Fact sheet #: AS-1024

Evaluating Body Composition of Horses

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Nutrition and feeding management support all aspects of a horse's health and welfare. Regular evaluation of the horses in your care can help you identify potential issues before they develop further, as well as monitor progress toward a healthy physique. This fact sheet details how to measure and evaluate equine body weight, fat storage (i.e., body condition scoring), and muscling.

There are many clues that indicate to an owner/manager they may need to adjust a horse's diet. Knowing what to look for can inform nutritional decisions, determine when to involve a qualified nutritionist and identify if an improvement has been made. The effect of dietary changes on the horse, such as shifts in the body composition, are often slow. Keeping photographic and written records of each evaluation can assist in monitoring such changes. Among the assessments a horse owner/manager can use are body weight, body condition scoring (BCS), cresty neck scoring (CNS), muscle evaluation, and general health observations.

Body Weight

What This Information Means

Knowing your horse's weight allows more accurate calculations of nutritional requirements and drug dosages, such as for dewormer. Knowing if your horse is gaining or losing weight over time will help you make appropriate management adjustments.

Other Factors Besides Diet Influencing Body Weight:

- activity level
- genetics (e.g., breed size)
- parasite load
- metabolic issues
- cardiac issues
- cancer
- other illness

How to Measure

The most accurate way to measure body weight is by using a scale (Figure 1). Horses can be trained to walk onto livestock scales, or you can drive a truck and trailer onto a vehicle scale with and without the horse and subtract the vehicle's weight to determine the horse's weight. However, not all farms have easy access to a scale.

A student weighing a horse during Ohio State ATI's 2021 ANMLTEC 3131T Equine Feeding and Nutrition course. Photo by Sara L. Mastellar.

Figure 1: A horse on a livestock scale. Photo by Sara L. Mastellar, Ohio State University Agricultural Technical Institute.

Weight tapes can be used to estimate body weight. Use according to directions on the tape and be consistent as there may be slight variations between different brands. Always using the same spot on the withers will more accurately track changes over time.

Weight tapes usually give an estimate that is lighter than the actual weight as measured by a scale (unpublished data). However, this varies from horse to horse.

If you do not have access to either a scale or a weight tape, you can use a formula to estimate your horse's weight. Some formulas are more accurate for certain breeds or types of horses due to their differing conformation. One of the most commonly used formulas is below. Measure both body length (BL) and heart girth (HG) in inches to obtain a body weight in pounds (Figure 2).

(HG2 x BL)/330 = BW (lb.)

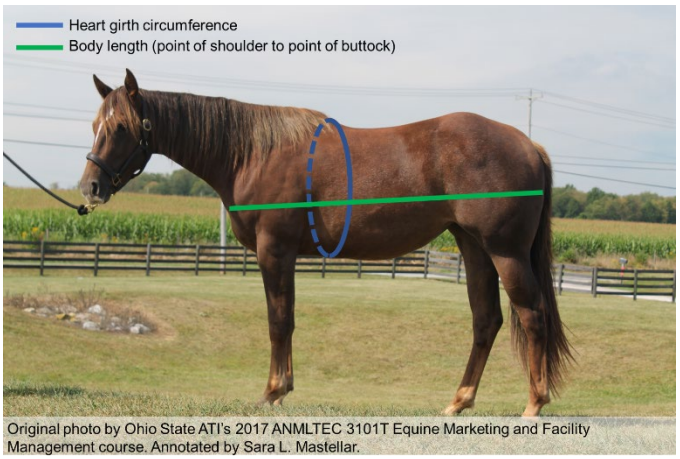

Figure 2: Measurements that can be used to calculate equine body weight. Photo by Sara L. Mastellar, Ohio State University Agricultural Technical Institute.

Body Condition Scoring (BCS)

What This Information Means

Body condition scoring is a measure of fat cover and storage on the body (Henneke et al. 1983). Scoring is based on visual appraisal and touch (particularly in scoring horses with long hair coats). Conformation differences between breeds or types do not affect scoring when all criteria are applied. Muscle tone should not be confused with fatness. Although, if the horse does not have enough calories in its diet to have fat storage/cover, it may not have the calories to support desirable muscling. In the US, typically the 1 to 9 Henneke scoring system is used for horses, while in other countries and in other species 1 to 5 scoring systems are common. In this fact sheet, we will focus on using the Henneke 1 to 9 scoring scale.

Different management strategies and riding disciplines may prefer a slightly different BCS from the "ideal" of 5. For example, Thoroughbreds in heavy race training may have a BCS of 4, ideal for their situation, but potentially not in the case of a retired geriatric horse headed into winter, where a BCS of 6 may be more appropriate.

Most of the domestic horse population is overweight or obese and the problem has worsened over time (Thatcher et al. 2008; Thatcher et al. 2012; Martinson et al. 2013), likely because most owners/managers underestimate the amount of fat their horse carries (Potter et al. 2016).

Over-conditioned horses are more likely to suffer from metabolic issues, heat exhaustion, poor performance, and joint problems, such as arthritis. In one study, when horses carried more body fat, they had more movement asymmetry (Jansson et al. 2021). Under-conditioned horses are more susceptible to disease and heal more slowly from injuries. Additionally, low body condition can mean there is an underlying health issue, such as a high parasite load. Adjusting calorie intake and workload, while meeting other dietary and welfare requirements, will influence BCS. If reducing calorie intake, work with a qualified nutritionist in identifying a diet that maximizes chewing time to reduce boredom and minimize the risk of developing gastric ulcers (Shepherd et al. 2021). Other factors besides diet can influence BCS, including those previously listed for body weight.

How to Measure

There are six areas to evaluate where horses store fat (Figure 3; Table 1). Just like humans, individual horses store more fat in some areas than others. There is no one best area to begin scoring; scoring may start at any of the six points on the horse. However, a consistent "front to back" approach can help scorers make sure that no area is missed. Score each area individually and then average the scores. Scores may be assigned in half-point increments.

Note: Donkeys suffer from many of the same issues as horses, but donkey body condition scoring is done differently because these animals carry fat in different areas (Pearson and Ouassat 2000). Be sure to use a donkey specific condition scoring system when evaluating those animals. Mule owners should be aware of body condition scoring systems for both horses and donkeys.

Original photo by Ohio State ATI's 2019 ANMLTEC 3101.01T Equine Marketing course. Annotated by Sara L. Mastellar.

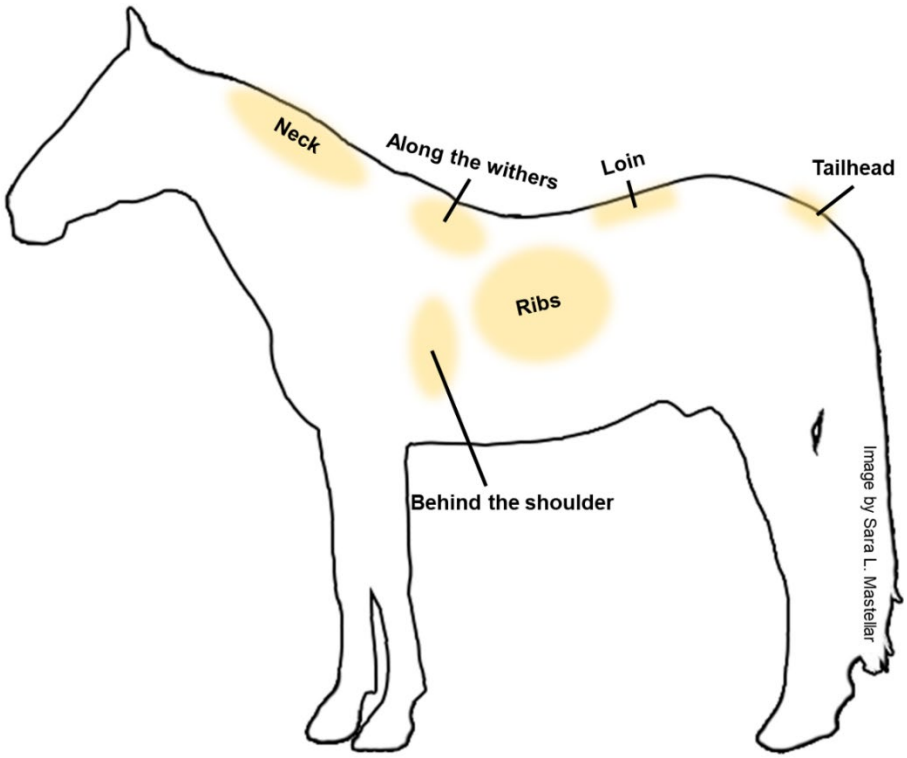

Figure 3: Areas to evaluate body condition score (BCS) on horses. Photo by Ohio State ATI. Annotations by Sara L. Mastellar, Ohio State University Agricultural Technical Institute.

Table 1: Description of the areas to be scored when body condition scoring horses.

Adapted from Henneke et al. (1983) similar to a previous factsheet from Utah State University by Hoopes et al. (2019).

Body area scores	1 Poor	2 Very thin	3 Thin	4 Moderately thin	5 Moderate	6 Moderately fleshy	7 Fleshy	8 Fat	9 Extremely fat
Neck Score:_____	Animal extremely emaciated. Skeletal structure is very apparent. No fatty tissue felt.	Animal emaciated. Slight fat covering over the spine.	Neck accentuated.	Neck not obviously thin.	Neck blends smoothly into the body.	Fat begins to be deposited along the sides.	Fat deposited along the neck.	Noticeable thickening of the neck.	Bulging fat.
Along the withers Score:_____	Bone structure is clearly apparent with spinous processes prominent. No fatty tissue palpable.	Bone structure is still discernible.	Withers accentuated.	Withers not obviously thin.	Withers rounded over spinous processes.	Fat begins to be deposited along the sides.	Fat deposited along the neck.	Area along the withers filled with fat.	Bulging fat.
Behind the shoulder Score:_____	Bone structure is clearly apparent. No fatty tissue palpable.	Bone structure is still discernible.	Shoulder accentuated.	Shoulder not obviously thin.	Shoulder blends smoothly into the body.	Fat begins to be deposited behind the shoulder.	Fat deposited behind the shoulder.	Area behind the shoulder filled in flush with body.	Bulging fat.
Ribs Score:_____	Ribs prominently visible with indentations between them.	Slight fat cover over ribs. Ribs very easily discernible.	Slight fat cover over ribs. Ribs easily discernible.	Faint outline discernable.	Ribs cannot be visually distinguished but can be easily felt.	Fat over ribs feels spongy.	Individual ribs can be felt, but noticeable filling between ribs with fat.	Difficult to feel ribs.	Patchy fat appearing over ribs.
Loin Score:_____	Spinous processes project prominently. No fatty tissue palpable.	Slight fat covering over the base of spinous processes. Transverse processes of lumbar vertebrae feel rounded.	Fat buildup halfway on spinous processes but easily discernible. Transverse processes cannot be felt.	Negative crease (A-frame) along back.	Back level.	May have a slight positive crease (gutter) down back.	May have positive crease (gutter) down back.	Positive crease (gutter) down back.	Obvious positive crease (gutter) down back. Flank filled with fat.
Tailhead Score:_____	Tuber coxae (hooks) and ischii (pins) of the pelvis project prominently.	Tailhead prominent. Tuber coxae (hooks) and ischii (pins) are prominent.	Tailhead prominent. Tuber coxae (hooks) appear rounded but are still easily discernible. Tuber ischii (pins) not distinguishable.	Prominence depends on conformation; fat can be felt. Tuber coxae (hooks) not discernable.	Fat around tailhead beginning to feel spongy.	Fat around tailhead feels soft.	Fat around tailhead is soft.	Tailhead fat is very soft. Fat deposited along inner thighs.	Bulging fat around tailhead. Fat along inner thighs may rub together.

_____ Overall average of body area scores = total of all scores divided by 6

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Cresty Neck Scoring (CNS)

What This Information Means

Cresty neck scoring (0–5 scale) is another measure of adiposity (fat) but focuses on where fat is stored in the body (Carter et al. 2009). It is similar to the neck sub-score for BCS. Horses, and especially ponies, with cresty necks (scores of 3 or greater) are at risk for metabolic issues (Fitzgerald et al. 2019), including laminitis. A BCS of 5 is likely associated with a CNS of 2.

Other Factors Besides Diet Influencing CNS

- any factor that can affect BCS
- genetics [Some breeds, such as Morgans or ponies, are predisposed to having cresty necks and associated metabolic issues (Norton et al. 2019)]

How to Measure

Evaluate the neck visually and by palpation (touch). Underlying muscling can give the appearance of a neck crest, especially in stallions or horses that participate in certain disciplines. Be sure to focus on the fat deposit portion of the neck. The fat deposit is largely above the nuchal ligament, which runs from the poll (top of the head) to the withers. Determine which score description and picture most closely match the horse that you are evaluating (Figure 4).

Muscling Evaluation

What This Information Means

Muscling is different from “condition” or fat storage. However, horses that are energy deficient will break down their own muscle tissue to use as energy to maintain other body systems.

Muscle evaluation systems for horses are newer than BCS. However, you should be monitoring muscling responses to activity/training and diet. Feeding management, such as where feed is placed (floor vs raised feeder), and voluntary activity will affect the horse’s posture (Raspa et al. 2021), both of which can potentially affect long term muscle development. In addition, the type and quality of a horse’s workload will affect muscle development (Walker et al. 2016). Ill-fitting tack and equipment can interfere with desired muscle development, too (Dyson et al. 2015). However, without the proper nutritional building blocks, a horse cannot build muscle. Principally, protein or amino acid deficiency can negatively affect the horse’s ability to build muscle (Graham-Thiers and Kronfeld 2005). Also, vitamin E deficiency can result in muscle atrophy associated with equine motor neuron disease (Divers et al. 2006). In addition to amino acids and vitamin E, dietary carbohydrates, fat, macrominerals, and selenium support muscle function (Urschel and McKenzie 2021).

Figure 4: Photographic representation of cresty neck scoring system described by Carter et al. (2009). Photos 0–4 are from The Ohio State University ATI Equine media library and Sara L. Mastellar, Ohio State University Agricultural Technical Institute. Photo 5 is from Chris Skelly/My Horse University.

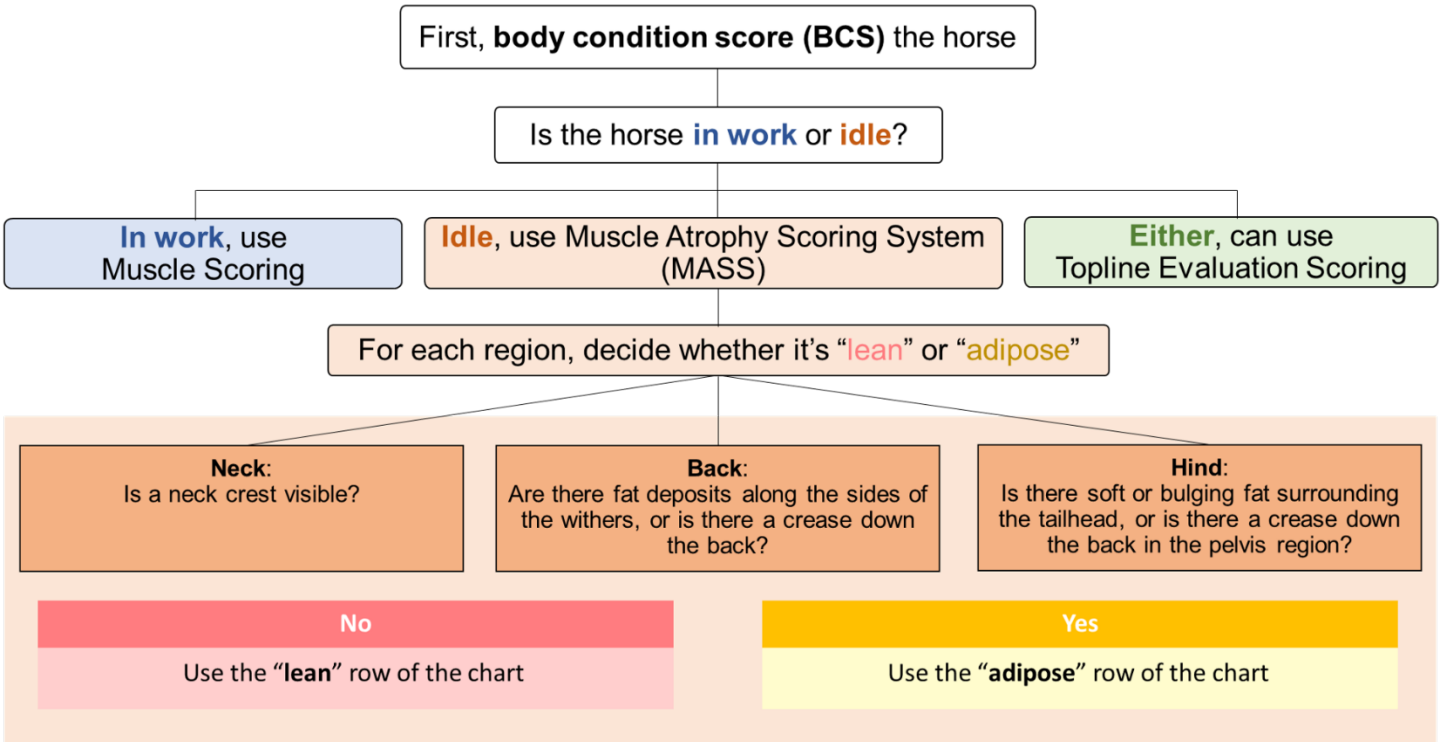


Figure 5: Determining which muscle evaluation system to use. Graphic by Ohio State ATI.

Macro- and micronutrients are discussed further in fact sheets titled "The Role of Macronutrients in Equine Nutrition" and "The Role of Micronutrients in Equine Nutrition."

Other Factors Besides Diet Influencing Muscling:

- activity level and type
- genetics
- age
- hormones (e.g., stallions v. geldings)
- feeding management
- saddle/equipment fit
- pain (e.g., lameness or back pain)
- neurologic issues
- Pituitary Pars Intermedia Dysfunction (PPID, previously known as Cushings)
- conformation

How to Measure

Muscle evaluation should be conducted only after BCS is determined so scorers have an appreciation of how much fat the horse is storing and where. There are three approaches to muscle scoring/evaluation (Figure 5). The first system (Table 2), developed for dressage horses in work, focuses on muscle development (i.e., strengthening via training) and was created by Walker et al. (2016). The second system, Muscle Atrophy Scoring System (MASS; Table 3), was developed for idle horses to detect atrophy or muscle loss (Herbst et al. 2021). The third and most simplistic approach focuses only on the topline of the horse.

How a horse stands can influence muscle appearance. Take note of how your horse is standing and try to have it in a similar position each time to give yourself the best chance of noticing differences over time. Ideally, the horse should stand on a flat surface comfortably square with head and neck aligned with the back instead of bent to the side. The jawline and underside of the neck should create a 90-degree angle with the nose level to the point of shoulder. Be sure to evaluate both sides because asymmetry could indicate an underlying issue.

Horses in work should be developing muscle, which would be reflected as increases in their "in work" muscle scores (1 = least muscled to 5 = most muscled). For idle horses, increases in atrophy score when using the Muscle Atrophy Scoring System (MASS; 1 = no atrophy to 4 = severe atrophy) indicate an underlying problem. If only conducting topline evaluation scoring, a score of "A" is considered ideal and a score of "D" is poor.

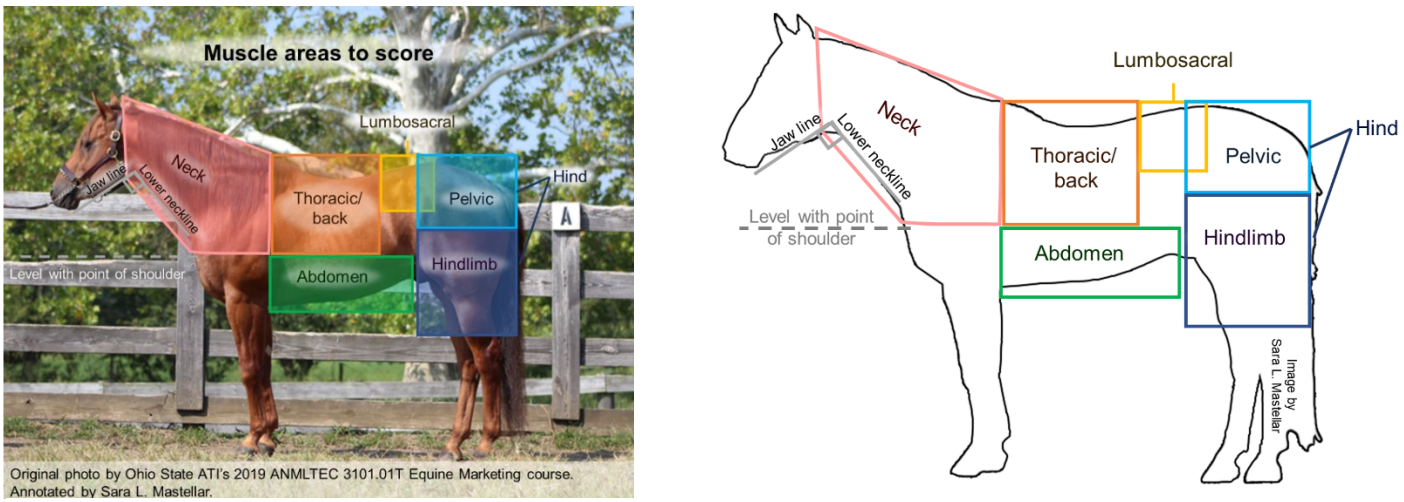


Figure 6: Body areas to score when conducting muscle scoring or using the Muscle Atrophy Scoring System (MASS). Adapted from Walker et al. (2016) and Herbst et al. (2021). Photo by Ohio State ATI. Annotations on photo by Sara L. Mastellar, Ohio State University Agricultural Technical Institute.

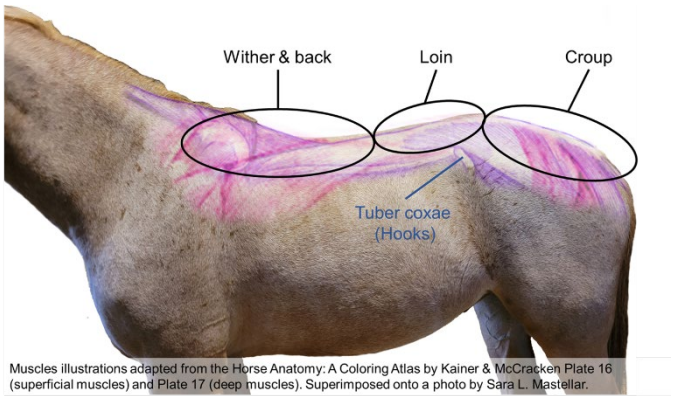
If using either muscle scoring or MASS, evaluate the different muscle groups shown in Figure 6 using the appropriate charts. When using MASS, the pelvic and hindlimb areas are scored together as the "hind."

The following definitions may be helpful in interpreting the descriptions in the muscle and atrophy evaluation charts.

- **caudal** - Toward the tail.
- **cervical** - Neck.
- **cranial** - Toward the head.
- **dorsal** - Topside or side that includes the back.
- **greater trochanter of the femur** - Protrusion on the long bone in the thigh of the horse (Figure 3).
- **palpation** - Evaluated by feel/touch.
- **spinous processes** - Protrusions and wing-like projections of the vertebrae.
- **transverse** - Extending horizontally, as opposed to vertical, such as the wings of some vertebrae.
- **tuber coxae** - Protrusion of the pelvis on the side of the horse (Figure 3). Sometimes referred to as the "point of hip" and known as "hook bones" in cattle.
- **tuber ischii** - Protrusion of the pelvis at the back of the horse (Figure 3). Sometimes referred to as the "point of buttock" and known as "pin bones" in cattle.
- **tuber sacrale** - Protrusion of the pelvis at the end of the loin and beginning of the croup of the horse (Figure 3).
- **ventral** - Underside or belly side.

Topline scoring is a method that has been used by feed companies to help customers gauge muscling of their horses. The topline evaluation system (Figures 7 and 8) was developed by Progressive Nutrition with scores ranging from A "ideal" to D "atrophied" (Smith 2016; Walker and Daniels 2019).

Look at and feel muscling along the wither, back, loin, and croup. Determine which score description and picture most closely match the horse you are evaluating (Figure 8).



Muscles underlying the various areas to score include: *Superficial, Deep

Wither & back	Loin	Croup
Thoracic trapezius	Longest dorsal	Superficial gluteal
Latissimus dorsi	Middle gluteal	Semitendinous
Thoracic spinal		Middle gluteal
Rhomboid		
Longest dorsal		

Figure 7: Areas to evaluate as part of topline scoring using the topline evaluation system. Photo by Sara L. Mastellar, Ohio State University Agricultural Technical Institute. Muscle overlay adapted from Plate 16 and 17 of "Horse Anatomy: A Coloring Atlas," by Kainer and McCracken.

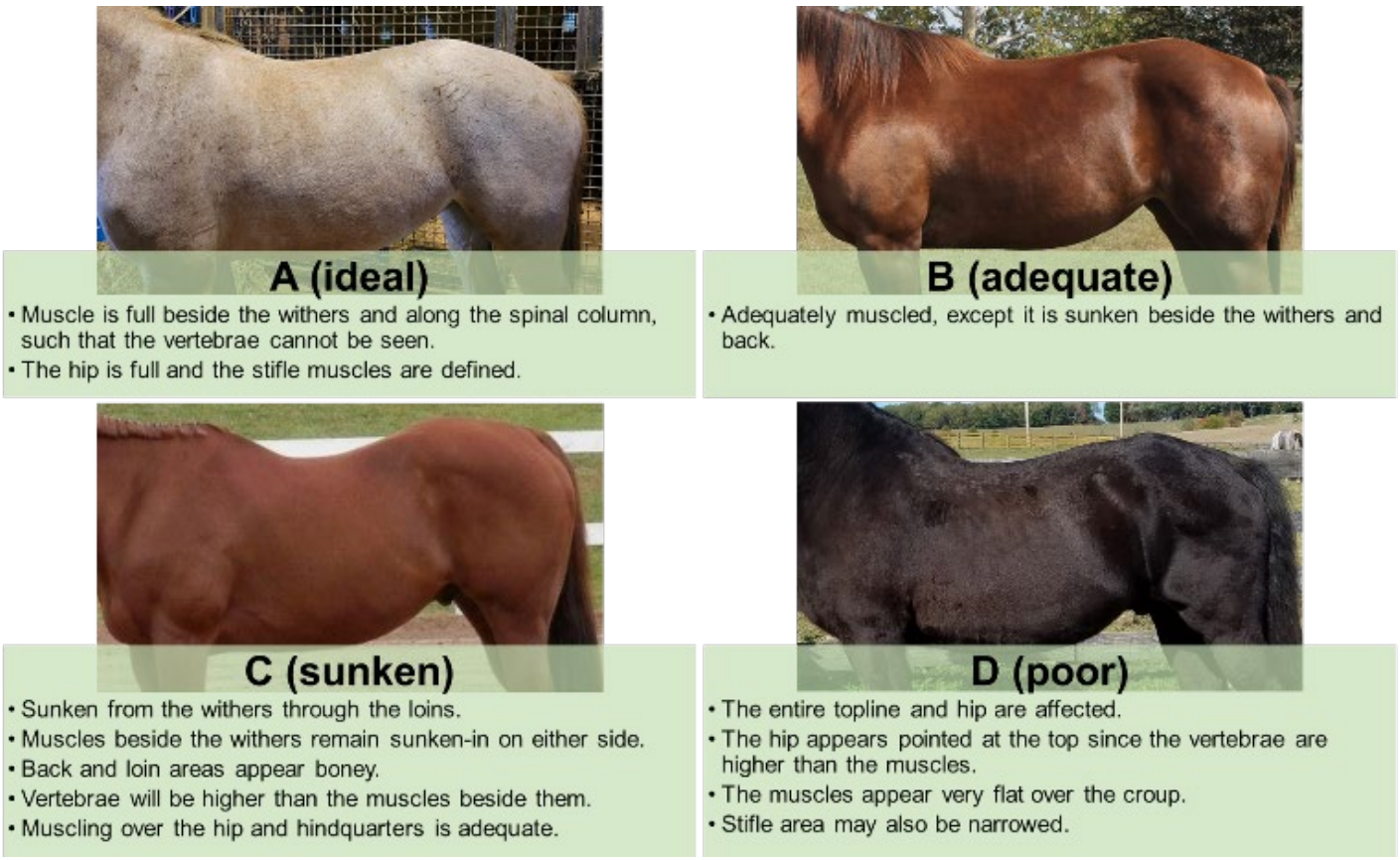


Figure 8: Photographic representation of topline score descriptions adapted from Smith (2016). Photos A, B, and D from the Ohio State ATI Equine media library and Sara L. Mastellar, Ohio State University Agricultural Technical Institute. Photo C from Haley M. Zynda, Ohio State University Extension.

Table 2: Muscle scoring for horses <u>in work</u>. Most of the statements within a box should be true (checked/ticked) to receive that score. Half scores are allowed.

Adapted from Walker et al. (2016).

Score	1 (least muscled)	2	3	4	5 (most muscled)
Neck Score:_____	☐ Side area concave ☐ Top of neck narrow and easily moveable ☐ Cervical vertebrae 1–5 visible and easily palpable ☐ Shelf where shoulder meets neck ☐ Scapula relatively prominent ☐ Muscles have weak tone on palpation ☐ Muscle tension on palpation	☐ Side area flat or concave ☐ Top of the neck flat but not convex and easily moveable ☐ Cervical vertebrae 1–5 easily palpable but not visible ☐ Shelf where shoulder meets neck ☐ Scapula visible but not prominent ☐ Muscles have weak tone on palpation ☐ Muscle tension on palpation	☐ Top of neck convex through part of length only, with concave areas ☐ Top of neck easily moveable ☐ Side of neck flat ☐ Ventral aspect of the neck concave or flat ☐ Indentation cranial to withers ☐ Cervical vertebrae 1–5 palpable under moderate pressure ☐ Muscles have slight tone on palpation	☐ Top and side of neck convex through parts of length but not entire length ☐ Indentation cranial to withers ☐ Ventral aspect of neck concave or flat ☐ No vertebrae visible ☐ Cervical vertebrae 1–3 vertebrae palpable under strong pressure ☐ Muscles have moderate tone on palpation	☐ Top and side of neck convex through entire length ☐ Ventral aspect of neck concave or flat ☐ No indentation cranial to withers ☐ No vertebrae visible ☐ Cervical vertebrae 1–3 vertebrae palpable under strong pressure ☐ Muscles have good tone on palpation
Thoracic Score:_____	☐ Spinous processes (including left and right sides) visible and easily palpable ☐ Articulation with ribs visible and easily palpable ☐ Muscles markedly concave from side and caudal view, the shape appearing more like a shelf than a smooth curve ☐ Muscles have weak tone on palpation ☐ Muscle tension on palpation ☐ Dipped back posture	☐ Spinous processes (including left and right sides) visible and easily palpable ☐ Articulation with ribs not easily visible although palpable ☐ Muscles concave from caudal and side view ☐ Muscles have weak tone on palpation ☐ Muscle tension on palpation ☐ Mild dipped back posture	☐ Spinous processes visible ☐ Dorsal tips and left and right sides of spinous processes palpable in dorsal 1–2 cm ☐ Articulation with ribs not visible or easily palpable ☐ Muscles slightly concave or nearly flat from caudal view ☐ Muscles slightly concave or nearly flat from side view ☐ Muscles have slight tone on palpation	☐ Spinous processes visible at the tip only (except withers) ☐ Spinous processes only palpable left and right side in dorsal <1 cm ☐ Articulation with ribs not visible or palpable ☐ Muscles flat from caudal view ☐ Muscles flat from side view ☐ Muscles have moderate tone on palpation	☐ Only dorsal tip of spinous processes palpable except at withers ☐ Articulation with ribs not visible or palpable ☐ Muscles level with spinous processes from side view ☐ Muscles convex from caudal view ☐ Muscles have good tone on palpation
Lumbosacral Score:_____	☐ Spinous processes (including left and right sides) visible and easily palpable ☐ Transverse processes visible and easily palpable ☐ Muscles concave from side and caudal view ☐ Muscles have weak tone palpation ☐ Muscle tension on palpation ☐ Tuber coxae prominent and visible ☐ Tuber coxae easily palpable	☐ Spinous processes (including left and right sides) visible and easily palpable ☐ Transverse processes not easily visible although palpable ☐ Muscles concave from side and caudal view ☐ Muscles have weak tone palpation ☐ Muscle tension on palpation ☐ Tuber coxae prominent and visible ☐ Tuber coxae easily palpable	☐ Spinous processes visible ☐ Dorsal tips and left and right sides of the spinous processes palpable in dorsal 1– 2 cm ☐ Muscles slightly concave or flat from caudal view ☐ Muscles have slight tone on palpation ☐ Muscle tension on palpation ☐ Tuber coxae easily palpable but not prominent	☐ Spinous processes visible at the tip only, and only palpable left and right side in dorsal <1 cm ☐ Transverse processes not palpable ☐ Muscles ?at from side view ☐ Tuber coxae palpable but seen only as a smooth convex region ☐ Muscles have moderate tone on palpation	☐ Only dorsal tip of spinous processes palpable ☐ Transverse processes not palpable ☐ Muscles convex from side view ☐ Muscles convex from caudal view ☐ Muscles have good tone on palpation ☐ Tuber coxae hidden under muscles and only seen as smooth convex region

Continued on next page.

Table 2: Muscle scoring for horses <u>in work</u>. Most of the statements within a box should be true (checked/ticked) to receive that score. Half scores are allowed.

Continued from previous page.

Adapted from Walker et al. (2016).

Score	1 (least muscled)	2	3	4	5 (most muscled)
Pelvic Score:_____	☐ Muscles deeply concave with a shelf-like appearance from caudal and side view ☐ Tuber sacrale prominent—easily visible and lateral aspect visible and palpable ☐ Tuber coxae prominent, visible, and easily palpable ☐ Sacrum and/or caudal vertebrae definable or prominent ☐ Muscles have weak tone on palpation ☐ Muscle tension on palpation	☐ Muscles concave in a smooth curve from caudal and side view ☐ Tuber sacrale prominent— easily visible and lateral aspect palpable but not visible ☐ Tuber coxae prominent, visible, and easily palpable ☐ Sacrum and/or caudal vertebrae not definable ☐ Muscles have weak tone on palpation ☐ Muscle tension on palpation	☐ Muscles flat from caudal view ☐ Muscles flat from side view ☐ Tuber sacrale prominent—easily visible and dorsal part of lateral aspect palpable ☐ Tuber coxae visible and palpable but not prominent ☐ Sacrum and/or caudal vertebrae not definable ☐ Muscles slightly toned on palpation	☐ Muscles convex from caudal view and/or side view ☐ Tips of tuber sacrale palpable only ☐ Tuber coxae palpable but seen only as a smooth convex region ☐ Sacrum and/or caudal vertebrae not definable ☐ Muscles have moderate tone on palpation	☐ Muscles convex from caudal view ☐ Muscles convex from side view ☐ Tuber sacrale largely hidden under muscles and only seen as smooth convex region ☐ Sacrum and/or caudal vertebrae not definable ☐ Muscles have good tone on palpation
Hindlimb Score:_____	☐ Muscles concave from side view (near the buttocks) ☐ Muscles concave from caudal view (in the thigh area) ☐ Tuber ischii visible and easily palpable ☐ Greater trochanter of femur prominent ☐ Muscles have weak tone on palpation ☐ Muscle tension on palpation	☐ Muscles concave from side view and/or muscles concave from caudal view. If only one is concave the other is flat. ☐ Tuber ischii visible and easily palpable ☐ Greater trochanter of femur visible but not prominent ☐ Muscles have weak tone on palpation ☐ Muscle tension on palpation	☐ Tuber ischii cannot be visualized easily ☐ Tuber ischii easily palpable ☐ Muscles flat from caudal and side view although isolated muscles may be concave ☐ Greater trochanter of femur palpable with moderate pressure ☐ Greater trochanter of femur not easily visible ☐ Muscles have slight tone on palpation	☐ Muscles convex from side view or muscles convex from caudal view but not both, with other being flat ☐ Muscles moderately toned on palpation ☐ Tuber ischii not obviously visible ☐ Tuber ischii palpable with moderate pressure ☐ Greater trochanter of femur palpable with strong pressure	☐ Muscles convex from side view and muscles convex from caudal view ☐ Muscles have good tone on palpation ☐ Tuber ischii not visible ☐ Tuber ischii require strong pressure to palpate ☐ Greater trochanter of the femur requires strong pressure to palpate
Abdominal Score:_____	☐ Sagging appearance to abdomen ☐ Abdomen appears to hang below level of the sternum ☐ Dipped back ☐ Muscles have weak tone on palpation ☐ Abdomen easily moves on pressure	☐ Abdomen lacks shape but does not have a marked sagging appearance ☐ Abdomen hangs slightly lower than sternum ☐ Moderate extension of the back ☐ Muscles have slight tone on palpation ☐ Abdomen easily moves under pressure	☐ Abdomen is more cylindrical than sagging in shape ☐ Abdomen appears to be at a similar level to the sternum ☐ Slight extension of the back ☐ Muscles have moderate tone on palpation ☐ Slight resistance to movement on pressure	☐ Abdomen is cylindrical in shape with minimal dropping of the ventral aspect ☐ Abdomen held approximately at level of sternum ☐ Muscles have moderate to good tome on palpation ☐ Flat back ☐ Moderate resistance to movement on pressure	☐ Abdomen is cylindrical in shape ☐ Abdomen tends to be held above sternal level ☐ Muscles have good tone on palpation ☐ Flat back or slight flexion ☐ Marked resistance to movement or pressure

Table 3: Muscle Atrophy Scoring System (MASS) for idle horses.

Adapted from Herbst et al. (2021).

Score		1 no atrophy	2 mild atrophy	3 moderate atrophy	4 severe atrophy
Neck	Lean	☐ Neck muscles are mainly convex and firm, without or with some softer areas. ☐ One smooth line where neck meets shoulder (no visible 'shelf').	☐ Neck muscles are mainly flat and firm, without or with some softer areas. ☐ Slight 'shelf' where neck meets shoulder.	☐ Neck muscles are mainly flat or slightly concave and rigid (not firm and elastic) or soft. ☐ Moderate, but not prominent, 'shelf' where neck meets shoulder; angle between hand resting on front of shoulder blade and neck is considerably > 90°.	☐ Neck muscles are mainly concave and rigid (not firm and elastic) or very soft. ☐ Prominent 'shelf' where neck meets shoulder; angle between hand resting on front of shoulder blade and neck is near 90° or is 90°.
	Adipose	☐ Neck muscles are mainly convex and firm, without or with some softer areas. ☐ One smooth line where neck meets shoulder (no visible or palpable 'shelf').	☐ Neck muscles are mainly flat and firm, without or with some softer areas. ☐ Slight 'shelf' where neck meets shoulder.	☐ Neck muscles are mainly flat or slightly concave and rigid (not firm and elastic) or soft (but not spongy). ☐ Moderate, but not prominent, 'shelf' where neck meets shoulder; angle between hand resting on front of shoulder blade and neck is considerably > 90°.	☐ Neck muscles are mainly concave and rigid (not firm and elastic) or very soft (but not spongy). ☐ Prominent 'shelf' where neck meets shoulder; angle between hand resting on front of shoulder blade and neck is near 90° or is 90°.
Abdomen		☐ Muscles in abdominal region are firm. ☐ Muscles on either side of the abdominal midline near the front legs are firm and not easily movable.	☐ Muscles in abdominal region are mainly firm with some softer areas. ☐ Muscles on either side of the abdominal midline near the front legs are mainly firm, with some softer parts, and are not easily movable.	☐ Muscles in abdominal region are mainly soft but not flaccid. ☐ Muscles on either side of the abdominal midline near the front legs are soft, but not flaccid, and easily movable.	☐ Muscles in abdominal region are very soft and flaccid or barely palpable. ☐ Muscles on either side of the abdominal midline near the front legs are very soft, flaccid and easily movable; or barely palpable, rigid (not firm and elastic) and barely movable.
Back	Lean	☐ Back muscles are convex or flat and firm throughout the entire back. ☐ Top, but not sides, of spinous processes visible, if at all; sides of spinous processes only palpable near the top, if at all.	☐ Back muscles are slightly concave and mainly firm with some softer areas. ☐ Top and sides of spinous processes visible; sides of spinous processes palpable near the top throughout the back; sides of spinous processes palpable in regions more distant from the top in some parts of the back.	☐ Back muscles are moderately concave and rigid (not firm and elastic) or soft. ☐ Top and sides of spinous processes visible; sides of spinous processes palpable in regions more distant from the top in most parts of the back.	☐ Back muscles are deeply concave and rigid (not firm and elastic) or soft. ☐ Top and sides of spinous processes visible; sides of spinous processes palpable in regions more distant from the top throughout the back.
	Adipose	☐ Back muscles are convex and firm throughout the entire back. ☐ Top, but not sides, of spinous processes visible, if at all; sides of spinous processes not palpable.	☐ Back muscles are flat or slightly convex and mainly firm with some softer areas. ☐ Top, but not sides, of spinous processes visible; sides of spinous processes only palpable near the top.	☐ Back muscles are slightly concave and rigid (not firm and elastic) or soft. ☐ Top and sides of spinous processes visible; sides of spinous processes palpable near the top throughout the back; sides of spinous processes palpable in regions more distant from the top in some parts of the back.	☐ Back muscles are concave and rigid (not firm and elastic) or soft. ☐ Top and sides of spinous processes visible; sides of spinous processes palpable in regions more distant from the top in most parts of the back, or throughout the back.
Hind	Lean	☐ Muscles convex at top and convex or flat at side (back view); muscles convex or flat in region below point of hip (side view). ☐ Bone at point of croup only slightly visible, if at all (side view), but may be palpable; bone at point of buttock not visible (side view) or palpable.	☐ Muscles flat at top and side (back view); muscles slightly concave in region below point of hip (side view). ☐ Bone at point of croup visible, but not protruding (side view) and easily palpable; bone at point of buttock not visible (side view), but palpable, although not easily.	☐ Muscles slightly concave at top and side (back view); muscles moderately concave in region below point of hip (side view). ☐ Bone at point of croup protruding (side view) and easily palpable; bone at point of buttock visible, but not prominent (side view), and easily palpable.	☐ Muscles concave at top and side (back view); muscles deeply concave in region below point of hip (side view). ☐ Bone at point of croup protruding (side view) and easily palpable; bone at point of buttock prominent (side view) and easily palpable.
	Adipose	☐ Muscles convex or flat at side (back view); muscles convex or flat in region below point of hip (side view). ☐ Bone at point of croup not visible (side view), but may be palpable, although not easily; bone at point of buttock not visible (side view) or palpable.	☐ Muscles flat at side (back view); muscles slightly concave in region below point of hip (side view). ☐ Bone at point of croup not visible, or slightly visible, but not protruding (side view), and easily palpable; bone at point of buttock not visible (side view) or palpable.	☐ Muscles slightly concave at side (back view); muscles moderately concave in region below point of hip (side view). ☐ Bone at point of croup slightly visible, but not protruding (side view), and easily palpable; bone at point of buttock not visible (side view), but palpable, although not easily.	☐ Muscles concave at side (back view); muscles deeply concave in region below point of hip (side view). ☐ Bone at point of croup protruding (side view) and easily palpable; bone at point of buttock visible (side view) and easily palpable.

Score using the appropriate row: Neck: _____ Abdomen: _____ Back: _____ Hind: _____

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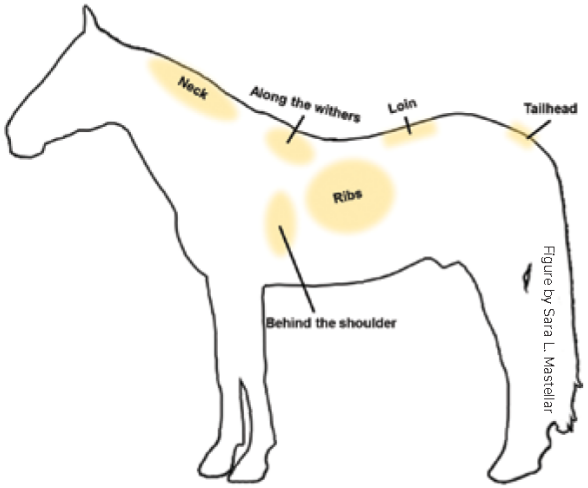
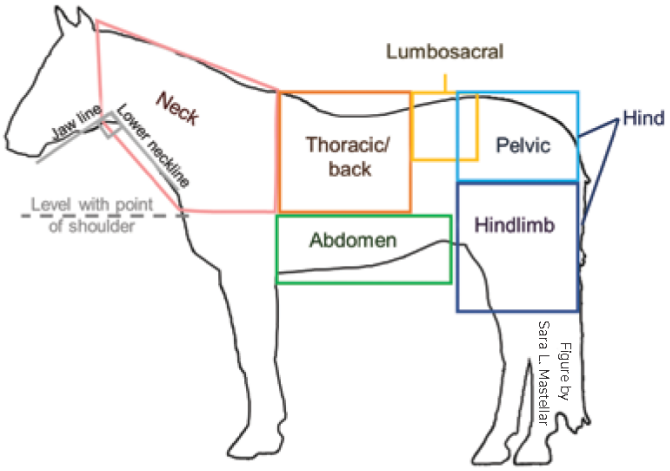
Figure 9: Example Body Composition Record

Horse name: _____ Date of evaluation: _____

Body length (BL): _____ Heart girth circumference (HG): _____ Body weight: _____





Other Observations:

Body Condition Score (BCS) and Fat Evaluations:

Body Area	Score (1-9)
Neck	
Withers	
Loin	
Tailhead	
Ribs	
Shoulder	
Average (overall score)	

Muscling and Atrophy Evaluations:

Body Area	Score (1-5)	or	Atrophy (1-4)
Neck			
Thoracic			
Lumbosacral			
Pelvic			
Hindlimb			
Abdominal			

Cresty Neck Score (CNS): _____ (0-5)

Topline Evaluation Score: _____ (A-D)

For more information and evaluation instructions:

ohioline.osu.edu/factsheet/as-1024

THE OHIO STATE UNIVERSITY EXTENSION

General Health Observations

There are many other indicators that a horse's diet is not ideal. These include:

- Low energy level, poor attitude, and sub-optimal performance can be a result of poor diet or feeding management.
- Frequent colic could mean there is inadequate fiber to support healthy gut motility, foreign material in the diet (e.g., sand), or inadequate water intake. There are many other causes of colic too.
- Poor fecal quality may suggest gut disturbances (e.g., microbiome dysbiosis).
- Hoof quality is supported by the diet, but is also affected by the time of year, disease, age, stress, moisture/dryness of the environment, and hoof care.
- The hair coat, mane, and tail quality are all supported by the diet, but can also be affected by grooming, time of year, and disease.
- Tearing of the eyes can indicate a vitamin deficiency, among many other things.
- Subfertility can be a symptom of vitamin and mineral toxicities, deficiencies, or imbalances. Energy status and body condition score also play a role in fertility.

If you notice that your horse has any of these issues, consider contacting a qualified nutritionist or veterinarian to perform a more thorough assessment on your horse, its diet, and your feeding management (Hesta and Shepherd 2021). Veterinarians should be included in the conversation if there is evidence of an underlying issue (e.g., metabolic issue, disease, or parasite problem) in addition to nutrition. These professionals should have a working knowledge of the equine digestive system and its limitations to help design diets that not only meet nutrient requirements, but also promote welfare (Harris and Shepherd 2021). The example body composition record (Figure 9) can be used to document all the areas discussed and serve as a record to monitor change over time. Consider also keeping photos of your horse with your records.

Take-Home Message

Nutrition and feeding management support all aspects of a horse's health and welfare. Regular evaluation of the horses in your care can help you identify potential issues before they develop further as well as monitor progress toward a healthy physique.

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Topics: Ag Crops and Livestock

Tags: horse, equine nutrition, weight, body condition score, bcs, cresty neck score, cns, fat storage, muscling, muscle evaluation, muscle atrophy scoring system, mass

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