. Contestants are welcome to ask questions to contest officials or other contestants.
29. A match will be 3 minutes in length. The official timekeeper and announcer will have a countdown to start and stop. Any activities performed by the robot after time has been called will not count for points.
30. Any structures built by the team or game pieces cannot be placed onto the ROBOT ZONE by human players but may be permitted to be placed by the robot so long as it is done autonomously and is permitted by challenge rules.
31. Tie-breaker procedures/order will be as follows:
    a. Highest total teamwork score
    b. Highest total preliminary match scores (does not include teamwork)
    c. Highest individual preliminary match score
    d. Contest officials will determine additional measures if a tie persists.
32. Any contestant, coach, or spectator that becomes disruptive or does not exhibit sportsmanship, may be removed from the contest area at the sole discretion of contest officials and/or show (host) management.
33. Teams must clean up their pit areas prior to the awards ceremony. Teams not advancing to finals are free to leave once their pit area has been cleaned and are dismissed by contest officials.
34. Final rankings will be shared with the contest host for them to post or distribute following the contest.

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# Coach's Pre-Contest Checklist

- ☐ Does your team have all the parts to their kit/laptop/tablet? (cables, chargers, batteries, ect)?
- ☐ Does their robot connect to the computer/tablet?
- ☐ Can your team download programs onto their robot?
- ☐ Does anything need charging?

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# 2023-2024 THEME:
# Vet-Bot Challenge:
# Operation Animal Care

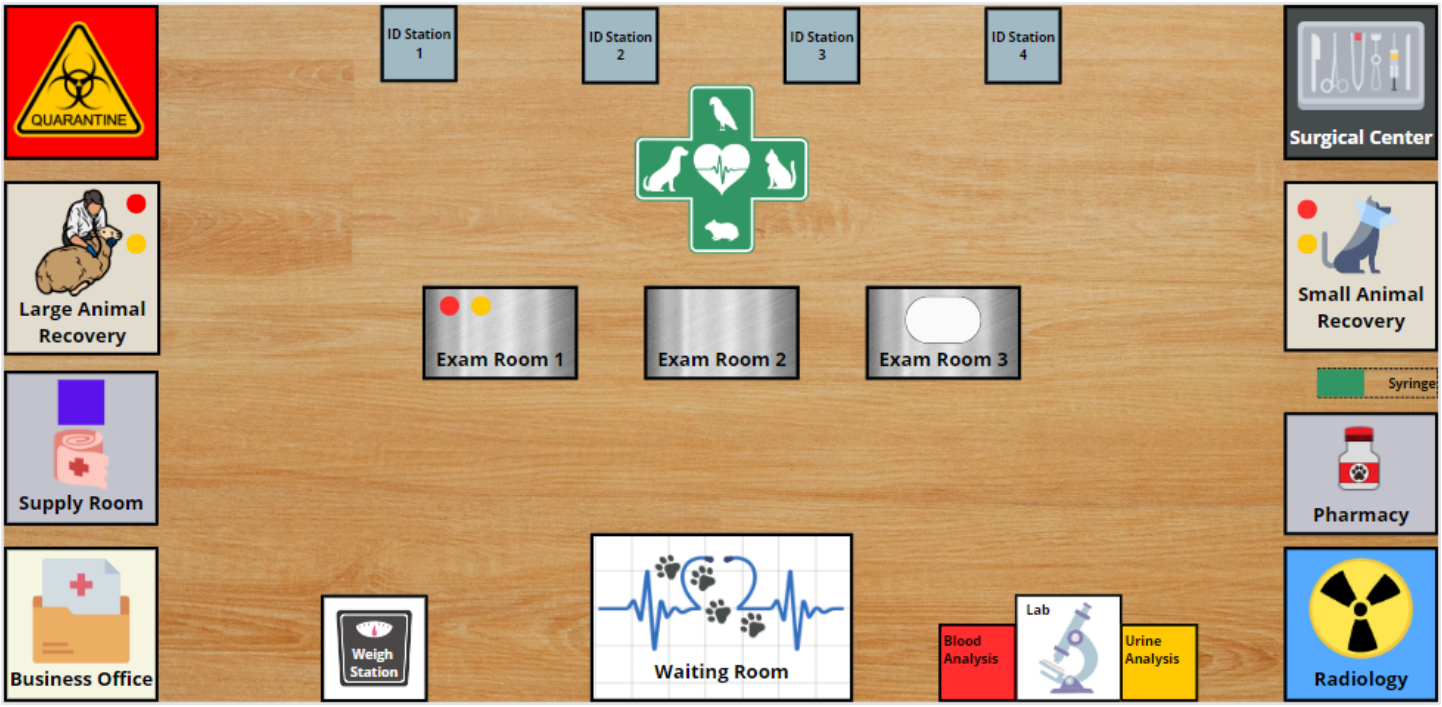
### Introduction

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 bellering 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

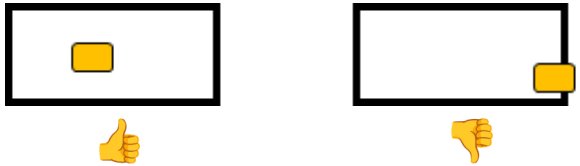



The game mat image shown above is available for teams to download (as a PDF) and printed at a source of your choosing. It will also be available to order at Geyer Instructional Products (search "AgRobotics"). Direct link to Vet-Bot Challenge game mat: link

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. | Transport **Canine Patient** from the **Waiting Room** to the **Weigh Station**.<br><br>The animal will be in the resource tray at the beginning of the match. | 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 Weigh 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**.<br><br>Points will be awarded once the robot has returned to the **Waiting Room**.<br><br> | 50 Full Points<br>25 Partial Points |

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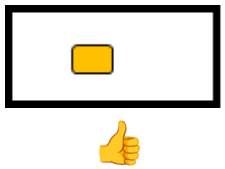
| **2** | Transport the caprine patient to the assigned exam room. | Transport **Caprine Patient** from the **Waiting Room** to the **Exam Room 2**.<br><br>The animal will be in the resource tray at the beginning of the match. | The robot must place the animal in an upright, freestanding position (no 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 Exam Room 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**.<br><br>Points will be awarded once the robot has returned to the **Waiting Room**.<br><br>  | 50 Full Points<br><br>25 Partial Points |

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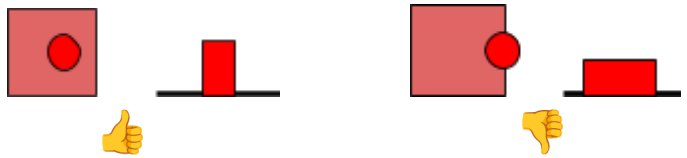
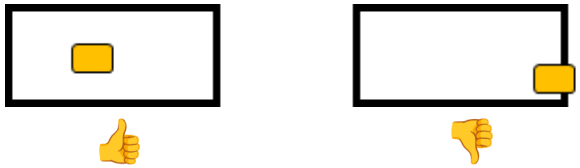
| **3** | Retrieve and deliver blood and urine samples to the lab. | Retrieve **Blood and Urine Canisters** from **Exam Room 1**, **Large Animal Recovery**, and **Small Animal Recovery**, then deliver to the appropriate **Lab** bin for diagnostics. Blood Canisters will be located in designated red circles 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. | The samples must be placed fully within the boundary of the corresponding color lab bin (colored box). Canisters cannot touch the black boundary. (2/2/24) If any Lego frame/structure is used in the delivery of the game pieces, the structure must also completely fit within the black boundary. Bottles must be placed in an upright (lid on top) position.<br><br>Points will be awarded at the (2/2/24) end of the match.<br> | 25 per bottle<br><br>100 point bonus for all 6 canisters placed correctly. |
| **4** | Retrieve the bovine patient from an exam room and transport it to the surgical center. | Retrieve **Bovine Patient** from Exam Room 3 and transport it to the **Surgical Center**.<br><br>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 the match. Its head will be facing the Small Animal Recovery room. | 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. (1/5/24) The animal must be touching the game mat to be awarded points.<br><br>Points will be awarded (1/5/24) when the robot fully exits the Surgical Center.<br> | 100 points |

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| **5** | Help the intern identify and properly label four livestock breeds. | Photos of livestock breeds will be mounted onto the inside wall of the game table and centered above the four breed ID stations.<br><br>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.<br><br>Breed names and photos are outlined in the Breed Identification Study Resource section of these game rules. | 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. (2/2/24) Exception: the back line next to the wall will not be judged. (1/5/24) Due to the curvature of the block, points will be awarded based on where the block physically touches the game mat.<br><br>Points will be awarded (1/5/24) at the end of the match.<br><br> | 50 points per correct station<br><br>100 points for all four correctly placed blocks. |
| **6** | Administer medication | Using the mounted syringe, the robot must administer the medicine into the patient by fully pushing the plunger into the barrel of the syringe.<br><br>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 placement of the air pump is | 9/22/23<br>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.<br><br>Points will be awarded at the time of completion. | 150 points |

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| | | modified as of 9/22/23. See dated additions below. The needle will not be attached to the pump. The plunger is the handle of the air pump.<br><br>At the beginning of the match, the handle will be fully extended and horizontal in orientation (parallel with the game table).<br><br>9/22/23<br>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). | <br>👍 <br>👎 | |

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| | | <br><br>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. | | |

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| | |  (how it will be affixed to the handle) | | |

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| | | <br>(how it will be oriented during game play)<br><br>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. | | |

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| **7** | Store medical supplies | 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.<br><br>Crates are represented by plastic storage containers with lids. Three containers will be half-filled with play | The robot can only transport one container at a time. Each container must be stacked on top of the previous container.<br><br>Points will be awarded at the end of the match. | 1st crate - 50 points<br>2nd crate - 100 points<br>3rd crate - 150 points |

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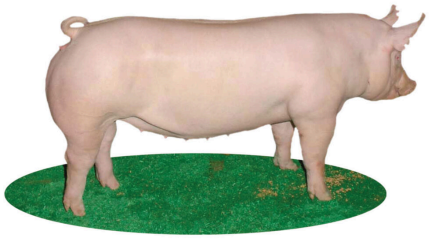
| | | dough and will be located in the resource tray at the beginning of the match. | | |

## 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<br>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 (State Fair)<br>Pork Checkoff Major Swine Breeds<br>OSU Swine Breeds | BREED ID PICTURES |
|---|---|
| **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. | <br>*Image Credit: porkcheckoff.org* |
| **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. | <br>*Image Credit: porkcheckoff.org* |
| **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. | <br>*Image Credit: porkcheckoff.org* |
| **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. | <br>*Image Credit: porkcheckoff.org* |

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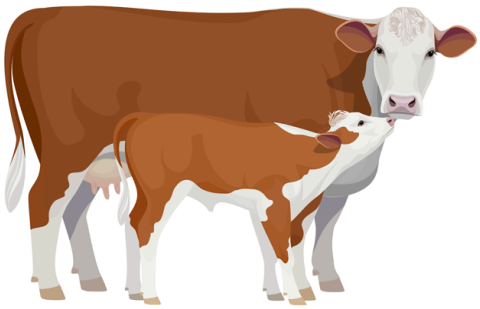
| **Berkshire -** The third-most recorded breed of swine in the United States, Berkshires are known for fast and efficient growth, reproductive efficiency, cleanness and meat flavor and value. The first U.S. meeting of Berkshire breeders and importers was held in 1875, with the American Berkshire Association formed shortly after – making it the oldest swine registry in the world. | <br>*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. | <br>*Image Credit: porkcheckoff.org* |
| **CATTLE STUDY LINKS (Fort Worth)**<br>**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. | <br>*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. | <br>*Shutterstock Stock Image* |

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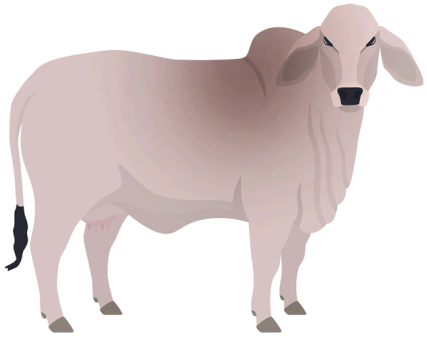
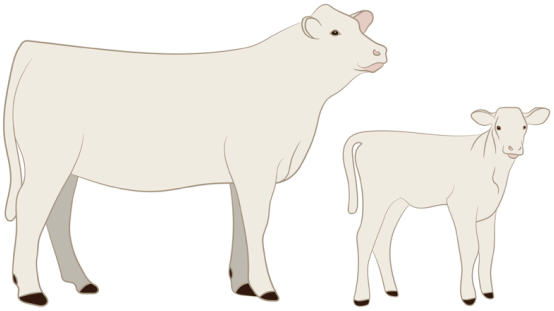
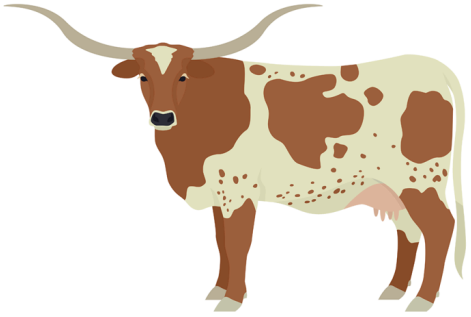
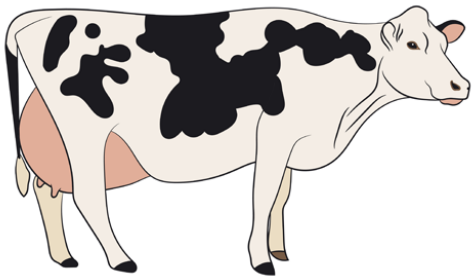
| **Brahman -** Varieties of cattle originating in India and crossbred in the United States with improved beef breeds, producing the hardy beef animal known as the American Brahman. The Brahman is characterized by a pronounced hump over the shoulder and neck, horns that usually curve up and back, and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

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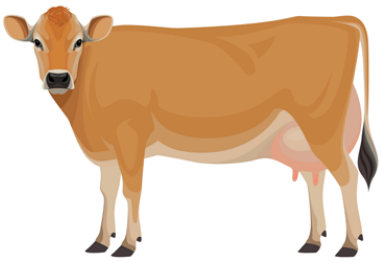
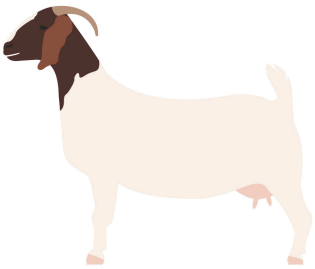
| **Jersey -** Breed of small short-horned dairy cattle; it is believed to have descended from French cattle. The color of the Jersey is usually a shade of fawn or cream, but darker shades are common. The Jersey is adaptable to a wide range of conditions, and its distribution is worldwide. Jersey milk is remarkably rich in butterfat, and for that reason animals of this breed help produce a variety of creams, cheeses & desserts. | <br>*Shutterstock Stock Image* |
| **GOATS (San Antonio)**<br>**OSU Goat Breeds**<br>**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 | <br>*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. | <br>*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. | <br>*Shutterstock Stock Image* |

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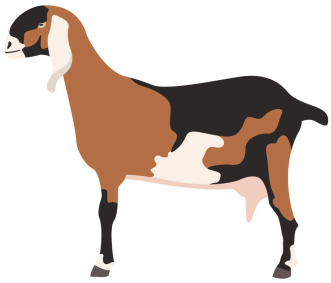
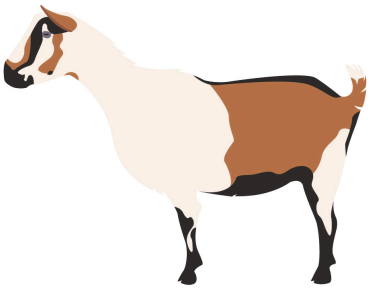
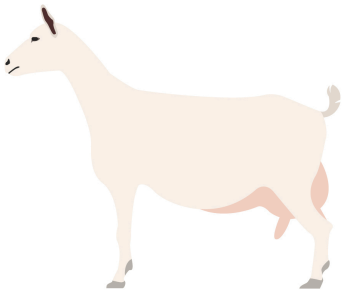
| **Nubian -** Nubian goats are easily recognizable due to their long, floppy ears, and convex "Roman nose" muzzle. Because of their Middle Eastern heritage, this breed can thrive in hotter climates than other dairy goats, and they have a longer breeding season. Although they don't produce as much milk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

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| **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. | <br>*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. | <br>*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. | <br>*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. | <br>*iStock Stock Image* |

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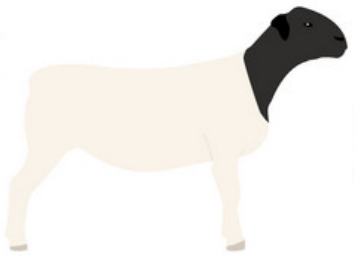
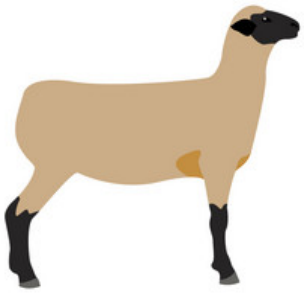
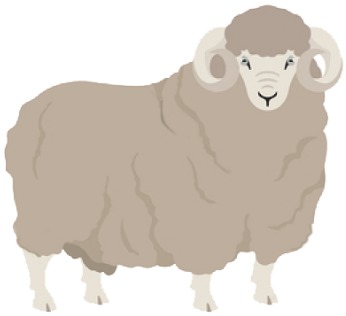
| **Ameraucana -** Ameraucanas are exceptional egg layers, laying about 250 eggs a year, and they start laying at about five or six months old. They are cold tolerant and do well in winter. They also do well on free range because they are curious birds. Ameraucanas lay blue eggs. Other traits include 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. | <br>*iStock Stock Image* |
| **SHEEP (San Angelo)**<br>**OSU Sheep Breeds**<br>**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. | <br>*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. | <br>*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. | <br>*Shutterstock Stock Image* |

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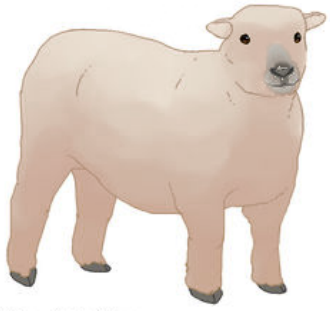
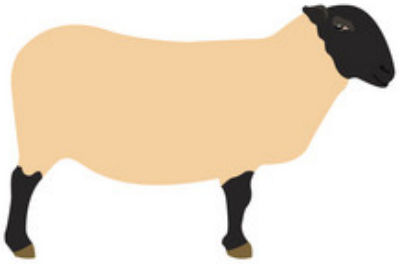
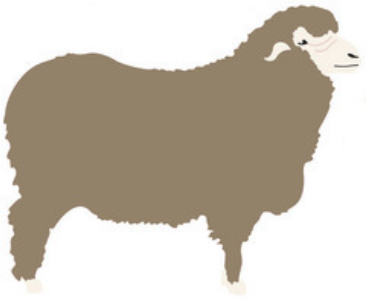
| **Southdown -** One of the oldest breeds of sheep, the Southdown originated in England where it contributed to the development of other breeds. It is medium to small sized with gray to mouse-brown face and wool on the legs. This early maturing breed has good lambing ability and excellent crossing ability 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. | <br>*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. | <br>*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. | <br>*VectorStock Stock Image* |