

INTRODUCTION

This manual has been developed as a study guide for the Florida State Fair Skillathon which is part of the Champion Youth Program. The topic for this year's Skillathon is **Nutrition and Feed Management**.

The Florida State Fair recognizes that agricultural education instructors, 4H agents, parents, and leaders provide the traditional and logical instructional link between youth, their livestock projects and current trends in the animal agriculture industry. **PLEASE NOTE:** This manual is provided as a **study guide** for the skillathon competition and should be used as an additional aid to ongoing educational programs.

Sections are labeled **junior, Intermediate, or Senior** to help exhibitors and educators identify which materials are required for each age level.

SKILL LEVELS

Exhibitors will be required to demonstrate a variety of skills based on their age category. Please note what skills you will be demonstrating.

YOUTH DOG SHOW

Juniors (age 8 – 10 as of Sept. 1, 2018)

- Anatomy of the Digestive
- Organs of the Digestive System
- Functions of the Digestive Organs
- Canine Toxicity

Intermediates (age 11 – 13 as of Sept. 1, 2018)

- All Of The Above Plus ...
- Nutrients
- Digestive Process
- Choosing a Nutritional Diet for Your Dog

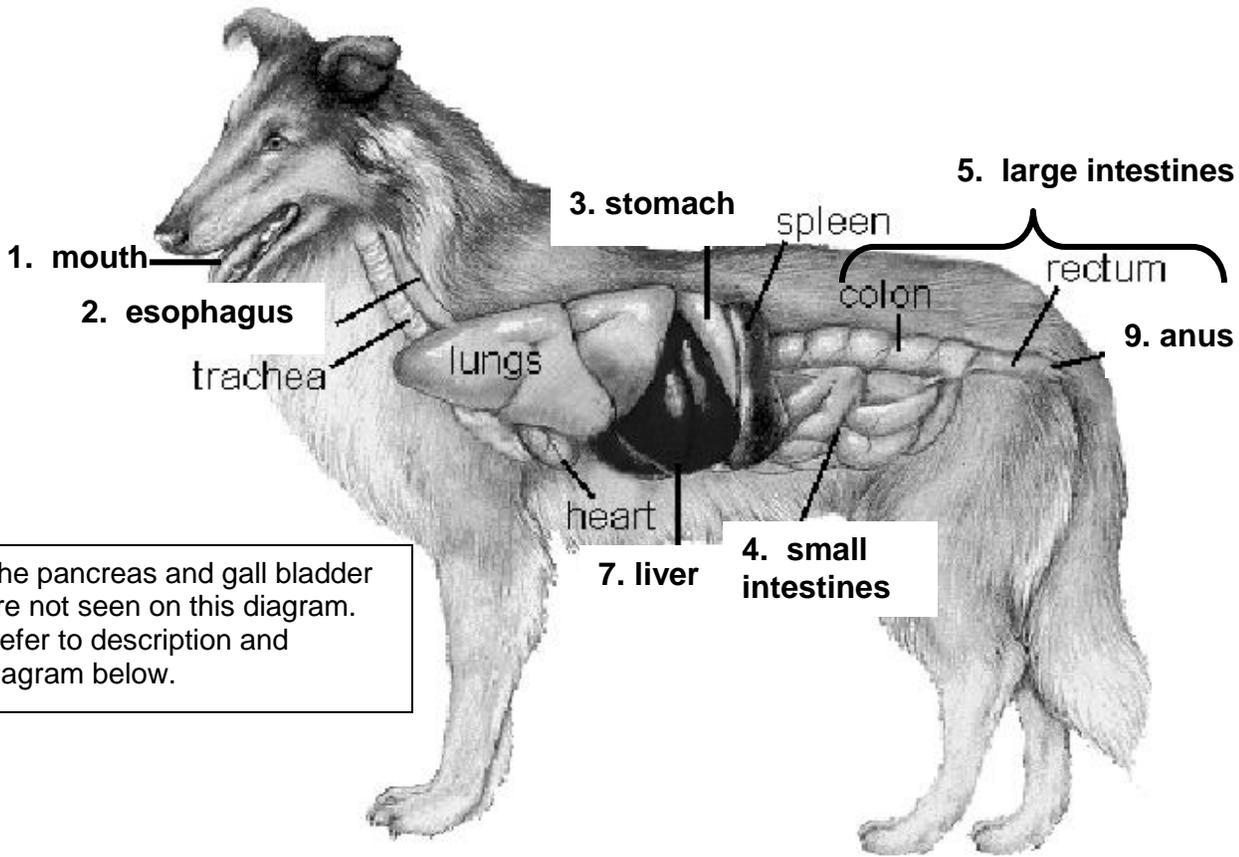
Seniors (age 14 and over as of Sept. 1, 2018)

- All Of The Above Plus ...
- Nutritional Disorders
- Digestive Disorders
- Understanding Pet Foods and Dog Food Labels
- Determining the amount to Feed

GOOD LUCK

ANATOMY of the DIGESTIVE

Junior, Intermediate and Senior



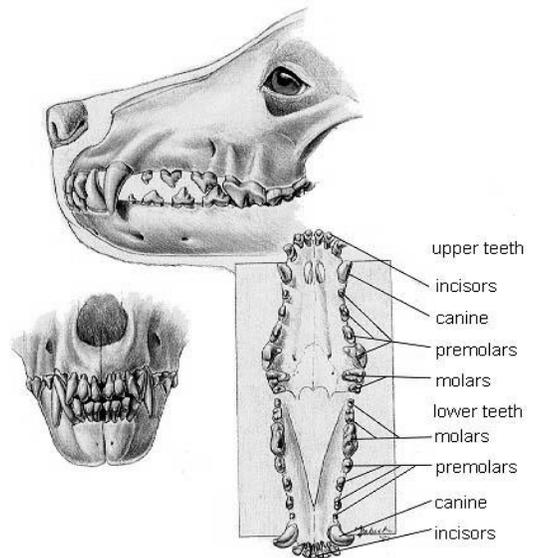
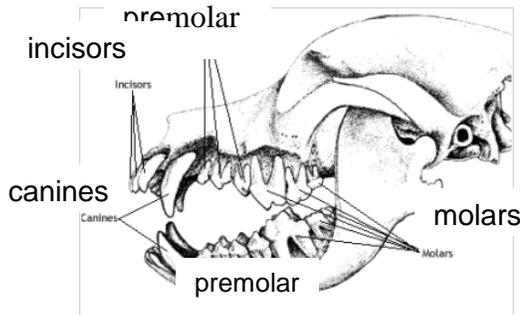
The pancreas and gall bladder are not seen on this diagram. Refer to description and diagram below.

This picture is found at: <http://www.vetmed.wsu.edu>

Junior, Intermediate and Senior

ORGANS of the DIGESTIVE SYSTEM

1. The **mouth** is the opening on the head with two rows of teeth. The tongue and salivary glands are also found in the mouth. Salivary glands are hidden beneath the skin in the

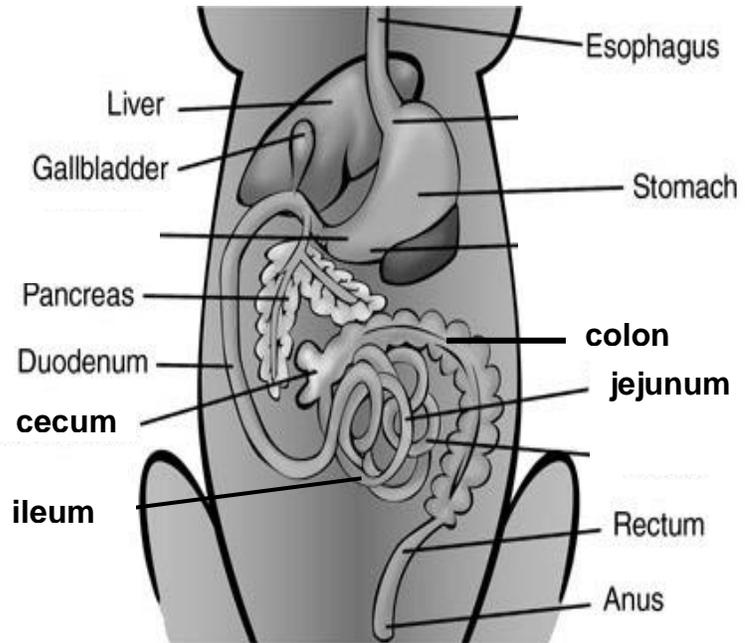


These pictures are found at: <http://nutrition.advancepetfoods.com.au>

- The **esophagus** is the muscular tube between the mouth and stomach. This tube goes between the lungs and connects to the stomach “underneath” the liver.
- The **stomach** is a large pouch-like organ between the esophagus and the small intestines. It is found just behind the liver on the left side of the dog.

- The **small intestine** is a long tube attached to the stomach. It is divided into three sections called the duodenum, jejunum and the ileum. The **duodenum** is the first and shortest section of the small intestines. The **jejunum** is the middle section; it is the longest section. The last section is called the **ileum**.

- The **large intestine** is a short tube. It is wider than the small intestines. This organ is made up of the **cecum**, **colon**, **rectum** and **anal canal**. It then empties through the anus.



This picture is found at: http://www.kingdomofpets.com/dog_health/

- The **pancreas** is a gland with two parts called lobes. One lobe is found next to the stomach and the second lobe is next to the first part of the duodenum of the small intestines.
- The largest gland of the digestive system is the **liver**. It has several parts called lobes. It is found on the right side of the body just above the stomach.
- The **gall bladder** is a small pear shaped pouch found under the liver.
- The **anus** is the opening at the end of the large intestines.

Junior, Intermediate and Senior

FUNCTIONS of the DIGESTIVE ORGANS

The purpose of the digestive system is to break down the food that dogs eat into smaller pieces that can be absorbed (taken into) the body and used. These nutrients include carbohydrates, proteins, fats, minerals, vitamins and water. Different parts of the digestive system have different jobs. Some make “juices” called enzymes to help break down the nutrients into smaller pieces. This is called chemical digestion. Some help mix the food with those enzymes. This is called mechanical digestion.

Below is listed each of the parts of the digestive system and their role in the digestion of foods that you need to know.

1. The **mouth** has **lips** that helps keep food in the mouth. **Salivary glands** make a watery juice called saliva. Saliva is made of water and enzymes that breakdown sugars and helps make foods softer to swallow. The **tongue** helps mix the food with saliva and pushes the food to the back of the throat to swallow.
2. The **esophagus** is a hollow tube with muscles. The muscles help move the soft food from the mouth to the stomach.
3. The **stomach** is a holding tank where food is mixed with the stomach juices called enzymes. These enzymes break the food in to smaller pieces. After the stomach has broken down the food further, it is called chyme. The chyme moves to the small intestines.
4. In the **small intestine** more enzymes are added to break down the chyme into smaller particles. These smaller particles can be absorbed into the body. As the chyme moves through the small intestines most of the nutrients are absorbed. Next, the chyme moves into the large intestines.
5. The chyme is full of water in the **large intestine**. The water is absorbed in the large intestines. Many salts are absorbed with the water. There are many good bacteria found in the large intestines. These bacteria break down fiber and help keep the dog healthy.
6. The **pancreas** is a gland that makes enzymes that help break down fats and sugars. An important enzyme called insulin controls how much sugar is in the blood.
7. The **liver** is a very large gland that makes bile. Bile is an important "juice" that helps break fat into small pieces that can be absorbed.
8. The **gall bladder** is a small pouch that holds the extra bile made by the liver until it is needed in the small intestines.
9. The undigested food or poop leaves the body through the opening called the **anus**.

Junior, Intermediate and Senior

CANINE TOXICITY

There are many foods you eat that your dog should not eat. These foods are called poisonous or toxic. If your dog eats some of these foods, they may become very sick. When they become sick they may have any of these symptoms:

- more sleepy (lethargic)
- puke (vomit)
- diarrhea
- stomach ache
- fever
- stagger or stumbling
- heart rate increases or decreases
- bleeding from their stomach or intestines
- seizures
- or other types of unusual behavior

Foods that are known to be toxic include:

- alcohol
- avocados
- broccoli (large amounts)
- chocolate
- cocoa powder
- coffee (or any drink with caffeine)
- grapes
- raisins
- macadamia nuts
- mushrooms
- nutmeg
- onions
- potato peels or green potatoes
- persimmons
- rhubarb leaves

There are many other foods that can cause your dog to feel sick but may not be toxic. For example, raw or cooked bones can cause a cut in the digestive system.

Many houseplants are also toxic and care needs to be taken to keep the dog from eating any part of the plant. Here is a short list of common house and garden plants, please research any specific plants you may have. Common plants include:

- azaleas
- daffodil
- dieffenbachia
- iris
- mistletoe
- poinsettia
- the nuts of several palm tree varieties

Intermediate and Senior

Nutrients

Nutrition is defined as “the process by which organisms take in and utilize food material”. Good nutrition is as important to an animal’s health as exercise and veterinary care. Making sure your dog gets good food requires understanding the nutritional needs of dogs. It is also helpful to understand how to tell if a dog’s diet is a healthy diet.

Nutrients are substances in the diet that support normal body functions. Functions like the heart beating, breathing, walking and running, everything the body does including growing new cells. Some nutrients can be made in the animal’s body. There are called *non-essential nutrients*. *Essential* nutrients must be eaten. Nutrients are classified into six groups: **water, carbohydrates, fats** (also called **lipids**), **proteins, vitamins, and minerals**.

Water is the most essential nutrient; it is involved in almost all body functions. The dog’s body is about 60 % water. That means that in 100 pound dog, there is about 60 pounds of water in all of the cells. Dogs need to have access to water, especially on hot days and during any exercise. Animals receive water from drinking it and from their food. An animal that is not receiving enough water will not eat well and may become dehydrated. If a dog is sick or injured, he may not drink as much water as he needs. The amount of water needed depends on the dog’s size, type of food fed (wet or dry), outside temperature, humidity, and water quality. Dehydration is a major risk to pets, particularly in Florida’s heat. Plenty of fresh water should be available to dogs especially when exercising, traveling, or on hot days.

Since dogs can become dehydrated easily when it is hot and they are exercising, like at a show, it is important to know the signs of dehydration. If you think your dog is dehydrated, it is best to talk with your veterinarian immediately.

Degree of Dehydration	Clinical Signs
< 5%	➤ not clinically obvious
5% to 6%	➤ slight loss of skin elasticity (stretchiness)
6% to 8%	<ul style="list-style-type: none"> ➤ obvious delay in return of tented skin to normal position ➤ slightly prolonged capillary refill time (this is checked by pressing on the pink skin inside the mouth and waiting for the deep pink color to return) ➤ eyes possibly sunken in orbits ➤ possibly sticky or dry mucous membranes (checking the pink skin inside the mouth)
10% to 12%	<ul style="list-style-type: none"> ➤ skin remains tented ➤ very prolonged capillary refill time ➤ eyes sunken in orbits ➤ dry mucous membranes ➤ possibly signs of shock (heart beating fast, cool extremities, rapid and or weak pulse)
12% to 15%	<ul style="list-style-type: none"> ➤ obvious signs of shock ➤ death imminent

Proteins are the building blocks of muscles and chemicals in the body. Proteins are the main building block of the organs and soft structures of the animal body. Water is attached to many of the proteins. The dietary requirement for protein is the highest in young, growing animals. All proteins are composed of smaller building blocks called amino acids. A healthy diet needs to supply all of the necessary amino acids called the essential amino acids. There are twenty that are needed for the body to work correctly. Ten of those the dog's body can make. The other ten amino acids the dog's body can not make and must be eaten.

Carbohydrates are complex sugars formed by plants during photosynthesis. These large molecules can be broken down into a smaller molecule called glucose. Glucose is used as a fast source of energy. Carbohydrates are found in the "cereal" like corn or rice that is put into dog food. Wild dogs do not eat a lot of plant material. The correct balance of carbohydrates is important for a healthy dog.

Fats are also as a source of energy. Fats are important for the absorption of fat soluble vitamins (see below). When broken down into smaller molecules the body can use, fats produce more energy than carbohydrates.

Vitamins are essential for the development of normal tissue and necessary for chemical reactions in the body called metabolic activity. They are needed small amounts. Diseases or syndromes can be cause when vitamins are not eaten in the right amount. Or vitamins can be toxic if given in extremely high amounts. Vitamins are classified as being either fat soluble or water soluble. Fat soluble vitamins such as A, D, E, K must be surrounded by fat molecules to be absorbed in the body. Water soluble, B vitamins and vitamin C, are absorbed when surrounded by water. There are many different types of B vitamins, including thiamine (B₁), riboflavin (B₂), niacin (B₃), pantothenic acid (B₅), pyridoxine (B₆), biotin (B₇), folic acid (B₉) and cobalamine (B₁₂). Folic acid may be made by the bacteria in the gut of the dog, but should also be included in the diet.

Minerals are inorganic, solid, crystalline chemical elements. They are grouped by the amount needed by the body. If the body needs a lot of the mineral they are called macronutrients. Included in the macronutrients are: Calcium (Ca), phosphorus (P), sodium (Na), chlorine (Cl), potassium (K), magnesium (Mg) & sulfur (S). Those minerals needed in smaller amounts are micronutrients. Micro

amounts of chromium (Cr), cobalt (Co), copper (Cu), fluorine (F), iron (Fe), iodine (I), manganese (Mn), nickel (Ni), selenium (Se), silicon (Si), & zinc (Zn) are needed. Calcium makes up nearly 50% of the total body mineral. Although it is mainly found in bone it is also important for contraction of muscles, including the heart muscle. Calcium will not be properly absorbed or used in the body unless there is a sufficient supply of phosphorus. Minerals function in protein synthesis, oxygen transport, and in skeletal formation and maintenance.

Intermediate and Senior

DIGESTIVE PROCESS

HOW A DOG'S DIGESTIVE SYSTEM WORKS

Food is made up of *very large* molecules. These large molecules must be broken down into smaller molecules. The smaller molecules are absorbed and used by the body. Digestion is the process of breaking down and absorption of food. Digestion starts in the mouth and finishes in the large intestines. Food is broken up both mechanically and chemically. Mechanical digestion breaks up the very large pieces of food, such as the teeth tearing meat into smaller pieces. Chemical digestion breaks up the large molecules into smaller molecules. The alimentary canal, a hollow tube, starts at the back of the mouth and goes to the anus. This is also called the alimentary tract or the "gut". Different parts of the gut's tissue looks and functions differently, and can be "divided" into different regions, such as the esophagus, stomach and intestines. The amount of time food spends in the gut depends on the type of food eaten, the dog breed and the age of the dog; it can range from 9 – 24 hours.

In the mouth, food is mechanically broken down with the teeth before it is swallowed. The function of each tooth is dependent on its shape. Pointed teeth, like the incisors or canines, are used for grabbing and holding the food. Teeth with a flatter top, or crown, are designed to crush food like seed and bones. Watch your dog when they chew a toy bone, notice they will hold the toy with their canines and chew with their molars. At the same time the dog is chewing, the salivary glands release saliva. Saliva is a mixture of water, mucous and enzymes that coat the food to make it easier to swallow. Enzymes in saliva help break down carbohydrates. These carbohydrates are further broken down and absorbed in the stomach. The tongue then helps push the food toward the back of the throat. Once in the esophagus, muscles moving in wave-like motion push the food to the cardioesophageal sphincter. This sphincter is between the esophagus and the stomach and allows food to move into the stomach.

Once in the stomach more enzymes and acid are added to help break up the large molecules. The muscles in the stomach help mix the enzymes and acid by churning everything together. When the food has reached the end of the stomach it is a soft liquid. This liquid is full of mucous and partially digested nutrients and it is now called chyme. Chyme moves into the small intestines through a tight muscle called the pyloric sphincter.

The duodenum is the first and shortest area of the small intestines. Here more enzymes and other chemicals are added. These chemicals begin to break up fats, proteins and carbohydrates. Bile from the liver and gall bladder and enzymes from the pancreas are added to the chyme in the duodenum. Chyme continues to move through the small intestines into the jejunum. The jejunum is the largest section of the small intestines. While the chyme moves through the jejunum the enzymes continue to

break up the large molecules. When the molecules are small, they can move through the wall of the intestines into the surrounding blood and lymph vessels. The last section of the small intestines is called the ileum. By the time the chyme is in the ileum almost all of the nutrients have been absorbed. Any undigested material passes into the large intestines through another muscle called the ileocecal sphincter.

In the large intestines 60 – 70% of the water is reabsorbed. Some of the large carbohydrates are called fiber. These carbohydrates are fermented by normal bacteria found in the large intestines. The material that is not digested passes along the large intestines and stored in the rectum of the large intestines until the dog defecates. Finally, the feces passes through the anus.

Brief Summary

1. Food entering the mouth is mechanically broken down and mixed with saliva before the tongue helps move it to the back of the throat.
2. Food moves down the esophagus, passes through the cardioesophageal sphincter to the stomach.
3. In the stomach more enzymes are added to chemically breakdown food and then are mixed with strong muscular action.
4. At the end of the stomach, the food which is now called chyme passes through the pyloric sphincter and into the small intestines.
5. While in the three regions of the small intestines more enzymes are added and mixed to the chyme to break nutrients into smaller molecules; and nutrients are absorbed.
6. Finally water is removed from the chyme in the large intestines as the unusable materials are stored in the rectum as feces. When the dog eliminates, feces is pushed out of the anus.

Intermediate and Senior

CHOOSING A NUTRITIONAL DIET FOR YOUR DOG

Choosing the diet for your dog is getting to be more difficult with all of the choices that are available. There are many different manufacturers of dog food selling everything from moist canned food to dry cereal, fresh diet and even vegetarian diets. And there are many homemade diets that can be made for your dog. So how do you choose the best diet for your dog?

When choosing a food you need to determine what age group your dog falls into: puppy, adult ages 1 – 8 or over 8 years of age, often called a senior dog. Each age group requires different amounts of protein, vitamins, minerals and fats. Puppies need more of everything because they are very active and still growing. Adult dogs need varying amounts of these nutrients depending on their level of activity; “couch potato dogs” need less calories than those that are running and playing in obedience/rally or agility.

Protein level is also very important for all dogs. First, remember that dogs are carnivores and require at 18 - 25% protein; it is usually recommended that most of the protein come from a meat source. The amount of protein needed is dependent on the age and activity level of the individual dog. Look at the label of the dog food and see where the protein is coming from, and if it is a meat source or if it is coming from rice, corn or soy. Puppies need about 28% protein, while active dogs need about 25% protein in their diet. There is still a debate as to what is the best source of protein; whether protein should come from meat or plants material.

Is the food practical for you to feed everyday? Fresh homemade diets can be expensive, time consuming to make every day and must be balanced with vitamins, minerals and vegetables for fiber.

Fresh diets can be purchased from the store, but again, can be expensive as well as bulky to store in the refrigerator. Fresh diets often are overfed, leading to an overweight dog. Labels must be checked for healthy ingredients just like those labels of dry dog food.

Does your dog have any allergies to foods or any other health concerns that require a special diet? Some dogs cannot tolerate some feed, such as corn or soybean, and should not be fed a diet with that feed in it. An ever increasing number of dogs are allergic to different feeds put in the food, from the varieties of meat (beef, chicken, lamb, fish, etc.) to varieties of cereals (corn, soybean, rice, etc.).

Tooth decay is another concern when choosing a diet, unless the teeth are being brushed regularly. Soft diets can lead to tooth decay when care is not taken to brush the teeth. Dry food can help promote tooth and gum health, unless water is added to it. And homemade diets with uncooked bones also promote healthy gums and teeth.

There are many choices to make when determining what diet to feed your dog, and they should change with the age of your dog. Do your research and find the best food for your dog and its age and activity level.

Senior

NUTRITIONAL DISORDERS

Problems with the digestive system or improper nutrition can cause various disorders. In most cases the problem can be resolved by seeking proper medical treatment.

<u>Disorder</u>	<u>Chief Cause</u>
Rickets	Ca, P, or vitamin D deficiency
Anemia	Fe, Cu, vitamin B ₁₂ , or folic acid deficiency
Hypoglycemia	Low blood sugar levels
Anorexia	Lack or loss of appetite
Goiter	Iodine deficiency
Muscular dystrophy	Selenium deficiency
Night blindness	Vitamin A deficiency
Coagulation disorders (blood clotting)	Vitamin K deficiency

DIGESTIVE DISORDERS

WHAT IS CANINE BLOAT?

Canine Bloat (Gastric Dilation or GDV) is a very dangerous risk to the canine digestive system; this is a digestive disorder. Unfortunately cause of this disorder is not always clear. Gastric Dilation, a condition that is fatal in dogs if not treated quickly, causes extreme discomfort, shock, coma and death within 6-12 hours. Always consult your vet as soon as possible to confirm the diagnosis that is characterized by stomach enlargement due to extreme gas and or dilation.

Gastric dilation maybe followed by “volvulus” a twisting rotation of the stomach. This twisting can “pinch” the esophagus and prevent gas in the dog’s stomach from escaping by belching. It may also block the food moving into the small intestines. Dogs can not vomit to get rid of the painful gas and food in the stomach. The food can not move into the intestines. It has also been found that this twisted tissue

squeezes one or more of the major vessels carrying blood to and from the heart. This produces abnormal blood circulation through out the dog's body, which causes shock and death.

Although the actual cause of bloat is unknown several factors are may contribute to bloat, although there are no definite answers.

- Deep chest cavity
- Eating habits
- Exercise
- Stress
- Heredity
- Disposition

Common symptoms of bloat are:

Abdominal swelling after meals	Heavy salivating	Weak pulse with off colored (blue, dark red, white) gums
Dry vomiting	Major anxiety	Whining
Excessive heartbeat	Pacing	
Gagging	Restlessness	
Heavy panting	Shallow breathing	

At first, affected dogs show some of the symptom above and are not interested in food or water. After 30-60 minutes dog begins to appear swollen in its midsection due to accumulation of gas in the stomach. The dog begins to pant heavily, but the breathing becomes shallow. Keep in mind that the gagging and vomiting is always unproductive.

Bloat should always be treated as a medical emergency. Bloat can kill a dog *within hours* after onset. The cause of bloat is not completely understood. It affects 36,000 dogs in the United States each year resulting in about 10,800 deaths (30%). If a dog is showing signs of bloat, contact the veterinarian immediately.

Some helpful suggestions to prevent bloat: Below are some suggestions to decrease the chances of bloat. These suggestions may or may not help detecting or preventing canine bloat, but observation and being canine-connected will help you understand and help your loyal pooch!

- Never feed your dog immediately before or after heavy work out or training session
- Allow 2-3 hours of rest time after feeding your dog
- Do not allow your dog to become overweight
- Watch for odd symptoms, abdominal swelling, dry vomiting, strange gagging, extreme restlessness, etc.
- Feed several small meals throughout the day instead of one large meal
- If you have a nervous dog, feed her/him in quiet relaxed atmosphere
- If you plan on changing your dogs diet, start slowly

What breeds are prone to bloat?

Bloat seems to affect deep-chested, large or extra large dogs between the ages of 4 to 10 years.

Akita	Dachshund	Gordon Setter	Rottweiler
Basset Hound	Doberman Pinscher	Great Pyrenees	Saint Bernard
Bloodhound	German Shepherd	Irish Setter	Standard Poodle
Borzoi	German Shorthaired	Irish Wolfhound	
Boxer	Pointer	Labrador Retriever	
Bouvier De Flanders	Great Dane	Newfoundland	
	Golden Retriever	Old English Sheepdog	

UNDERSTANDING PET FOODS AND DOG FOOD LABELS

Every dog food label must include specific information, which is usually divided into two parts:

1. Principal Display Panel
2. Information Panels

PRINCIPAL DISPLAY PANEL

Principal display panels show basic information, including the following:

1. Brand Name (i.e., Iams, Purina etc.)
2. A statement describing the main type of the food (i.e. chicken rice, beef by products, etc)
3. Class of food (i.e. Growth, maintenance, light, etc.) and Category of dog (puppy, adult, senior, etc.)
4. Weight or quantity of contents (i.e. 5 pounds, 20 pounds, etc.)

INFORMATION PANEL

This panel lists the nutritional content of the food

1. General analysis (shows the “as is” percentages of the food contents)
2. Ingredients list (shows ingredients in descending order by weight)
3. Nutritional adequacy claim (identifies specific life stage for which food is intended and whether animal feeding tests based on AAFCO procedures were used)
4. Feeding instructions (how much food to give your dog).

UNDERSTANDING SOME PET FOOD INGREDIENTS

MEAT AND MEAT BY-PRODUCTS

Meat or Meat based: meat is the clean flesh of slaughtered cattle, swine, sheep or goats.

Meat Meal: rendered meal made from animal tissue.

Meat By-Product: clean parts of slaughtered animals, not including meat. These parts include lungs, kidneys, brain, spleen, liver, bone, blood, stomach, and intestines freed of their contents.

Chicken Liver: organ meat, highly useable protein source containing vitamins A, K, and foliate.

Poultry by Product: clean parts of slaughtered poultry, such as heart, lungs, liver, kidneys, feet abdomen, intestines, and heads.

Poultry by product meal: made up of ground, rendered, and clean parts of slaughtered poultry, such as undeveloped eggs, necks, feet, and intestines.

Dehydrated eggs: whole poultry eggs which are dried

Meat and Bone Meal: Rendered from meat and bone

Whole Fresh eggs: This is the highest rated source of usable protein, and rates above all meats and meat products. Shells are a great source of Calcium Carbonate good for strong healthy teeth.

Beef Tallow: this is very hard white fatty substance which is rock hard and looks like bone

Animal By-Product Meal: Consists of rendered animal tissue which does not fit in any of the other categories.

Animal Digest: a powder or liquid made by taking clean under-composed animal tissue and breaking it down using chemical and or emblematic hydrolysis.

Fish Meal: Clean, dried and ground tissue of undecomposed whole fish or fish cuttings which may or may not have the oil removed.

Salmon: fish meat, an excellent source of protein and fatty acids like Omega-3 and Omega –6

Ingredient Listing

All ingredients used in manufacture of the pet food shall be listed in the ingredient list on the label. The ingredients shall be listed in descending order of predominance by weight. No reference can be given to ingredient quality or grade in the ingredient list. The names of all ingredients must be shown in letters that are the same size, color and type.

If meat and/or meat by-products are used in the pet food and if the animal species are other than cattle, hogs, sheep or goats, then the source must be designated. For example, if the meat is from horses, the label should state "horsemeat" or "horse by-products."

Here is an example of a pet food product Guaranteed Analysis and Ingredient List:

Guaranteed Analysis:

Crude protein not less than 31.5%

Crude fat not less than 8.0%

Crude fiber not more than 4.5%

Moisture 12.0%

Calcium (Ca) not less than 1.2%

Phosphorus (P) not less than 1.0%

Salt (NaCl) not more than 1.5%

Taurine not less than 0.125%

Ingredients: Ground yellow corn, corn gluten meal, soybean meal, poultry by-product meal, animal preserved with BHA, ground wheat, fish meal, meat and bone meal, phosphoric acid, calcium carbonate, dried animal digest, salt, potassium chloride, dried whey, choline chloride, brewers dried yeast, dried skimmed milk, taurine, L-lysine, zinc oxide, ferrous sulfate, niacin, vitamin supplements (A, D-3, E, B-12), calcium pantothenate, citric acid, manganese sulfate, riboflavin supplement, biotin, folic acid, copper sulfate, thiamine mononitrate, pyridoxine hydrochloride, menadione sodium bisulfite complex (source of vitamin K activity), calcium iodate.

Senior

DETERMINING THE AMOUNT TO FEED

The correct amount of nutritionally balanced food is critical to the health of any animal. If a dog gets too many calories without enough exercise they become obese. If a dog does not get enough calories for their level of exercise then they lose weight. Usually a dog without enough calories to maintain a good body mass for an extended period of time also does not get enough of the other necessary nutrients and becomes malnourished.

Prepared diets have an area on the label with the "recommended feeding amounts" to help determine the necessary amount to feed each dog. That amount is given in a range. For example, a dog with a body weight of 10 – 20 pounds should be feed between $\frac{3}{4}$ to $1\frac{1}{4}$ cups of food daily. It is up to the owner to determine how much each individual dog may need. Even dogs of the same breed may vary in the amount fed due to age, activity level, individual metabolism and health. A younger more active dog may require more food than an older more sedentary dog of the same breed. Or if two dogs are of the same age and activity level, one has a "quicker" metabolism than the other, the first dog may need more food than the second dog to maintain and not loose weight.

When preparing a homemade diet the amount of calories (cal) per day can be calculated to determine how much food should be fed. The amount will vary depending on the content of the food made.

Remember that one gram of protein yields about 4 calories (cal), one gram of fat yields about 9 calories and one gram of carbohydrates yields about 4 calories; the other nutrients (vitamins, minerals and water) do not contribute to the calories. Metabolizable Energy (ME) from the diet is important to determine how much food will actually be used by the dog. ME is the amount of energy, calculated in calories, which the dog keeps and used with in its body.

The amount of energy required for each dog is dependant on the breed, age, condition, and activity level. General recommendations need to be monitored for each individual dog. Merck Veterinary Manual has the following recommendations for calories needed.

Activity level	Kcal/kg body weight (approximately)
Working adult dog (heavy)	450
Working adult dog (moderate)	65
Inactive dog	50
Lactating females	200
Growing puppy	120

All of the calculations use the metric unit of kilograms; therefore pounds must be converted to kilograms. One kilogram is equal to 2.2 pounds. Therefore a 22 pound dog would weigh 10 kg.

For example: Determine approximately how many kilocalories a 35 pound dog at the fair, which can be considered a moderately working dog, would need to maintain good body condition.

$$35 \text{ lb} \times \frac{1 \text{ kg}}{2.2 \text{ lbs}} \times \frac{65 \text{ Kcal}}{\text{kg}} = 1034.09 \text{ Kcal}$$

An alternative method for calculating:

$$35 \text{ lb} \times \frac{1 \text{ kg}}{2.2 \text{ lbs}} = 15.91 \text{ kg}$$

$$15.91 \text{ kg} \times \frac{65 \text{ Kcal}}{\text{kg}} = 1034.09 \text{ Kcal}$$

Monitoring the dog is essential to keeping the dog healthy. Everyday the dog should be given an unlimited amount of water and just enough food to maintain good body weight. Larger dogs or more active dogs can be fed twice daily. The owner should regularly check the “health” of the coat to ensure the coat is in good condition as well as observe the body weight. Check weekly for the amount of tissue is on the ribs; in most breeds, the ribs should be barely felt when touched lightly.

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