



2020 Equine Symposium &  
Convention Hosted by USPC

2020 USPC Research Project Fair  
Presented by the Grayson-Jockey Club  
Research Foundation



**Grayson-Jockey Club  
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Abstract Book

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**The 2020 USPC Research Project Fair is Presented by**



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# **Individual Experimental Projects**

## **Individual Experimental Project #1**

### **How Can Exercise Help My Riding**

McKenna A., D-1, Spokane PC (Inland Empire Region)

This summer both of my instructor kept telling me I needed to do squats to improve my riding. So I have decided to do a project to learn about what exercising could do to my riding. I am reading a book that my riding instructor gave me about riding exercises. The book is called Fit & Focused in 52 by Coach Daniel Stewart.

My plan is to do an experiment about what exercises can help me best. I am planning to practice those exercises and keep track of if I can get better at doing them each time. I will also keep talking to my instructor about how exercise can help with riding. I will be presenting what I learn at Badge and at my school.

## **Individual Experimental Project #2**

### **The Magnificent Magnification of Horse Hair**

Fable W., D-1, Pierport PC (Great Lakes Region)

#### Prior Knowledge

Horse hair could be different depending on which breed or part or color of hair you are looking at. Horse hair can sometimes be soft and sometimes not be. Horse hair types are body hair, mane hair, and tail hair.

#### Initial Research

I learned that there are a lot of different layers in horse hair. These layers are called the follicle, the medulla, the cortex, and the cuticle. Different types of follicles give different types of hair cells. The follicle grows in the skin of horses and it allows horse hair to grow. It's like the root of horse hair. The medulla is the inner section of the hair. The cortex is mostly made of keratin. It provides the color and the bulk of the hair shaft. The cuticle is the outside layer of the hair shaft. The cuticle makes sure that hair stays to the follicle and has a good part in the shine we see on the horse's hair. I also learned that the shine of the hair mostly depends on health.

#### Hypothesis

I wonder if the medulla is bigger, does that mean that the width of the hair would be bigger? The size of the hair probably depends on breed but probably not on color. Maybe the body hair is rougher than mane hair.

#### Data Collection Summary

I will use a Scanning Electron Microscope (SEM) to look at horse hair really close up. I will look at hair from different colors and breeds of horses. I will separate the brown and the white of a paint's hair to look at just the colors and see if they are different. I will look at mane and body hair, and I will compare them. I will cut a hair in half and look at the cross section.

## **Individual Experimental Project #3**

### **A Mechanism for Chevron Cross Country Jumps to Decrease the Risk of Rotational Falls**

Liesel F., HB/C2, Atlanta PC (South Region)

To develop a collapsible jump aims to add safety technology to the eventing world by decreasing the risk of a fatal rotational fall. By collapsing upon force, such as a falling horse, the device allows the horse to safely roll off the jump or stand up and recover from the impact. Most fixed jumps without safety technology can cause a rotational fall when the horse misses at the take off, causing the legs to get caught, and flips over the jump causing serious if not fatal injuries to the horse and rider. The jump consists of a main base, a hinged releasable top, a gas-charged lift support shock, and gate latches. This construction allows a falling horse to completely compress the jump and latch it together for a safe and less risky recovery. The jump will not collapse with small impacts such as a horse stumbling or brushing the jump. The weight trials found the jump to be suitable for its purpose, but further testing is needed in order for it to become a credible and usable piece of safety equipment.

The objective of the final prototype is to introduce more safety equipment to eventing and create safety equipment that is easier to reset by the jump judges. Additionally, a larger scale study should include measuring the effects of the repeated use of the device in the field. Overall, the jump is a step in the right direction to make eventing a safer sport.

## **Individual Experimental Project #4**

### **Activity Levels of Horses in Different Environments**

Mylo R., C-1, Fox Hills PC (Oregon Region)

The natural behavior of horses is to be constantly moving while they are grazing. Constant movement and grazing is beneficial to a horse's gastric health because this prevents gas build up in the intestines and reduces the chance of colic. Unfortunately, many horses do not have access to constant grazing pasture because owners keep the horses in small paddocks due to a variety of reasons. For example, keeping horses in gravel paddocks in the winter can prevent the horses from getting muddy and tearing up fields. In addition, some large boarding facilities do not have enough grazing pasture for all of their horses. It is not known whether horses kept in paddocks are as active as horses that are turned out in large grazing pastures.

The purpose of this experiment was to compare activity level of horses kept in gravel paddocks compared to free grazing on grass pasture. The way I compared activity levels was to measure the number of steps horses took in paddocks versus pasture. I secured a step counter onto the bottom of each horse's blanket and measured the number of steps they took while in a paddock or a pasture during the day. I did this experiment on three horses for ten days in each of the environments. The paddocks were 12 x 28 feet and each horse was in a separate paddock. Hay was provided in slow feeders in each paddock. The pasture was roughly acres and contained three horses. No hay was provided but the horses had free access to grass.

I found that the average number of steps taken by horses in paddocks was 152.6 compared to 305.8 in the pasture. Based on these results I can conclude that horses walk almost twice as much in the pasture than in a paddock. This suggests that horses should be out on pasture as much as possible.

## **Individual Experimental Project #5**

### **The Effect of Different Riding Styles on the Nuchal Ligament**

Salena S., C-2, Rainier PC (Northwest Region)

Each time we get on our horses, we ask them to do things with their body. We want our horse to be round, coming through their back and using their hind end. However, the way we ask our horse to do that can be effective or not depending on how we ask them and how they are trained. We must be aware of our horse's anatomy and biomechanics to truly understand what and why we are asking them to do things. In this experiment, I created a model of the basic anatomy of a horse's neck which includes the neck vertebrae, nuchal ligament, and the skull. I then attached spring scales to three different parts of the nuchal ligament and recorded the tension given on each spring scale when the horse's neck was articulated in different ways. The articulations that I recorded were behind the vertical, on the vertical, in front of the vertical, and neutral (or natural). I also created a vertical bar that both the nuchal ligament and vertebrae are attached to that can raise and lower to simulate the thoracic sling's engagement or lack thereof. I took data incorporating all these articulations and recorded the tensions that the spring scales gave me and put them on graphs to compare the tensions.

For the nuchal ligament to be used correctly, there must be some tensions present in it to help support the horse. However, an extremely uneven tension throughout the ligament can impair its ability to function. In this experiment, I am exploring how the horse's body is affected by these different types of riding and using the model as an easier way to show others what happens to a horse when they are asked to do certain things. My model showed that when a horse was ridden with its thoracic sling engaged and in front of the vertical or neutral, the tension on the nuchal ligament was the least and most even. This can be compared to a horse who is ridden with a dropped thoracic sling and behind the vertical. This not only affects the front end of the horse but the entire body. The nuchal ligament is connected directly to the supraspinous ligament which helps engage and lift the entire back of the horse. This then allows the hind end to engage and come under the horse to propel itself forward or up.

My experiment showed me why riding a horse in front of the vertical with a lifted thoracic sling is significantly more beneficial and healthier for the horse's well-being. While we are riding our horses, it must be our goal to develop a horse that is carrying itself with a raised thoracic sling and in front of the vertical to ensure that they can do their job effectively without putting unwanted strain on the horses' joints and ligaments.



Photo of Model:



# **Individual Literature Reviews**

## **Individual Literature Review #1**

### **Choke in Horses**

Kylie H., D-2, Fox Hills PC (Oregon Region)

What is Choke and how to prevent it

- Something lodged in a horse's trachea known as [windpipe]. A horse can breathe but not swallow. If not treated, horses can't eat or drink and often die.

Signs of Choke

- Slow down feed consumption
- Schedule regular dental exams to remove sharp edges or rotten teeth
- Soak grain
- Feed small amounts
- Feed on the ground

Resources:

United States Pony Clubs D Manual

Online Research

Veterinary Encyclopedia

## **Individual Literature Review #2**

### **An Oldie But a Goodie: Caring for a Senior Horse**

Livia D., D-2, Bear Valley Springs PC (Camino Region)

Because I own a senior horse, I have chosen to do my project on how to keep senior horses healthy and active. I thought it would be helpful to learn how to keep them in the best shape possible so they can lead long, productive, and happy lives. In order to research this topic properly, I chose to read scholarly magazine articles written about improving and protecting the health of older horses. I also read several books written specifically about the health of senior horses. In addition to these resources, I was able to interview our veterinarian to get advice directly from an expert.

Senior horses have unique and specific needs. To maintain a healthy body weight, they require good nutritional support. They often require extra calories in the form of good quality hay. Conversely, some senior horses require a very controlled- calorie diet due to excess body fat. Proper dental care is also important and usually includes check-ups by an equine veterinary dentist twice a year. Horses with few teeth left may require special mashes to be fed to help them get good nutrition.

Another very important aspect of senior horse care is keeping them fit with regular exercise. Older horses that spend too much time in their stalls are likely to be affected by colic and arthritis. Horses that can no longer be ridden can still enjoy plenty of movement through pasture turnout or even hand-walking. Senior horses that sit in their stalls for extended periods also suffer from morale issues. Having regular activities and a “job” helps older horses have more purpose and be more content.

As horses age, they may require additional veterinary support. Regular check-ups can help to identify issues before they become advanced problems. Early treatment often prevents rapid deterioration. Common problems faced by older horses include cataracts, Cushing’s Disease, and arthritis.

In conclusion, the best way to take care of an older horse is to be prepared to attend to their unique needs. Providing good nutrition, regular exercise, and proper dental and veterinary care will give your senior horse a much better chance at a long, happy, and healthy life.

## Individual Literature Review #3

### Navicular In Depth

Sabrina S., C-1, Mill Creek PC (Midwest Region)

In my presentation I will identify major things you should know about Navicular disease that can impact our horses and how we care for them. Navicular disease is damage to the navicular bone that may occur due to interference with blood supply or trauma to the bone. Damage can occur to the deep flexor tendon, navicular bursa, or navicular ligaments all resulting in pain and lameness. Navicular can be caused by simple things such as short, upright pasterns, or that the horse is exercised on hard ground or in a small circle. These can be some of the causes of Navicular. This disease affects the front feet of horses causing low-grade bilateral lameness that usually progresses slowly. In some cases, one foot is affected more than the other, causing an obvious lameness. Affected horse may stand with the more painful foot in front placed with the other pointing. These are some of the symptoms of the disease. A diagnosis for this disease is based on a combination of history, symptoms, nerve blocks, and radiography. A history of intermittent low-grade or recurrent lameness is suggestive of navicular disease. These are the major things you should know about Navicular Disease.

After my presentation, you will be more knowledgeable about the causes, symptoms, and diagnosis of this disease. Some ways to help comfort your horse might include rest, drug treatment, shock wave therapy, and hoof care that improves hoof angles, among others.

### Citations

“Special Feature: Podotrochlosis: ‘Navicular Syndrome’ Is No Longer the End of the Road for Horses.” *The Horse*, <https://thehorse.com/features/navicular-syndrome/>

Carson, Deidre M. “Navicular Syndrome in Horses.” *vca\_corporate*, <https://vcahospitals.com/know-your-pet/navicular-syndrom-in-horses>.

## **Individual Literature Review #4**

### **Biomechanics of Jumping**

Mikayla S., HB/C-1 TRAD, Rose City PC (Oregon Region)

This project is a kinesiology report on the skill of cross country jumping. Kinesiology is the study of movement, especially related to areas of fitness, exercise, and what can be done to improve movement efficiency, strength, and endurance. In this project study, I analyzed the specific motion of jumping within eventing. Along with that, I explored a few facets of that motion including what the motion is, what bones and muscles are involved, the application of force, the potential locations of injury, treatment plans, and proposed a workout plan to improve the efficiency of that action. The USPC A manual was the main resource I used for this project, as well as several online sources that are cited in my project.

Through this project I gained a deeper understanding of the biomechanics of jumping, both for the horse and the rider, including major muscles and joints that are involved. I also learned more about potential injuries that could happen while jumping, what structures they involved, and how to prevent them. The area I spent the most time researching was the different exercises to improve jumping style, muscle strength, and total-body endurance. I found this area particularly interesting, and I enjoyed learning how to strengthen different muscles and condition a horse properly. I came away from this project with a lot more practical knowledge that I will put to use in my own riding.

## Individual Literature Review #5

### How to Care for your Horse with Eye Problems

Shawn W., HB/D-3 Eventing, Mill Creek PC (Midwest Region)

As one would expect, a horse's eyes are crucial to how the horse lives and how well they perform at competitions. As such, large eyes are a conformation point that is desired by riders from all disciplines in their horses. Therefore, it is also reasonable to assume that it is in the best interest of the rider to maintain their horse's eyes for injury and ailment. But this begs the question of what is the best way to maintain your horse's eyes, and if there are some ocular issues that your horse can't avoid. Many things can go wrong with a horse, but a career-ending issue is the inability to see, and it is vital for the rider's sake, and the horse's sake to avoid career-ending issues as much as possible.

Vision loss is quite a potent issue for the equine population in the United States because "An estimated 1 to 2% of the American equine population" (Oke, Dealing With.) suffers from blindness in one eye or both. While 1 to 2% may not seem like a lot, that's roughly 140,000 horses in the United States alone. There are many causes for blindness such as aging and genetics, but undoubtedly the largest cause is trauma (Oke, Dealing With.). Trauma seems like it would be very simple to avoid, but that is not the case as trauma is caused by dust, branches, other horses' tails, and a myriad of other things.

There are many ways your horse can obtain an ocular abnormality but once your horse has one, what do you do? Blindness affects the horse in all aspects of their life from their social interactions to their training. Horses with vision issues "typically don't do well in herd situations" they are lower in the pecking order and are commonly "excluded from food and water" (Oke, Dealing With.). It is not only important to consider the social environment you are putting your horse in but also the physical environment you put them in. It is important to consider anything your horse could hurt themselves on; sharp objects, hooks, footing, etc. In training a blind horse, it is important to consider that the horse will rely more on their other 4 senses and as such, it is important for riders to "reassure their horses frequently with touch" (Oke, Dealing With.). It is also important for riders to approach their horse on the same side because "religiously the following training and handling routines will help visually impaired horses learn what is expected of them" (Oke, Dealing With.).

#### Works Cited

Oke, Stacey. "Dealing With Deteriorating Vision in Horses." The Horse, Nov. 2018, <http://thehorse.com/162495/dealing-with-deteriorating-vision-in-horses/>

## **Individual Literature Review #6**

### **Proprioception Place in Equine Performance**

Nicole H., HB/C-1 Eventing, Springfield PC (Midwest Region)

Proprioception refers to the body's ability to know where the limbs are and what they are doing at any time without having to look. It is often thought of as the "sixth sense." In equines, proprioception is the awareness of its position and movement, including where they place their limbs and feet. Equine proprioception permits a horse to sense the pressures, locations, and tensions within their own bodies and ours. At any moment as a horse with sharp proprioception carries a rider, he knows not only where his legs are, but also where the rider's legs are and what they are doing.

Research has shown that proprioception plays an important role in many factors of equine performance, including recovery, training, and injury prevention. By incorporating proprioceptive exercises into your horse's routine, you can target the small cybernetic muscles that are not regularly activated in everyday riding; these muscles are responsible for precise movements.

Exercises that target the proprioceptive system aim to: raise awareness of limb placement; improve balance; increase muscle strength; and establish a fuller range of motion in the joints. In short, by working to improve your horse's proprioceptive awareness, you can not only help your horse perform better and more efficiently, but also reduce the chance of an injury due to fatigue and/or lack of coordination. This makes the horse safer to ride and work around.



# **Group Experimental Projects**

## Group Experimental Project #1

### What Saddle Pad Keeps Your Horse the Least Sweaty

“Mane Attraction”

May M., D-1, Glenoaks Pony Club Riding Center (Middle California Region)

Audrey G., D-1, Glenoaks Pony Club Riding Center (Middle California Region)

The purpose of a saddle pad is to cushion the horse's back, prevent rubbing, and to absorb sweat. Sweat is important to prevent the horse from overheating (Pascoe, 2017). But, some of the consequences of sweat include saddle sore and infection from bacteria (Vogel, 2011). We decided to focus our project on the sweat produced in relation to the different saddle pads in order to find out which saddle pad kept our horses the least sweaty. We predicted that the Baby saddle pad would keep the horse the least sweaty because it had no padding unlike the other saddle pads and would absorb the moisture of the horse's sweat and conceal it onto the pad.

Our methods included weighing the paper towels before placing them on the horse, then weighing it after to see the difference from the sweat being pressed on the horse's saddle pad area. Another method we used was to take pictures of the horse's saddle area, before and after we rode. We recorded the horse, the outside temperature, any special conditions of the horse, the date and time of day, the duration of the ride, the saddle pad used, the weigh of the paper towels, and how many layers of paper towels the horse's sweat went through. The saddle pads used were Dover, Centaur, Barnsby, Baby Saddle Pad, SmartPak, Toklat, and Passport.

From November to December, we collected data for seven days, the average temperature outside was 58.61 degrees Fahrenheit. The average time for riding was 47.69 minutes, with most of the riding done during 3 to 4 in the afternoon. The most used horse was Turbo, and the average layer soaked through the paper towels was one layer. Eight horses of different breeds and sizes were used in our experiment. One extra thing to consider is that one of our horses has Cushing's disease. Occasionally, we did not take the before or after picture. A few of the days we were planning to ride we could not due to the rain and bad weather.

The Dover saddle pad produced the least sweat, measured by no layers soaked through. Some limitations of the study were time and weather. Doing the project over a year would provide more accurate data.

#### Resources

- Pascoe, Elain. “The Scoop on Horse Sweat.” Practical Horseman 4 Oct. 2017. Practicalhorsemanmag.com. Web. 17 Nov 2019
- Vogel, Colin. Complete Horse Care Manual. New York: DK, 2011. Print
- Whitaker, Julie. The Horse. New York: Thomas Dunne Books/St. Martin's Press, 2007. Print.
- Leste-Lasserre, Christa. “Saddle Pad Science.” The Horse 1 Apr. 2013. Web. 17 Nov 2019
- Peacock, Ian. “Saddle Pads...More Impact Than We Think.” Holistic Hors 19 Dec. 2019. Web 17 Nov 2019

## **Group Experimental Project #2**

### **Helmet Usage by Equestrians**

“Cat and Paige”

Caterina R., C-1, Fox Hills PC (Oregon Region)

Paige W., D-3, Fox Hills PC (Oregon Region)

In sports, injuries to the head are the most common injuries that can lead to long term consequences. Multiple concussions can lead to dementia and memory loss. Many sports now require the athletes to wear a helmet to reduce the risk of concussions. Even though Charles Owen started making helmets in 1911, many equestrians still do not wear them. Though many studies have shown helmets reduce the likely hood of a brain injury while riding, many people still do not wear them.

The purpose of our project was to determine the percentage of equestrians who don't wear helmets and why they don't. We created a survey and distributed it via social media. We obtained 315 responses. 75% of the responses were from english riders and 15% were from western riders. Eighty-one percent of the respondents said they always wear a helmet. Five percent never wear a helmet and 8% wear a helmet 75% of the time they ride. The top reasons for not wearing a helmet were: not tradition in the discipline (6.7%), calm horse (5.7%), wear a cowboy hat (5.7%), don't think they will fall (5.35%). For those people who wear a helmet only 75% of the time, it was often in shows where they did not wear a helmet.

It is surprising we found that 80% of people always wear a helmet. We predicted that more people did not wear helmets all the time because at rodeos, trails, fair, movies, beach, and gaming we do not see people with helmets. We expect that we got these results as 80% of the people we surveyed ride English and we see most English riders with helmets. We would more specifically target western riders if we did this survey again. Although most of our respondents tend to wear helmets, we think more people still need to be educated about the importance of wearing a helmet while riding to reduce the risk of head injuries. The main reason for not using a helmet were that it is tradition in the discipline and they think their horse is very calm. Neither of these reasons are more important than protecting your brain.

### **Group Experimental Project #3**

#### **Grooming and the Horse's Heart Rate**

"The Heart Monitors"

Peyton S., D-2, Wayne DuPage Hunt PC (North Central Prairie Region)

Abraham L., D-2, Wayne DuPage Hunt PC (North Central Prairie Region)

Through research we will determine whether or not grooming affects a horse's heart rate. We will be using a variety of horses that will differ in age, breed, environment, and skin thickness. Research will be conducted by taking an initial standing heart rate, introducing brief, light exercise, and taking the horse's heart rate immediately after, some days including grooming and some days recording heart rate alone. Our expectation is that grooming will calm the horse and reduce the heart rate more quickly.

Project still in process – conclusion not yet determined.

## **Group Experimental Project #4**

### **Measuring a Horse's Height and Weight**

"Fox Hills Pony Club"

Emily M., D-2 HM/D-2 Flat and Jumping, Fox Hills PC (Oregon Region)

Olivia T., D-3 HM/D-1 Flat and Jumping, Fox Hills PC (Oregon Region)

Introduction: A horse's height and weight are important measurements for a horse owner to have. A horse's weight is used to know how much feed it needs, to monitor health, monitor weight changes, measuring medication dose, and the ability to see possible health problems. Height is important for proper tack, saddle, blanket, and rider fit as well as entering certain competitions.

Problem: Not all horse owners have a scale large enough to measure a horse's weight, so they must measure a different way. Horse owners could guess the horse's weight or use a weight tape. For measuring height, horse owners could guess, use a height stick or a measuring tape. However, measuring tapes are cheaper and more available than a measuring stick.

Hypothesis: The weight tape will give a horse's weight within 50 lbs. of a scale weight and will be more accurate than guessing. The measuring stick will be more accurate than the tape and the tape will be more accurate than guessing. The scale and measuring stick will be the most accurate because both the scale and measuring stick are more precise.

Procedure: Ten horses' weights were estimated. Next these horses were weighed on a scale and measured with a weight tape. Three measurements were taken with the weight tape and the average weight was used for comparison, as directed by the weight tape instructions. The difference between each horse's average taped weight and scaled weight were compared along with the difference between the estimated weight, scaled weight, and taped weight.

The height for 10 other horses was estimated and then measured with a height stick and tape measure. Three measurements were taken with the measuring tape and averaged. The difference between the average measuring tape height and measuring stick height was compared as well as the difference between the estimated height, stick height, and measuring tape height.

Result: The weight tape was within 50 lbs. of the scale weight for all but 2 horses. In comparing the estimated weight with the scale weight and weight measuring tape, clearly the scale weight was the most accurate, the weight measuring tape was the next

most accurate, and estimating was the least accurate way to measure a horse's weight. For height measurements, the height stick measurement was within 0.1 hands of the measuring tape result, except for one horse. When comparing the actual stick height and the estimated height, the difference was within 0.2 hands, but mostly within 0.1 hands.

Conclusion: Our results show that the weight tape in most cases will give a horse's weight within 50 lbs. of a scale weight and is a more accurate measurement than guessing. A measuring stick was the most accurate measurement for height; however, a measuring tape is a good alternative measurement if a measuring stick is not available, and both are more accurate than estimating height. We recognize that our sample size was small and therefore increased the risk for bias and error in our research.

# **Group Literature Reviews**

## **“C” Group Literature Review #1**

### **The Scapula: Human vs. Horse**

“IMGE”

Brianna P., C-1 FL/C-2 HM/Jumping, Skagit Valley PC (Oregon Region)

Lena B., C+, Eno Triangle PC (Carolina Region)

The scapula bone or the shoulder blade is a major bone in the human and horse's body. It stabilizes the arm and neck and facilitates the shoulder movement and rhythm. In humans, it connects the humerus to the clavicle, and in horses, it connects the front legs to the rib cage. The main difference is that the human's scapula is connected to the body by bone (the clavicle). In horses, the shoulder is only connected to the body by muscles. If horses had a clavicle, then they would break it when jumping. With only muscles and no clavicle, the main movements are flexion which happens during the stance phase and extension during the swing phase, then (minimal) adduction and abduction during lateral movements. The movements for humans are adduction, abduction, flexion, extension, internal rotation, external rotation, and 360-degree circumduction. Although humans and horses both have a ball and socket joint, humans have much more mobility. The main reason being the horse's joint is against the ribcage which limits the movement. Additionally, humans' ball and socket joint is much deeper and they have a clavicle connecting to the sternum.



## **“C” Group Literature Review #2**

### **EGUS**

“It’s an Ulcer Thing”

Michaela F., HB/C-2 Eventing, Mill Creek PC (Midwest Region)

Alaina M., C-1 Eventing, Mill Creek PC (Midwest Region)

Gastric ulcers are a large problem that affects 60-90% of show and racehorses, so large that some horses can die from their complications. As owners of performance horses, we rode on the curiosity boat to discover more about this syndrome to prevent ulcers from ever again rising in our horses and always be prepared. There are many common environments that can put horses at risk for ulcers. We have both previously dealt with ulcers in our horses, one of which seriously colicked and had to be taken to an equine hospital. We will take you aboard our curiosity boat to join us on our voyage of discovery in which we will find causes, prevention, and treatment of Equine Gastric Ulcer Syndrome.

## **“C” Group Literature Review #3**

### **Water Conservation**

“Mikayla and Meia”

Mikayla S., HB/C-1 Eventing, Rose City PC (Oregon Region)

Meia H., HB/C-2 Eventing, Rose City PC (Oregon Region)

The goal of this project was to find and design a solution for the rainwater runoff from the roof of a building to help prevent erosion and flooding as well as to utilize that water in the best way possible. Meia’s family was planning to build a new barn and arena and we wanted to help design a simple way to use the rainwater runoff from the roof. In order to make the best use of this water, we researched ways to use and collect water in order to avoid erosion of the surrounding land and to use the water from the property’s well to water the large arena. This plan allows for conservation of rainfall to be used in place of well water as a water supply for the arena sprinklers. The water harvested can also be used to water the surrounding landscaping, and to help provide an additional source of water for the Clackamas County Fire Department. We researched different types of rainwater harvesting systems (RWH) and decided on a conveyance system with multiple storage containers.

Through this process, we also learned about important components of RWH, such as outlets, inlets, overflow, vents, and inspection ports. We mainly used sources from the internet, which are cited in our project. As well as calculating the total cost, we concluded that with this RWH, the property owner would be able to harvest around 540,000 gallons of rainwater annually. The owner ended up using our plan in the design of her barn, and it is up and running smoothly!

## **“D” Group Literature Review #1**

### **The Horses of World War II**

“Degitz Duo”

Krista D., C-2 HM/C-2 Eventing, Walnut Creek PC (Midsouth Region)

Aidyn D., D-1 Eventing, Walnut Creek PC (Midsouth Region)

Over the ages horses have played a vital role in human civilization from pulling a plow, a form of transportation, pleasure riding, and they have even played a part in the art of war. The horse and human bond have been utilized in various ways over the years but even with the mechanization of the world’s militaries, horses have played a role in warfare throughout history. Horses have been used to transport troops, supplies, and artillery, taken part in offensives charges as part of the Calvary and aided their riders to relay orders and messages between commanders. World War II was one of if not the last war when horses played a major role. The art of war changed from horses being the lynchpin in the military machine to submarines, jeeps, tanks, and planes taking over the land, sea, and air. Thought the use of horses in warfare has diminished they continue to play a role in warfare. This literature review will look into how horses were utilized during World War II.

## **“D” Group Literature Review #2**

### **Parts of the Equine Digestive System**

“Green Spring Hounds Girls”

Scarlett N., D-2, Green Spring Hounds PC (Maryland Region)

Chloe W., D-2, Green Spring Hounds PC (Maryland Region)

For their presentation, Chloe and Scarlett will be reviewing all of the parts of the equine digestive system. They will discuss the different parts, what they are responsible for, and their position within the body.

## **“D” Group Literature Review #3**

### **Treatments for Navicular**

“Jamie and Kadynce”

Jamie L., D-1, Sandia Creek Ranch PC Riding Center (Southern California Region)

Kadynce Z., D-2, Sandia Creek Ranch PC Riding Center (Southern California Region)

We are creating a basic outline of treatments for navicular syndrome, then branching out to each treatment and labeling the pros and cons for each treatment. We will first define what navicular is, then explain what is happening within the hoof and why it is different from the average hoof. We will discuss treatments to alleviate pain and discomfort caused by navicular syndrome, then label the benefits and detriments of each treatment.